UPPER LAS VEGAS WASH Volume I

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 1
General Documentation

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

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TSDN - Flood Insurance Study

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TSDN - Flood Insurance Study

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Flood Insurance Study

City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
Clark County, Nevada
EMW - 95 - C - 4840

Introduction to Technical Support Data Notebook

The information provided in this Technical Support Data Notebook has been organized into several volumes. Volume 1 includes General Documentation for the study, including contact reports, meeting notes, correspondence, and certification forms. Volume 2 provides backup information regarding the review of the existing flood control structures in the study area, including the North Las Vegas Detention Basin Diversion Dike. During the course of the study, the performance of this existing flood control structure was found to be questionable under 100-year discharge conditions. An independent evaluation of this structure was undertaken by the Clark County Regional Flood Control District, and submitted to FEMA for review near the end of the study period. In order to avoid delay in completion of the study, Northwest Hydraulic Consultants was directed by FEMA to complete the study for two cases - with and without the diversion dike. Volumes 3 and 4 include data regarding the engineering analyses (hydrology and hydraulics) for two study cases. Volume 3 provides engineering analysis data for the 'With Diversion Dike' case, and Volume 4 provides information for the 'Without Diversion Dike' case.

Volumes 5 and 6 provide the FIS Report Data for the 'With Diversion Dike' and 'Without Diversion Dke' cases, respectively.

Volume 7 provides Mapping Information data relevant to both study cases. Work maps for each case are provided separately in Volumes 8 and 9. Additional Miscellaneous Reference materials relevant to both cases are provided in Volume 10.

MEMORANDUM

TO: File

FROM: Joey Howard

DATE: February 5, 1998

SUBJECT: FEMA - Clark Co. Phone conversation with Les Sakumoto

---

During a phone conversation with Les Sakumoto yesterday, we discussed the issues regarding:

- CNLV request for a letter stipulating the impacts if the grouted rock transition to the concrete channel at Lone Mountain Road was not constructed.
- CNLV interest in seeing some credit for Sunrise Development Park Channel Plans.
- CNLV has submitted the diversion dike analysis to CCFCD for review and will be forwarded to NHC following CCFCD's review. NHC anticipates receiving the analysis in two to three weeks.

With regard to the request for the letter, Les and I agreed that a letter was out of scope of the FIS study. Les said that we were not to allow the receipt of approved channel plans and the diversion dike analysis to impede our progress in completing the study. Additionally, NHC should consider the rescission of previous plans in evaluating the time frame of any planned development.

MEMORANDUM

TO: File

FROM: Joey Howard

DATE: February 5, 1998

SUBJECT: FEMA - Clark Co. Phone Conversation with Lenny Badger

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Lenny Badger contacted me yesterday to inform me that the diversion dike analysis would be forwarded to NHC following CCFCD review, which is anticipated to take two to three weeks.

Secondly, the CNLV would like to get some credit for future channel improvements to the channel shown in the rescinded Sunrise Development Park Plans. I said that I would review the FEMA guidelines regarding proposed development and provide him with FEMA's approach to proposed plans.

Finally, Lenny asked if NHC or FEMA could write a letter stipulating the impacts of not constructing the grouted rock transition to the Lone Mountain Bridge concrete channel. I told him I would have to discuss this with Ed and Les and would get back to him.

RECORD OF TELEPHONE CONVERSATION

DATE: 1/26/98 JOB: 50010

Individual	Organization	Telephone No.
FROM: Joey Howard		
TO: Lenny Badger	CNLV	702-633-1224

SUBJECT: Las Vegas Wash

NOTES: Asked Lenny about the status of the Sunrise memorial Park channel and for a letter stating the city of North Las Vegas will construct the grouted rock transition upstream of Lone Mountain Road.

The original developer for Sunrise went broke Lenny said there are plans for a different proposed channel. He is unsure of when or what type of channel will be constructed. He will get back to me regarding if we should include any channel improvements.

He said he would check on the bond status for Lone Mountain Rd and get back to me regarding grouted rock.

(continued on back)

ACTIONS REQUIRED:

Job # 50010-1 -

Phone Conversation w/ Lance Earl PH 702-362-5118

Kelly Chuma gave Mr Earl my name and suggest he call. He said he has a client interested in purchasing the Sunrise Memorial Park and was interested in finding the properties flood hazards. I told him we were under contract with FEMA and could not provide any information to him directly about the ongoing study Moreover, I told him it was FEMA's policy not to release any information about the study until it had been thoroughly reviewed by FEMA. I said I would have Ed call him back or provide him with someone at FEMA to discuss the matter further.

MEMORANDUM

TO: File

FROM: Joey Howard

DATE: January 30, 1998

SUBJECT: January 29th phone conversation w/Les Sakumoto Re: Clark Co.

On January 29, 1998 Les Sakumoto returned Ed Wallace's phone call regarding the Clark County FIS.

Ed and I had the following concerns:

- As we were reviewing the scenarios for the diversion dike and it's possible failure, we were unsure if the 500 year flood event with diversion dike in place was relevant. In the case of the 100 year flood event, we are uncertain how much water will overtop the dike. However, there is a chance that the dike would remain in place. A high enough flow at a prolonged duration over the top of the dike will likely result in it's failure. During the 500 year event, approximately 6000 cfs would overtop the dike for a prolonged amount of time, this would almost certainly cause the dike to fail. Since failure of the dike during the 500 year flood event is almost certain, should the case were the dike stays in place during the 500 year flood event even be considered a viable scenario? How will these scenarios be considered by FEMA? Will it be reviewed in the context of a levee failure where the worst cases of each scenario will be shown on one map or will two separate maps be made with one superseding the other when the diversion dike issue is resolved?

  Les said we should model both the 100 and 500 year events for both cases - with and without the diversion dike. Les wants to complete a study for both cases, not a single worst case scenario as would be done for a levee failure. Two reports and two sets of work maps are required.

- Since there is not a model for the 500 year Range Wash flood event, the NLVDB pool elevation for the diversion dike failure scenario is not readily available. The Range Wash LOMR by Boyle developed models for the 10, 50, and 100 year flood events. NHC could create a model by synthesizing a 500 year rainfall event and inserting it into the Boyle Range Wash Model, however this would be additional work that was not anticipated.

Les requested that we extrapolate available rainfall data and use it in the model prepared by Boyle to generate a 500 year runoff hydrograph.

- How should NHC proceed with a hydraulic analysis of an area of wash that is being used as a depository for construction waste i.e. concrete manhole bases, concrete junction boxes and the like? This waste is being dumped in a confined area of the wash upstream of a dirt road named Azure Ave. The concrete matter is not likely to be fluvially transported considering the weight and size of material. The dumped material forms a dam, approximately 3' in height, across the wash causing water to back up; creating the potential for the backwater to over top the left bank and flowing across Azure Ave and possibly Losee Rd. It is not clear whether this material is accurately represented in the available topographic data, but appears to be reflected on one set of available maps.

  Ed and I asked if we should obtain additional survey data or use the existing 4' contour mapping (Kenney) and the 2' contour City of North Las Vegas (CNLV) mapping.

  Les said that we should use the best available data, this being the existing 4' contour mapping and the 2' contour CNLV mapping. Les does not believe we should count on the City of North Las Vegas to remove this material.

- Lenny Badger at the CNLV informed me this week that the flood control channel proposed by the Sunrise Park Inc. would not be constructed and that another developer had taken it over. Final plans for the channel probably would not be available for at least three weeks and that they were uncertain that the plans could be constructed with in 1 year of the study submittal date. If we wait for these plans we will delay our scheduled delivery date. We asked Les if we should delay the study so that we could include these plans or finish leave the plans out and finish as quickly as possible.

  Les said it is FEMA's policy to include plans that will be constructed with in 1 year of the study submittal but that it was our decision to include the additional information. However, we should not allow this to delay the study. We agreed not to include the new channel plans.

MEMORANDUM

TO: File

FROM: Joey Howard

DATE: September 11, 1997

SUBJECT: Phone Conversation with Kelly Chuma, City of North Las Vegas

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I called Kelly Chuma today to obtain information pertaining to the community base map for the Clark Co. FIS. Before I could make my request, Ms. Chuma told me this study was "the worst thing to ever happen to the City of North Las Vegas." She asked me why NHC had taken so long to notify the City with our concerns and if we were required to have community coordination to discuss these concerns. I told her that I was not the appropriate person to discuss this matter with, however it was my understanding that we were following the procedure established in the FIS Study Guidelines. In addition, I told her it was my understanding that any technical concerns NHC had were to be presented to FEMA for their review. Upon FEMA's concurrence, these concerns would be shared with the local agencies. I suggested that she discuss her concerns with Ed Wallace or Les Sakumoto. She said that she had repeatedly tried to contact both of them and that they would not return her calls. She added that she had given up trying to contact them in June.

During the conversation, which lasted for approximately 25 minutes, she expressed her dissatisfaction with the Study and those agencies involved in it. At the end of the conversation she gave me Randy Cagels' (North Las Vegas GIS department) name and phone extension, who she felt might be able to assist me with my base map request.

Debra reviewed the phone logs dating from January to the present and found one message from Kelly Chuma on May 14, 1997 at 2:10. Ed and I returned her call about this time, but she was unavailable. We left a message with her receptionist.

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
EMW - 95 - C - 4840

Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 3·25·97

Contact	Organization	Telephone
Kevin Eubanks	CCRFCD	(702) 455-3139

Subject Range Wash LOMR
NLV Detention Basin Diversion Dike

Summary of Contact

Kevin will send copy of additional info on Range Wash sent to Belcher for review. NHC copy and send back

CCRFCD did not submit additional info on NLVDB Diversion Dike - constructed prior to District formation

Best bet - Jim Bell at CNLV, but likely that CNLV also does not have info, may have to be redone

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
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Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 9.12.96

Contact	Organization	Telephone
Ed Mifflin	Baher	(703) 960-8800
Tom Smith	Baher	(703) 960-8800
Les Sakumato	FEMA	(415)923-7183
Joey Howard	nhc	(916) 371-7400

Subject Review of Flood Control Structures

Summary of Contact

- TEC also has questions concerning Range Wash, Upper Interceptor Berm. Concur with nhc's writeup - Aug. 29 memo.
- Upper Berm has been reviewed previously - assume it remains in place for this study
- Range Wash - Baher will request additional info from CCRFCD
- North LV Detention Basin Diversion Dike - not sure if it has been reviewed. Baher will look for more info.

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

To: Will Thomas
Baker Engineers

From: Les Sakumoto

Date: 6 Sept. 1996

Re: Conference Calls on Sept. 12, 1996

Will:

Enclosed are the data for the calls:

EST	PST	Study Contractor	Number	Contact
10am	7am	Nolte	916-263-0292	Jon Walters
1pm	10am	Borcalli	916-564-3300	Lee Frederiksen
3pm	12 noon	Northwest	916-371-7400	Ed Wallace

cc: ***Jon Walters***
Lee Frederiksen

Ed Wallace

Jack Eldridge

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
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Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 3.27.96

Contact	Organization	Telephone
Kevin Eubanks	CCRFCD	702 455·3139

Subject Additional Info Needed

Summary of Contact

Western Tributary - FIS done by Cohen van Leeuw
Doesn't think hydrology was changed
modified slightly for completion of
Kyle Canyon Detention Basin

Infor for NLVDB? - Not sure, Randy Tam no longer at CNLV
Send Kevin a list of info needed.

Kevin has copy of West Range Wash Diversion Dike
design and sedimentation work

Conv. w/ ~~Ken~~ Hansen (303) 290-0303
Portland Cement Assoc.

In place — pour cement, rototil

Plant mix

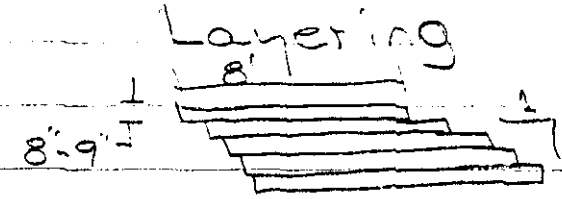
truck dumps

Soil cement placement - Plating

In place - pour cement on flat ground (table it) and rototill it in.

Plant Mix - mix soil w/ cement in a mixer pour soil cement down slope; dozer at bottom spreads it out; Rollers compact it

Layering



applied in 8-9" layers at a width of 8' at slopes of 1:1 Since it is solid block it can be overtopped & undermined without catastrophic failure

Roller Compacted Concrete can be as durable as Concrete

8/28 11:30
Conv. w/
Patti Schwartz

Coachella Valley - Diversion Dikes
Built in the 1940's by the COE to protect farmland from the standard Project Flood.
These structures have not been tested.
~~Residential development~~ Routine Maintenance is required to remove silt and debris.

~~New Condo~~

Flood protection for new development consists of a debris basin at the fan apex with super critical channels downstream.

Diversion Berm Case Studies

Coachella Valley Water District 619-398-2651

Patti Schwartz - Stormwater section
built at base of fan
detain water evacuation channels
Clay Core
8/8 11:00 spoke to her she will get back to me
8/20 said she will send a package should receive something in 1 wk or so

Riverside Co. Flood Control District

909-275-1200
Stewart Mckibbins → Bob Collins designing Struct Tra + FEMA won't buy off
3/8 11:00 left message

Diversion Dam
Mission Creek Dessert Hot Springs @ mouth
Midway Canyon
Cabazon Report - Obtain

3.5' freeboard
Conc. or soil cement lining
8/20 left message on Bob Collins voice mail

Job# 50010-1 - Clark Co. 2/22/96
From: Joey Howard
Note to File:

2-?-96 (15) nhc received hard copies & DWG files of the Upper Las Vegas Interceptor channel/Berm to the Upper Las Vegas Detention Basin

2-20-96 nhc received contact prints from N. Las Vegas Det. Basin to I-15

2-20-96 nhc received 1"=400' halftones for U.L.V. Interceptor Channel/Berm to the Upper Las Vegas Det. Basin

The topo coverage along the interceptor channel extends ~600' to the north, possibly 500' short of the County Boundary. I spoke to both John Cahoon & Gary Finnie on 2/20 and 2/22, respectively. Gary said he would get back w/ me today.

Ed I spoke w/ Ken Hasen at the Portland Cement Assoc. He was involved in the design of the RCC bank protection in the NLVDB diversion berm. According to him the RCC armoring was properly installed and should perform much like concrete and RCC dams do. In his experience he has seen RCC toe downs undermined and stay in place. As long as the supporting material is left the RCC will also stay.

He wasn't familiar with the NLVDB. From my description of the section as a soil cement structure he didn't have the same confidence in the placement. However if the soil cement is installed properly he says it should withstand the freeze/thaw cycle.

I made some minor changes in the summary, however we address most of the issues we discussed with Gerry in the draft Summary.

I need to include the vic. map.

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
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Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 10.24.94

Contact	Organization	Telephone
Phu Simpson	Clark County	(702) 455.4603

Subject Available Info

Summary of Contact

Contact Vicky - Montgomery Engineers
Has aerial photos
Topographic map - done by Colorado firm

Phu has other information to send us - will send when she gets prints from Montgomery

Also getting plans for lined channel upstream Vegas Valley and bridge at Nellis Boulevard

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
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Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 9.22.94

Contact	Organization	Telephone
Kevin Eubanks	CCRFCD	(702) 455-3139

Subject Available information

Summary of Contact

Mtg set for Thurs. 9/29 @ 2:00 pm

Plans for detention basins - get from local entities.

Upper Basin - City of Las Vegas - Randy Fultz

North LV Basin - City of North Las Vegas - Randy Tarr

CCRFCD has O&M manual - Kevin will get a copy for us.

COE - Kevin doesn't think COE had significant involvement in NLV, only on west side of valley.

Contact at CCRFCD for NLVDB is Steve Roberts.

Kevin will get us a copy of the hydrology study.

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
EMW - 95 - C - 4840

Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 9.19.94

Contact	Organization	Telephone
Phu Simpson	Clark County	(702) 455.4603

Subject Available Info

Summary of Contact

Has drainage study for Sloan Channel by G.C. Wallace

also -

- drainage study, development plans, grading plans for development along Las Vegas Wash
- plans for County wetland park - downstream and east of Silver Bowl

Flood Insurance Restudy
Upper Las Vegas Wash
Clark County, NV and Incorporated Areas
EMW - 95 - C - 4840

Contact Report

Telephone Conversation

By: Ed Wallace, Northwest Hydraulic Consultants

Date: 9.19.94

Contact	Organization	Telephone
Randy Fultz	City of Las Vegas	(702) 657-2264

Subject Available Info

Summary of Contact

- Drainage study on Washington Avenue done based on City hydrology information - not signed off yet. Areas < 10 sq. mi.
- Washington Avenue - MEA predesign report done.
  3x8x12 culverts Sand Hill at Las Vegas Wash, just west of Lamb between Lamb and Pecos at lower end of system
- At upper end Spaghetti Bowl, US 95. Segment/Washington Avenue 1000' west of Maryland Parkway - under contract now for design - 2½ miles

Do not have all funds available to build - have appropriated funds for 2 miles.
Schedule for construction - fiscal year 97/98 - could be accelerated
2 mile portion 94/95 - design for entire project
Field survey done to support design
Designed to handle 100-year design flows

AFFIDAVIT OF PUBLICATION

PASTE CLIPPING HERE

ANNOUNCEMENT OF INTENT TO PERFORM FLOOD ELEVATION STUDY

The Federal Emergency Management Agency announced that under authority of the National Flood Insurance Agency of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), it will fund a detailed study of the flood hazard areas in Clark County. The study will be performed for the Federal Emergency Management Agency by Northwest Hydraulic Consultants. The purpose of this study is to examine and evaluate the flood hazard areas in the community that are developed or are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by the community to carry out the floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining the appropriate flood insurance premium rates for buildings for their contents.

This announcement is intended to notify all interested persons of the commencement of this study so that they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Federal Emergency Management Agency for consideration in the course of this study. Such information should be furnished to Mr. Kevin Eubanks, Clark County Regional Flood Control District, (702) 455-3139, the Chief Executive Officer of the community, for forwarding to Northwest Hydraulic Consultants.

PUB: December 28, 1995
Las Vegas Sun

STATE OF NEVADA)
COUNTY OF CLARK) SS:

BARBARA CARR, being first duly sworn, deposes and says:

That she/he is a legal clerk for the LAS VEGAS REVIEW-JOURNAL and THE LAS VEGAS SUN, daily newspapers regularly issued, published and circulated in the City of Las Vegas, County of Clark, State of Nevada, and that the advertisement, a true copy of which is attached, was continuously published in the LAS VEGAS REVIEW-JOURNAL or THE LAS VEGAS SUN for a period of ONE insertions from the period of DECEMBER 28, 1995 to DECEMBER 28, 1995, on the following days:

DECEMBER 28, 1995

Signed: Barbara Carr

Subscribed and sworn to before me this 29th day of December, 1995

Linda M. Gough
Notary Public

LINDA M. GOUGH
Notary Public - Nevada
Clark County
My appt. exp. May 14, 1996

RJ-132A

Rev. 5/94

3.19.98 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Les Sakumoto, FEMA
Joey Howard, nhc
Ed Wallace , nhc

Don't need to submit mylars of work maps as Guidelines state with draft FIS - digital files are adequate. Submit hard copy on bond.

Report from Montgomery Watson/CCRFCD - provide general comments concerning approach, technical backup with submittal of draft FIS - finish both cases (with and without diversion dike at NLVDB, and submit.

NHC plans to have draft complete April 7. Les would like to see work maps before they are submitted.

Areas with less than 1 foot of flooding in 100 year event - will fall within shaded x zone, therefore just show shaded x, not necessary to show a zone break for areas that could get wet in 100 -year event.

Show shaded ZONE X only, not necessary to show unshaded ZONE X - will be put in by TEC based on current maps.

Shading for ZONE X - nhc will use a shading (hatch) in AutoCAD.

Line type between AO/AE zones? Need to check with TEC

Les will schedule a conference call with TEC -

1) Line type between AE/AO

2) X Zone - confirm that 100 - year shallow flow zone boudary/subboundary will not be shown.

Perneill Buch-Pedersens's group will review at TEC

NHC is to prepare 2 reports and two sets of work maps - one for each case (with/ without NLDVB diversion dike)

NHC has incurred substantial additional cost in coordinating with FEMA regarding the diversion dike, analyzing two cases, producing two sets of maps, producing two reports and TSDN's. Need to decide on best approach for dealing with increased cost. Ed Wallace to call Les next week to discuss.

12.11.97 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Les Sakumoto, FEMA
Joey Howard, nhc
Ed Wallace , nhc

Limit of Study - upper Las Vegas Wash nhc hasn't studied anything north of channel - no floodplain determined for numerous small tributaries/incised channels.

Les - hold study to mainstem - show northern boundary of channel as limit of study

North Las Vegas Basin - need to map elevation of pool for case without diversion dike - will require considering hydrograph from West Range Wash. No available hydrograph. NHC will need to generate 500-year hydrograph to determine maximum pool elevations that would result from West Range Wash flows.

Panelization — ok to use sheets as provided by Kenney Aerial for work map base sheets, do not need to re-panelize to match existing maps.

Next project - DFIRM - panelize according to quad sheets

Zone A at Craig Rd - prefer not to have Zone A's use AO zones for shallow overbank flooding.

Put BFE's in constructed channel (e.g., King Charles). Guidelines say to use spercritical profile in constructed channels - critical depth elsewhere. Les will check and confirm.

At Western Tributary - profile by Ensign & Buckley is subcritical; extend upstream to meet computed water surface elevations

Check on flow downstream of I-15 on Las Vegas Wash for without diversion dike case -

this flow could affect other study areas downstream.

Pick worst case for 500 yr Q downstream of Craig Rd in channel.

Draw limit of study line at I-15 freeway.

100 - yr without below Craig Rd results in overbank flow, ponding next to freeway, railroad

NHC has checked sensitivity of results to n-values.
Mike Grimm - regional coordinator pilot project - plot erosion potential
PO Region 9 at TEC

MEMORANDUM

TO: FILE

FROM: Joey Howard

DATE: December 12, 1997

SUBJECT: Meeting notes from 12/11/97

Meeting Date: December 11, 1997
Attendees: Les Sakumoto, FEMA
Ed Wallace, NHC
Joey Howard, NHC

Subject: Clark and Washoe County FIS restudies

Clark County

Ed and I showed Les our work maps and profiles for Clark County. The maps and profiles extend from the Upper Las Vegas Wash Diversion Berm/Channel to Interstate 15. The diversion weir at the North Las Vegas Wash down to I-15 were mapped using two scenarios: diversion structure diverting the entire flow from the 10-100 year events into the basin, referred to as the "with diversion" case, and total failure of the diversion structure for the 100 and 500 year events, referred to as the "without diversion" case.

The following are Les's comments:

1. Upstream of the North Las Vegas Detention Basin, use the northern channel boundary as the northern limit of study.
2. Increase the contour line weights for the final work maps.
3. Modify the without diversion scenario to account for flows that would enter the basin prior to failure of the diversion weir. Compute a volume split to calculate a pool elevation in the basin. Compare this pool elevation with the pool elevation resulting from a 100 year event on the Range Wash.
4. Show all areas of shallow flooding that are hydraulically disconnected from the main channel as AO Zones computing a depth and velocity. If a break out flow cannot be directly modeled, make an estimate of the breakout discharge and use normal depth to compute an average depth and velocity.
5. Les will check to verify if critical depth or supercritical depth should be shown on the maps and plotted in profile for the King Charles Diversion Channel.

6. Compute flows that would remain in the channel for 10 through 500 year events at downstream end of project reach.
7. Obtain 10 and 50 yr flows for the Western Tributary from the CCFCD and use normal depth to plot backwater profile for the profile plots.
8. The 500 yr flow will break out above the King Charles Channel. Use the discharge estimated to remain in the channel and plot the 500 year profile on the channel alignment.
9. Use I-15 as the limit of study on the downstream end of the study reach.
10. Document scenarios for the breakout flows at Craig Rd. and the probable flow paths. Use AO and AH zones to map.
11. Mike Grimm has replaced Karl Mohr as the Tech Coordinator for FEMA, Region 9.

Washoe County

Les concurred with Ed's thought that we should take another try at writing down our concerns that the regional regression equations are not representative of the area and that another method should be used to develop peak discharges. We told Les that we are going to revise the gage analysis to include the 1997 event at the revised discharge of 2600cfs, change one of the other indirect measurements to a historic peak and the other to an outlier. This would be consistent with Will Thomas' suggestions for analysis of the Galena Creek streamflow record.

Regarding the mapping of Galena Creek, downstream of Joy Lake Road should be mapped as an AO Zone instead of an AE Zone as previously proposed. This would be done to account for channel avulsion that was evident in the 1997 and past events.

3.27.97 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
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Les Sakumoto, FEMA
Joey Howard, nhc
Ed Wallace , nhc

Changes at TEC
Neil Gruber - TEC Study Coordinator for all studies
Perneille Busch - Pederson (Reviewers)

Clark County
North Las Vegas Detention Basin Diversion Dike
Hydrology - Interbasin storm produces highest peak flows into basin. Make sure TEC, CCRFCD agree. With Interbasin Storm, computed water surface elevation is at top of dike. NHC will write a letter to Les describing questions regarding NLVDB Diversion Dike that Les can use to discuss problem and request additional information from CCRFCD.

If structure has not been reviewed by TEC, go ahead as far as possible with studies May need an SPR.

Clark and Washoe Counties Flood Insurance Restudies
Status Meeting August 13, 1996

1. Clark County
    A. Hydrology
        1. Status
        2. Previous HEC-1 modeling
            - minor modifications to outlet for NLV Detention Basin
            - used Interbasin storm for channel between detention basins
            - used precipitation to estimate 500-year outflow from NLV detention basin - increases 500-year Q
    B. Hydraulics
        1. Status
        2. Model/Mapping for 100-year
            - Study limits
            - NLV response to letter
        3. Model/Mapping for other events
            - SWSE
            - additional topo for 500-year event
        4. Diversion Structures
            - Upper Las Vegas Interception Berm
            - West Range Wash Diversion Dike

2. Washoe County
        1. Status
        2. Response from Baker?

3. Schedule for Study Completion

8.13.96 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties

nhc 50010

EMW - 95 - C - 4840

Les Sakumoto, FEMA

Joey Howard, nhc

Ed Wallace , nhc

Sept. 12 - conference call scheduled with TEC to discuss Washoe County Hydrology, Clark County Flood Control Structures

Draft Hydrology for Clark County - submit to Tom Smith at Baker - short summary that we confirm basic hydrology in use by CCRFCD

North Side of ULVW channel don't need to go outside of main channel with AE - use Zone A.

Starting water surface elevations - use slope area.

Use quads for 500 year if necessary. Check against Kenney topo.

Be conservative on 'N' Values in lower wash - debris and low depth? NHC will test sensitivity to 'n' s.

Dikes in Clark County - nhc has concerns regarding performance. NHC to submit writeup on concerns to TEC - discuss on Sept. 12.

Send to Les prior to call - aerial photos, area map, plans, typical sections, short writeup on evaluation of structures.

Check on LOMR's based on similar structures.

4.24.96 Meeting Notes

Outlet Modifications at North Las Vegas Detention Basin - not in existing model

evaluate impacts, write a letter to community asking what they want to do

Developers in NLV - construction of Sunset Memorial Channel uncertain.
Need to considr what will be in place 1 yr from study date.

May need to get Kevin Eubanks at CCRFCD involved to determine appropriate assumptions

Debris - potential plugging problem with bridges downstream - need to tell City what problem is, potential impacts on study. Debris could close off bridge openings.

If results of study change discharges downstream, tell TEC that profile differences cannot be resolved.

At tributaries, go 100-200' upstream and blend in elevations.

Les - if extra coordination in Clark County results in extra costs - let him know. Will try to find $ to reimburse.

4.18.96 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Kevin Eubanks, CCRFCD
Joey Howard, nhc
Ed Wallace , nhc

Available info

Jim Ball - CNLV reference

Lone Mountain Rd. Bridge - no records at District, check w/CNLV

NLV Detention Basin - Design Report - No record at District

Range Wash - As Built drawing & sedimentation analyses -Kevin has copies.

Diversion Dike -

Return to Kevin -

Submitted to FEMA February 96

Diversion Dike @ North LV Basin - no records at District - built in 1983; pre CCRFCD

Upper Las Vegas Wash Detention Basin

Black & Veatch - CLOMR for Upper basin -

refers to sedimentation analyses

Compaction of the embankment? Ask FEMA about certification

Steve Conney - Black & Veatch -

works somewhere else now - 732-0448 local number

In Massachusetts now?

Karl Mohr & Ed Mifflin have seen West Range Wash Diversion Dike and Upper Basin Interception Berm

Steve Roberts at CCRFCD worked on North LV or Upper Basin when he was with a private consultant - Kevin will ask if he knows odf additional sources of information

later meeting with Steve Roberts, same date - no additional info

4.18.96 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties

nhc 50010

EMW - 95 - C - 4840

Kelly Chuma, CNLV

Joey Howard, nhc

Ed Wallace , nhc

CNLV has plans on microfiche, originals in storage

Kelly took over for Randy Tarr

Sunset Memorial Park

approved interim grading plan

concerned that project might not get completed

interim plan - earth channel, eventually come

back with concrete channel - narrower

Kelly is aware of debris problem

Interested in remapping of flood zone - wants

N-channel area included

thinks design flows are 2800± after construction of facilities upstream -

G.C. Wallace Report

NHC used CNLV microfiche

Found in CNLV Files

King Charles plans

Lone Mountain Bridge Plans

Craig Road Bridge

N - channel

→ Need plans for North Las Vegas Detention Basin

9.28.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Phu Simpson, Clark County
Ed Wallace , nhc

Information Available

Cooper Aerial Photos 3750 So. Valley View, Suite 7 362-4776
1"=400 1994 LVN 89103

County Wetland Park
Aerial photo & topo mapping complete
1"=100', 2' contour

Jon Yeekes
Comprehensive Planning 455-4181

Don't study within park
Park boundaries haven't been defined

Phu will send what they have.

County is building bridges at Nellis and Sahara on Las Vegas Wash

County has drainage studies for 2 bridges

Flamingo Wash - is there a study contractor?

Sloan Channel
County will improve from Charleston to Las Vegas Wash
Study competed
Planned to construct next year
Phu expects plans soon

Phu has grading plans for subdivisions, drainage study
South of Charleston, east of Las Vegas Wash

Flows have changed in Las Vegas Wash due to construction of facilities upstream (13,000 cfs went down to 7100 cfs).

She will call us about park boundary

Stonegate between Las Vegas Wash and high school - have study /LOMR

CCSD - plans, topo?
Munson Channel is channel north of trailer cont
Sanitation District
Kerf Olsen 434-6602
Brett Lane - Surveys

12.8.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties

nhc 50010

EMW - 95 - C - 4840

Steve Roberts, CCRFCD

Kevin Eubanks, CCRFCD

Gale Fraser, CCRFCD

Shelly Cobarr, CCRFCD

Bill Rozeboom, nhc

Ed Wallace , nhc

Reviewed project schedule and status.

NHC needs additional information on Flood Control System. Available information from District, other sources?

Range Wash Post, Buckley, Shuh & Jernigan

Las Vegas Contact- Virginia Valentine

PBS&J is working on response to FEMA concerns regarding West Range Wash Dike.

Black & Veatch

Upper Basin - site information from predesign report

outlet design slightly different than shown

Should have As Builts for Upper Basin

All flood insurance study work done by Corps to 1991

Special Flood Hazard Study

July 1988 COE - laid groundwork

1991 MPU - Montgomery FIS Report

Montgomery HEC-1 model does not have the ULVW detention basin in it.

Range Wash - Boyle Engineering did design.

1991 HEC-1 Model used as the base.

Designed in 1992
West Range Wash Constructed July 1993 - May 1994

ULVW detention basin

Designed May 91

Constructed Apr 92 - July 93

Precipitation Analysis

1984-1985 Black & Veatch

Regional analysis of precip on west side of valley

then

Corps looked at historical records, precip & discharge. Believed NOAA estimates to be low.

Corps - Recon - entire Las Vegas Valley

Hydrologic documentation - Corps for LVW and tributaries

also

Corps 1991 - Feasibility Study Tropicana/Flamingo Wash

documentation

6 hr storm recommended by COE

Black & Veatch had used 3 hr storm

District Adopted 6 hr storm

District SCS lag time & Curve Numbers - matched Corps

April 1988 Hydrologic Documentation for Feasibility Study

Factor of 1.43 - how District Manual relates to NOAA Atlas

District doesn't agree with NOAA Atlas Revisions - numbers are too low

Other contacts -

Dr. James - State Climatologist

Carson City

Dr. French - DRI

Sediment

Boyle Engineering West Range Wash - Used HEC-6; ran a number of different scenarios -

Black & Veatch did sediment analysis on Upper Las Vegas Wash Interception Berm

9.28.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Randy Tarr, City of North Las Vegas
Ed Wallace , nhc

Flood Insurance Restudies - current studies
contact
Kevin Eubanks, CCRFCD

Randy has copies of plans for North Las Vegas Detention Basin. Keep plans, make copies of reports and return to Randy

Boyle designed Range Wash Diversion Dike
Randy can get plans,

I-15 to Charleston Las Vegas Wash - Ensign & Buckley
NLV has some topo - Randy will provide [Montgomery (1981)]

Black & Veatch has also worked on flood control structures

County may have additional info - ask Phu Simpson

Randy will get copy of Range Wash plans

West of golf course - proposed mortuary
conceptual - size of bridge crossing
would like to include

Lone Mountain Bridge - Randy will get plans
Craig Rd? built by state? Randy will look, see if CNLV has plans

CLOMR
King Charles - processed by Montgomery
Randy will get - never completed

Randy is interested in removing area along Losee Road from Zone A

MEA - Barbara Brown 798-1007
Sunset Road near Airport
contact Lornell Gubler

Ask City of Las Vegas about study of NW area

Kyle Canyon Detention Basin under construction now

John Bell Report - *Subsidence*
UNR School of Mines
81/82 - follow-up 91/92 -

Survey - Datums

contact City Surveyor - LV
Rita Lumos
CNLV could help with surveys?
CNLV may have a mixed set of Bench Marks - NGVD, NAVD, *etc*

Clark County - lead agency for GIS and survey

GIS will also include elevations at 1/4 corners

9.28.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Randy Fultz, City of Las Vegas
Ed Wallace , nhc

Additional Information

Lornell Gubler - MEA Sunset
798-1007
To Leona - existing facilities
$5.4 million Leona to Eastern
1 year to construction

10 year plan - worst case scenario

MEA design up to Sagman

Will have a request in to get money to build improvements up to Sagman ahead of time

NDOT will start work on the Spaghetti Bowl in 1997

City wide hydrology study - Montgomery Watson
would be completed by Jan/February
Hydrology - MEA the same as Montgomery Watson

Montgomery made modifications to Master Plan model

Check on funding improvements to Sagman

9.28.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Kevin Eubanks, Clark County Regional Flood Control District
Ed Wallace , nhc

Washington Area -
key - how much flow is left on the surface at
confluence of Las Vegas Wash & Washington Ave
- warrant a flood zone?

Las Vegas Creek is Washington Avenue

CVL did study south of Las Vegas Wash

Interception berm at upper basin - designed for sediment load

ill NHC need to submit design information for basins? -
FEMA said yes, but really necessary?
Have already accepted flows for facilities
downstream (LOMR, LMMP, etc.)

9.27.95 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties

nhc 50010

EMW - 95 - C - 4840

John Cahoon, Kenney Aerial Surveys

Dave Hough, CRS

Ed Wallace , nhc

4290 S. Maryland Pkwy 9:30

1. Project Scope
2. Mapping Limit / Technical Specs
3. Approach
4. Schedule

Subsidence is an issue - Dave ties to monuments outside subsidence area - 4 monuments

Cheyenne/Tonopah Highway - several feet of subsidence

15 feet at Meadow Mall

water table - 300' drop

hydrocompaction of fines

Horizontal NAD 83

Dave will reoccupy points form CNLV control

ERM's - some can be flight control

can be established by GPS

Copies of Guidelines for Study Contractors given to Kenney and CRS

Scope

1. Mapping
2. Draw Thalweg, identify XS locations
3. XS digitally
4. Field XS

   Spot elevations within 0.6'

9.7.94 Meeting Notes

FEMA Flood Insurance Studies - Clark and Washoe Counties
nhc 50010
EMW - 95 - C - 4840

Clark County Community Meeting

Leslie K. Sakumoto, P.E. - FEMA Project Officer
Randy Tarr - City of North Las Vegas
Kevin Eubanks - Clark County Regional Flood Control District
Tom Chiatovich - City of Las Vegas
Bob Murnane - City of North Las Vegas
Phu Simpson - Clark County
Bob MacArthur, Northwest Hydraulic Consultants
Ed Wallace, Northwest Hydraulic Consultants

Sources of Information
Aerials, Mapping

Rupp Aerial Photography
Bill MacDonald 252-4771
93/94 color mural
4340 S. Valley View, #202
aerial photography
mobile 595-1169
has them in car $5/ea

Maps - Landsicor Las Vegas 1993 Topo, zoning

FEMA
Study area -
Las Vegas Wash
Freeway to Detention Basins
Les may add two options

CCFCD - funded by 1/4¢ sales tax
has master plan, reviews land development concurrent
approval with individual cities/counties
Individual entities build flood control facilities

Randy Tarr
North Las Vegas - Regional plans submitted to district for concurrence
has drainage studies on file -
come to NLV office to review, get copies

City of Las Vegas - Tom Chiatovich - roles about the same as NLV
small city impact

Clark County - Phu Simpson
reviews hydrology studies submitted by developers, on-file drainage studies

Master plan
interlocal contracts to implement master plan facilities
local agencies construct

NLV - has taken lead on some City of Las Vegas projects based
on hydrographic province
Programs - flood insurance restudies
NPDES

Uniform regulations
Hydrologic criteria/drainage design manual
1990 - drainage manual
working with COE
reviewing drainage studies/precipitation analysis with regional significance
funding shared with Washoe County
coordinated effort to complete studies

Recent FEMA studies
Duck Creek - Highway to Robindale
Blue Diamond - Alluvial fan

Nimbus Engineers is studying now -

Robindale to Confluence with Las Vegas Wash
Charleston to Freeway Las Vegas Wash
connects to study reach
Study area goes through all three jurisdictions
Need to update FIRM using discharges based on all flood control structures in place

Hydrology - Montgomery -
Hydraulics -
topography - none
prepare base maps
BFE / Floodway
10-11 miles
detention basins are constructed

LOMR - Stonegate

Review:

Annual Report
Drainage Design Manual
Hydrology by Montgomery
prepare list of discharges
O&M manuals
Rating Curves / Storage Capacity

Diversion Dike-

Designed by Boyle
unlined feature

FEMA buy off
Ensign & Buckley - doing LOMR downstream

CCRFCD - will start producing documents for review
our study - responsible for all hydraulic structures
above freeway -
reasonable curves
O & M manual

Detention structures - topo
Topo mapping

BFE only above first detention basin?

Subsidence Monumentation - at sites
DRI trying to get funding for studies

NAVD 88
NGVD 29 - initial set of maps is on 29,
give conversions to 88

City of Las Vegas Surveyor 229-6217 Rita Lumos - converted 29 to 88
nonuniform conversion - valley wide subsidence
City Surveyor

CCRFCD needs to check what datum they are using-

subsidence not likely to be a problem in our study area

Brett Lane County Surveyor

Restudy - should be based on NGVD 29
Conversion non-uniform

Aerial topo mapping width?

Gale Fraser thinks 1/4 mile wide strip from NLV basin down
CCRFCD doing studies
NW area
does not include LV Wash
Cohen van Leuw - ready to submit

CH2M Hill - Tropicana Wash complete to Flamingo Wash

Nimbus - Pitman Wash
CLOMR for Red Rock Detention Basin
LOMA, LOMR stuff important
King Charles - CLOMR submitted
Contact Baker for all LOMA/LOMR
Start from D Firms? Change effective maps?
No - Start new

Landsicor Aerial Photo of Nevada
876-9290

Washington Avenue confluence with Las Vegas Wash
Ensign & Buckley, MEA

Washington Avenue near Charleston

Option 1 - cost
- Washington Ave
  - Wash to end of proposed project
  - Flow if breaks out would go east
  - 2500 cfs
  - 1-2 yrs existing condition hydrology
  - get schedule from County
  - If it will be funded and done early, throw out as an option
  - Las Vegas Wash to Las Vegas Blvd

[work with Tom] Possibility - do study based on conditions now and on construction of next piece

Option 2 - Cost
- Las Vegas Wash
  - Charleston to confluence of Pitman / Duck
- most open area
- channelized through Stonegate, then
- proposed wetland park area - in design phase
- topo available in park
- Stonegate area has LOMR - get from Tony Appleby

Three reaches
- Silver Bowl to Charleston
- Washington Ave
- Freeway to detention basins

Access letters - local agencies
- daily coordination with locals
- Provide estimate by Dec. 1

- Ten year plan
- FIS hydrology
- Design Manual
- Master Plan
- Cooper has aerial photos
- Nevada Aerial
- Mercury Blueprint - topo maps

FEDERAL EMERGENCY MANAGEMENT AGENCY
Time & Cost Meeting

Restudy: Clark County, Nv. **Wednesday: 7 Sept. 1994**

1. Name, Position *Leslie K. Sakumoto, P.E. - Civil Engineer - Project Officer*
   Representing *FEMA-MT-Hz, Region IX, Bldg 105, Presidio of San Francisco San Francisco, CA. 94129*
   Telephone No. *(415) 923-7183 (Voice) - (415) 923-7147 (Fax)*

2. Name, Position Edward E Wallace - Principal Engineer
   Representing Northwest Hydraulic Consultants
   Telephone No. (916) 371-7400

3. Name, Position Robert C. MacArthur Principal Engr.
   Representing Northwest Hydraulic Consultants
   Telephone No. (916) 371-7400

4. Name, Position Randy Tarr - Dev. & Flood Control Coor.
   Representing City of North Las Vegas
   Telephone No. (702) ~~657-2265~~ 657-2264

5. Name, Position KEVIN EUBANKS
   Representing CCRFCD
   Telephone No. 702-455-3139

6. Name, Position Tom Chiatovich
   Representing City of Las Vegas
   Telephone No. (702) 229-6276

7. Name, Position Bob McKinnon Administrator, Dev. & Floods
   Representing City of North Las Vegas
   Telephone No. (702) 657-2264

8. Name PHIL SIMPSON.
   Representing City of North Las Vegas
   Telephone No. (702) 455-1620

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west sacramento, california 95691-3430
(916) 371-7475 - fax
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sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 8, 1998

SUBJECT: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

Northwest Hydraulic Consultants' (NHC) analysis of the diversion dike at the North Las Vegas Detention Basin indicates that overflow of the diversion dike would occur during the base flood event. This overflow was computed to occur without considering effects such as sediment deposition, bar and bedform roughness, roll waves, and water surface fluctuations arising from flow transitions from critical and supercritical flow upstream of the diversion dike to subcritical flow at the diversion dike. In NHC's opinion, all of these effects may occur during a major flood event. The stability and resistance to failure of the diversion dike during sustained overtopping events is questionable as well. During the conduct of the flood insurance restudy for Upper Las Vegas Wash, NHC was unable to conclude that the structure met FEMA performance standards during the base flood event. These issues were raised in our letter to FEMA Region IX dated April 28, 1997.

In response to these concerns, a report was prepared by Montgomery Watson (MW) and Chen Engineering Technology (CET) to further evaluate the integrity of the dike during the base flood event. The report was provided to the City of North Las Vegas in February 1998. We have had the opportunity to review the information provided in this report, and still have the concerns expressed in our April 28, 1997 letter. We understand that FEMA and the TEC will review the MW and CET report, and may also review other backup information not presented in the report. NHC offers the following suggestions and special concerns for FEMA and the TEC for use in their review of the diversion dike.

1. If the diversion structure is to perform as a levee, then the structure should meet FEMA's minimum requirements for levee integrity. Central to certifying a levee for providing flood protection, FEMA's requirements state that the structure must have a minimum of 3 feet of freeboard over the computed base-flood water surface elevation. Both NHC's and MW's analysis of water surface elevations through the diversion

structure reach indicate that the freeboard requirement is not met.

2. Alternatively, if the structure is to perform as a spillway, then the structure must be designed to maintain stability during overtopping. Toe scour protection, energy dissipation, and foundation support during overtopping events are critical for maintaining spillway structure stability. The cutoff wall must be sufficiently deep to protect the spillway from toe scour along the entire length of the spillway. The diversion dike record drawing included as an attachment to the MW report was used to develop the profile elevations of the diversion weir crest, ground elevation of the downstream spillway face, and the footing elevation supporting the spillway face. This information is provided on the attached Figure 1. The figure indicates that the existing channel invert elevation is below the footing elevation for the central portion of the spillway structure. A possible erosion scenario during an overtopping event includes rapid headcutting and lateral migration of existing channels downstream of the spillway face. Since the invert elevation of these channels is below the elevation of the footing in the central portion of the spillway, the lateral migration could undermine the footing in the central portion of the spillway and lead to failure of the structure.

3. Flow curvature and flow state transitions from supercritical or critical flow to subcritical flow through the diversion dike reach greatly complicates the hydraulic analysis and determination of water surface elevation and velocity distribution through the reach. Superelevation effects alone would increase water surface elevations on the order of 1 foot at the transition. Flow instabilities resulting from the transition from super- to subcritical flow and the curvature effects would lead to further water surface instabilities. These instabilities are not computed or accounted for in the 1-dimensional HEC-2 or HEC-RAS modeling procedures. The statement made in the cover letter of the MW report that

   "...the computed 100-year water surface elevation is approximately 2 inches below the top of the armored portion of the diversion structure. In other words, no overtopping occurs."

   should be tempered with an analysis of the uncertainties in computing water surface elevations under the complex conditions that exist at the diversion dike. Within the limits of accuracy of 1-dimensional hydraulic modeling, the MW report thus appears to confirm NHC's results that the structure does not meet FEMA freeboard requirements and that overtopping (given the uncertainties involved) is likely. The analysis presented still fails to account for the very real effects of flow curvature and flow state transition on water surface elevations.

4. In the cross-sections plotted for the HEC-6 and HEC-RAS models presented in the MW report, no discussion of effective conveyance width is presented. Several of the cross-sections are cut through both the main channel section and small tributary arroyo sections. The flow area in the tributary sections would be ineffective in providing conveyance to flow during floods arising from the Upper Las Vegas Wash.

5. The report does not provide adequate information to evaluate several sedimentation issues. HEC-6 is a 1-dimensional model, and must be carefully applied to situations such as this one with complicated hydraulic conditions. HEC-6 is a useful tool for evaluating sediment dynamics. The model can provide insight in identifying channel reaches subject to sediment deposition and erosion, and the feedback of bed profile changes on the flow hydraulics. However, direct application to situations such as this one, with little if any hydraulic and sediment transport calibration and verification data, should be used to address sedimentation and hydraulic response in a more qualitative rather than quantitative sense. HEC-6 is probably useful in this case in identifying uncertainties and testing computational sensitivities, but a single, explicit result from HEC-6 can not be realistically expected. Several specific comments on this application of HEC-6 follow:

   - All of the hydrodynamic issues discussed previously (superelevation, super- to subcritical flow transitions, flow curvature) are applicable to the analysis using HEC-6 for bed profile stability through the reach.

   - No discussion of the development of the inflowing bed and bank material sediment rating curve was provided. Sedimentation study results require an accurate assessment, through field measurement or sensitivity analysis, of the boundary conditions at the inflow to the study reach.

   - The results also indicate substantial deposition through the upper cross sections of the study reach. This may not be reasonable, as this portion of the study reach is flowing at critical or supercritical conditions. Substantial deposition would more likely be expected after the flow transitions to subcritical flow. The HEC-6 results indicate, however, that relatively little sediment deposition occurs through this reach.

   - The study results indicate incision through and downstream of the choke control section of the reach. This reach is lined with soil cement. Soil cement is not immune to erosion, however we question the applicability of the Tofalletti and Meyer-Peter Mueller sediment transport functions for computing scour in soil cement. The conclusions stated that the channel steepens due to sediment

deposition in a supercritical flow section and erosion through a section lined with soil cement should be reconsidered. In addition, if the results are implying that scour of the soil-cement channel is likely during the base flood event, then the stability and performance of the entire diversion channel during the base flood event are questionable.

NHC completed flood hazard mapping for the conditions of (1) the base flood routed through the North Las Vegas Detention Basin and (2) with the failure of the diversion dike during the base flood event. The appropriate condition may be applied after technical review of the performance of the diversion dike. We hope these comments are useful in FEMA's review of the structure.

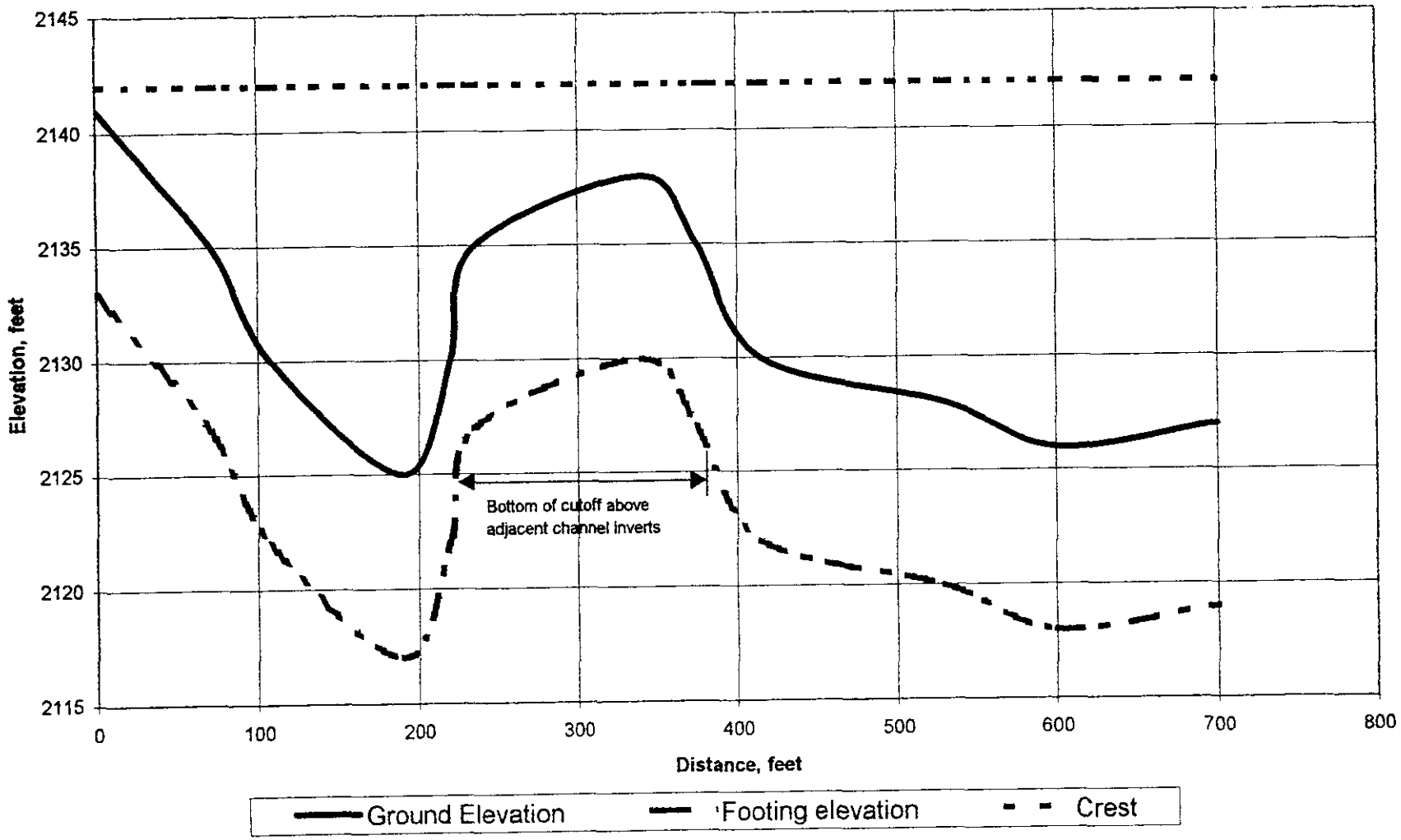
Sincerely,
Northwest Hydraulic Consultants, Inc.

Edward E. Wallace, P.E.
Principal

projects/50010/mwrev.wpd

North Las Vegas Diversion Dike

Figure 1. Profile Comparison of Weir Crest, Ground, and Footing Elevations



Author: les sakumoto <lsaku@mindspring.com> at ~internet
Date: 3/20/98 9:16 AM
Priority: Normal
CC: Joey Howard at MAIL
CC: Edward Wallace at MAIL
TO: michael.grimm@fema.gov at ~internet
TO: NGruber@mbakercorp.com at ~internet
TO: WLace@mbakercorp.com at ~internet
TO: PBUCH-PEDERSEN@mbakercorp.com at ~internet
CC: jon.walters@nolte.com at ~internet
Subject: Upper Las Vegas Wash restudy
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Fri, 20 Mar 1998 09:15:33 PST
Received: from camel8.mindspring.com (camel8.mindspring.com [207.69.200.58])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id VAA14591;
Thu, 19 Mar 1998 21:34:07 -0800 (PST)
Received: from neptune (ip227.sacramento.ca.pub-ip.psi.net [38.11.128.227])
by camel8.mindspring.com (8.8.5/8.8.5) with SMTP id AAA06285;
Fri, 20 Mar 1998 00:34:00 -0500 (EST)
Message-Id: <3.0.3.32.19980319213359.00940c10@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: QUALCOMM Windows Eudora Pro Version 3.0.3 (32)
Date: Thu, 19 Mar 1998 21:33:59 -0800
To: michael.grimm@fema.gov, NGruber@mbakercorp.com, WLace@mbakercorp.com
PBUCH-PEDERSEN@mbakercorp.com
From: les sakumoto <lsaku@mindspring.com>
Subject: Upper Las Vegas Wash restudy
Cc: ewallace@nhc-sac.com, jhoward@nhc-sac.com, jon.walters@nolte.com
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Hello people: 3-18-98

I met with Northwest Hydraulics today. They appear to be on schedule to submit the Upper Las Vegas Wash restudy during the first half of April. Their target date is around April 7, 1998.

Nolte is also trying to get the Lower Las Vegas Wash restudy into the TEC at about the same time. The lower study is from Charleston to Lake Las Vegas. With all these pieces into the TEC we should have covered all of Las Vegas Wash.

Les

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

Gale Wm. Fraser, II, P.E.
General Manager / Chief Engineer

BOARD OF DIRECTORS

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Chairman
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David Wood
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Clark County

March 3, 1998

Les Sakumoto
FEMA Region IX, Bldg. 105
The Presidio
San Francisco, CA 94129

Las Vegas Wash, Change in Flow Rates

Dear Mr Sakumoto:

In response to your letter, dated May 5, 1997, regarding the effectiveness of the North Las Vegas Detention Basin (NLVDB) to reduce downstream flow rates, we have enclosed an analysis of the NLVDB prepared by Montgomery Watson, dated February 1998. This work is submitted as a follow up to the District's letter to you, dated June 26, 1997.

The analysis demonstrates that, after considering hydraulic and sediment impacts, the NLVDB diversion berm will direct the base flood into the NLVDB without overtopping.. It is acknowledged that, as intended, there is negligible freeboard during the diversion of the base flood to the NLVDB. The diversion structure is constructed with a concrete-lined spillway and cutoff wall to pass flows exceeding the base flood without being damaged, thus minimizing the cost of the NLVDB embankment spillway. Please consider that, when weighed against the provisions of 44 CFR 65.10, this is the optimum function of the diversion design.

On behalf of the District and the City of North Las Vegas, we assert that the submitted analysis demonstrates that the diversion structure will function as designed and that the

301 E. Clark Avenue, Suite 301 • Las Vegas, Nevada 89101
(702) 455-3139 • FAX: (702) 455-3870

NLVDB is adequate for reducing the base flow rate and downstream flood hazards without further modification. Accordingly, the NLVDB should be credited as such by FEMA in preparation of the affected Flood Insurance Rate Maps in the vicinity. Should you need further information or have questions, feel free to contact Kevin Eubanks at (702)-455-3139.

Sincerely,

Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District

James A. Bell, P.E.
Deputy Director of Public Works/City Engineer
City of North Las Vegas

CC: Karl Mohr, FEMA, W/Enclosure
Ed Wallace, Northwest Consultants, W/Enclosure
Kelly Chuma, North Las Vegas
Randy Fultz, Las Vegas
Steve Parrish, Clark County

KLE:csm

File: LMMP

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date:	January 27, 1998	Job Number: 50010
From:	Joey Howard	Number of Pages: 4
To:	David L. Hough	Original via:
Company:	Associated Consulting	
Fax Number:	702-647-9265	
Telephone No:	702-647-9265	
Subject:	Las Vegas Wash Survey	

Please call immediately if you do not receive all pages of this transmission.

Remarks:

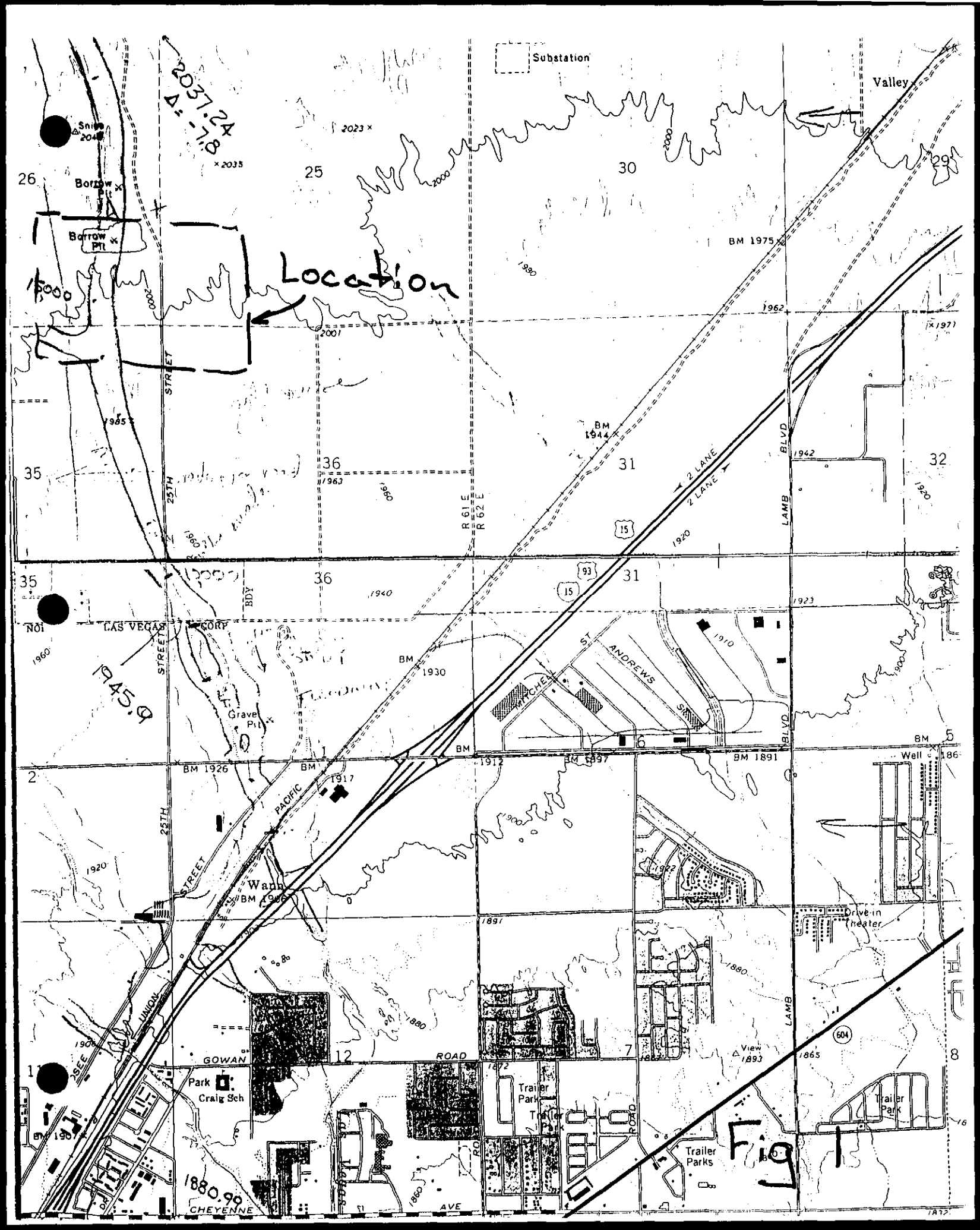
NHC is conducting a flood insurance study on the Las Vegas Wash. There is an area where runoff may overtop the banks of the main wash and enter into a different flowpath, see figures 1, 2, and 3. Arrows on figure 3 show the direction of flow along the wash and the approximate location where a breakout might occur.

To adequately evaluate the potential for overtopping in this area, we need additional spot elevations at the lowest points that contain runoff in the wash (the areas where runoff will overtop first). The approximate locations of these areas are shown on figures 2 and 3.

In the field you will see there is a potential for flow to overtop the banks of the main wash near line 1, the flow appears to cross over a ridge in the approximate location of line 2. There is a depression east of line 2. To the east and south of the depression along the dirt roads, there are potential low points where the runoff could overtop.

Points should be shot along lines 1, 2, 3, and 4 shown on figure 2 picking up the low points and any significant grade breaks along if grade breaks are not appearent take shots at 25' intervals. I estimate the number of points required to be under 150.

Please contact me so that we may discuss the cost, turn around time, and clarify any details regarding the location of the points.


Substation
Valley
Location
Borrow Pit
Borrow Pit
Grave Pit
BM 1975
BM 1944
BM 1930
BM 1926
BM 1917
BM 1912
BM 1897
BM 1891
Well
Drive-in Theater
Trailer Park
Trailer Park
Trailer Park
Trailer Parks
Craig Sch
Park
Wash
GOWAN ROAD
CHEYENNE AVE
LAS VEGAS
PACIFIC
UNION
ANDREWS ST
LAMB BLVD
25TH STREET
2 LANE
2 LANE
R 61 E
R 62 E
1880.99
Fig 1

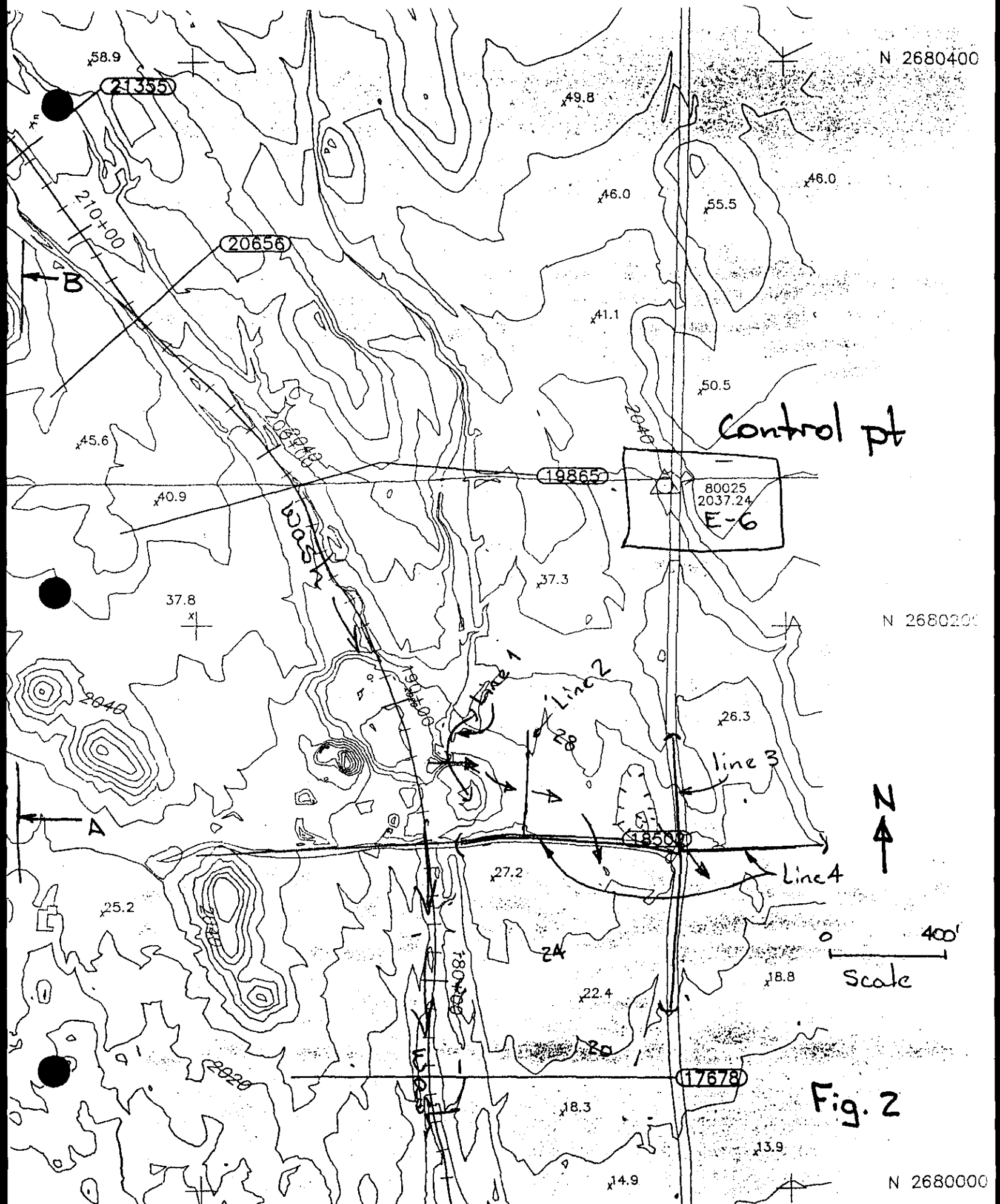

N 2680400
21355
20656
19865
18500
17678
B
A
210+00
208+00
206+00
204+00
202+00
200+00
198+00
196+00
194+00
192+00
190+00
188+00
186+00
184+00
182+00
180+00
58.9
49.8
46.0
46.0
55.5
41.1
50.5
45.6
40.9
37.8
37.3
26.3
27.2
25.2
22.4
18.8
18.3
13.9
14.9
2040
2020
Control pt
80025
2037.24
E-6
Line 1
Line 2
Line 3
Line 4
28
24
20
N
0
400'
Scale
N 2680000

Fig. 2

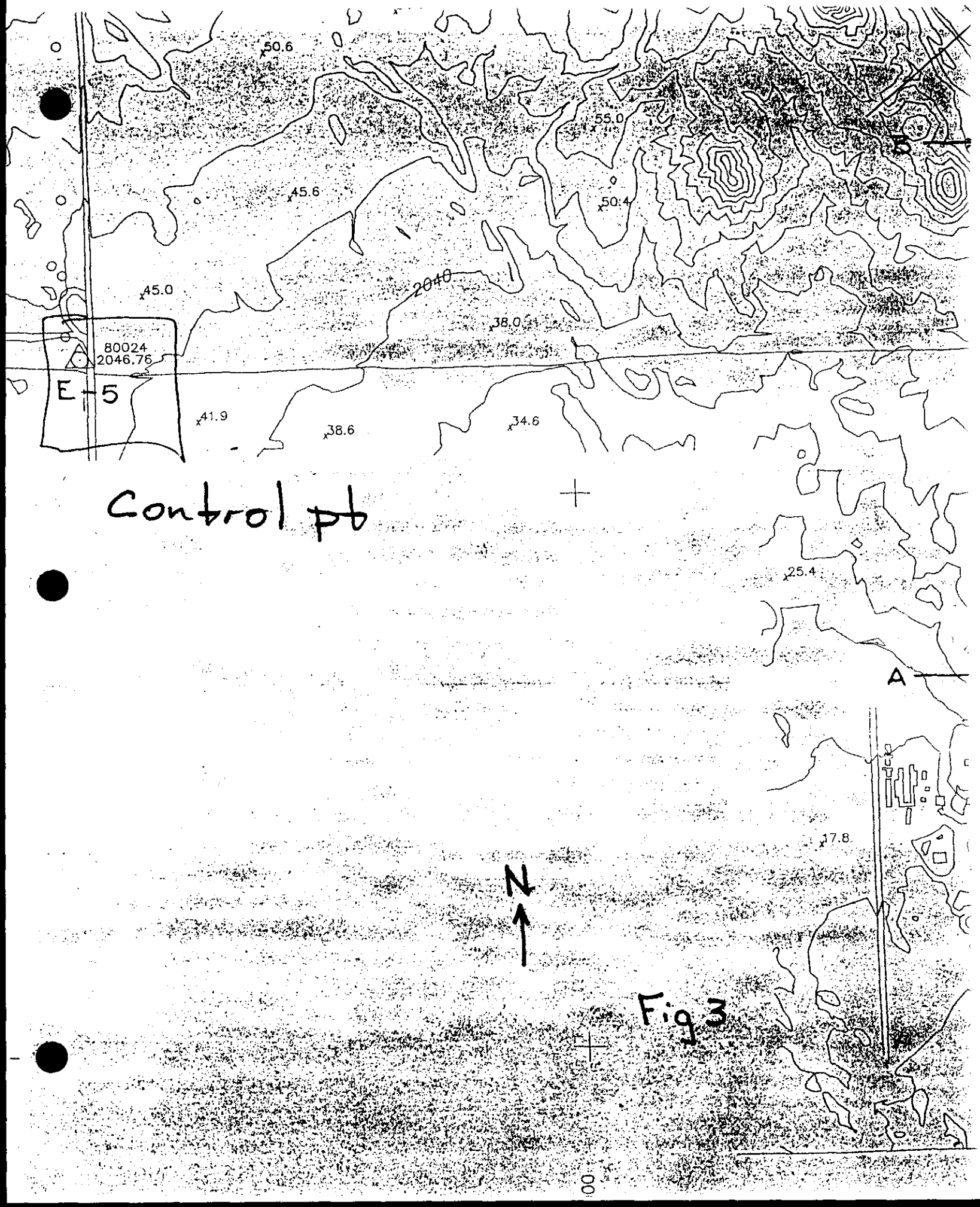

50.6
55.0
B
45.6
50.4
2040
45.0
38.0
80024
2046.76
E-5
41.9
38.6
34.6
Control pt
25.4
A
17.8
N

Fig 3

Mon. Num.	Northing	Easting	NAVD88 Elev.	NGVD29 Elev.
C-2	26,813,133.0675	772,339.5075	Panel 2296.26 Monu. 2296.51	2293.83 2294.08

Description: GRAND TETON/ALLEN FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S7IS8/S18IS17, T19S,R61E, 1990

C-3	26,813,322.8925	777,690.8673	Panel 2258.88 Monu. 2259.28	2256.45 2256.85

Description: GRAND TETON/CLAYTON FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S8IS9/S17IS16, T19S,R60E,1991

C-4	26,813,333.4382	783,079.6540	Panel 2214.04 Monu. 2214.34	2211.61 2211.91

Description: GRAND TETON/REVERE FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S9IS10/S16IS15, T19S,R61E, 1991

C-5	26,813,239.0908	788,446.9337	Panel 2197.28 Monu. 2198.48	2194.85 2196.05

Description: GRAND TETON/NORTH 5TH FOUND 3.5" CAPPED PIPE (CNLV), SECTION CORNER MONUMENT, S10I11/S15I14, T19S,R61E, BLM 1991

C-6	26,813,182.9116	793,610.6336	Panel 2221.64 Monu. 2221.64	2219.21 2219.21

Description: GRAND TETON/LOSEE SET HUB AND TACK FOR SECTION CORNER LOCATION FROM FOUND TIES (PLS9399) ON TOP OF NEW DIVERSION DIKE, S11IS12/S14IS13, T19S,R61E

E-5	26,802,511.9913	788,322.9267	Panel 2049.16 Monu. 2049.91	2046.73 2047.48

Description: CENTENNIAL/NORTH 5TH FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S22IS23/S27IS26, T19S,R61E, 1991

E-6	26,802,500.2282	793,588.9443	Panel 2039.67 Monu. 2040.17	2037.24 2037.74

Description: CENTENNIAL/LOSEE FOUND 3.5" CAPPED PIPE MARKED DEPT. OF THE INTERIOR, BLM, CADASTRAL SURVEY RM 66FT NE TO NE S26, T19S,R61E, 1991 (SW REF. MON.)

G-6	26,791,853.9181	793,700.0325	Panel 1948.34 Monu. 1947.89	1945.91 1945.46

Description: LONE MOUNTAIN/LOSEE FOUND 2" BRASS CAP IN WELL MONUMENT AT CENTERLINE INTERSECTION, MARKED PLS 8431, POINT USED FOR SECTION CORNER S35IS36/S2IS1, T19SIT20S,R61E

J-6	26,781,174.3348	793,796.6934	Panel 1883.42 Monu. 1883.42	1880.99 1880.99

Description: CHEYENNE/MARY DEE FOUND 4" CNLV ALUM MON AT CENTERLINE INTERSECTION, POINT USED FOR SECTION CORNER MONUMENT S11IS12/S14IS13, T20S,R61E

Author: lsaku@pop.mindspring.com at ~internet
Date: 1/15/98 4:04 AM
Priority: Normal
To: Joey Howard at MAIL
Subject: Re: Clark County FIS
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Thu, 15 Jan 1998 04:04:45 PST
Received: from camel14.mindspring.com (camel14.mindspring.com [207.69.200.64])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id CAA24735
for <ljhoward@nhc-sac.com>; Thu, 15 Jan 1998 02:40:17 -0800 (PST)
From: lsaku@pop.mindspring.com
X-ccAdmin: Teresa Webster@eagle
Received: from t2p4 (user-36sac9m.dialup.mindspring.com [205.197.49.54])
by camel14.mindspring.com (8.8.5/8.8.5) with SMTP id FAA20210
for <ljhoward@nhc-sac.com>; Thu, 15 Jan 1998 05:40:11 -0500 (EST)
Message-Id: <3.0.3.32.19980115024011.0094d920@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: QUALCOMM Windows Eudora Pro Version 3.0.3 (32)
Date: Thu, 15 Jan 1998 02:40:11 -0800
To: "Joey Howard" <ljhoward@nhc-sac.com>
Subject: Re: Clark County FIS
In-Reply-To: <9800148848.AA884822333@nhc.nhc-sac.com>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Joey:
If we can use it for highways, I see no reason why we can't do it here.
Just make a note of your rational and explain that this new info came in
after everything was laid out.

Les

==========

At 03:58 PM 1/14/98, you wrote:
>
> Les
>
> The station distance for the new channel between Lone Mountain Road
> and Craig Road is 18' shorter than the channel stationing we defined
> for the wash from the topographic maps. On a 1"=400' map that is a
> distance 0.045", this is within 5% of the map scale. Adjusting the
> stationing would require restationing the channel centerline and
> relabling cross sections on 7 sheets and 3 HEC-2 models. Making these
> changes would be a day or two worth of time. We suggest using a
> station equation to reconsile the 18' difference.
>
> Is the use of a station equation ok? Or do you have any other
> suggestions. Please advise. Thank you.
>
> Joey
>
> As a side note the guidelines specify that cross sections must be
> within 5% of the map scale (see "Cross Sections" Page 9-8). However,
> I did not read in there about centerline stationing.
>
>

Author: les sakumoto <lsaku@mindspring.com> at ~internet
Date: 1/11/98 4:43 PM
Priority: Normal
CC: Edward Wallace at MAIL
TO: michael.grimm@fema.gov at ~internet
TO: ngruber@mbakercorp.com at ~internet
TO: PBUCH-PEDERSEN@mbakercorp.com at ~internet
TO: EMifflin@mbakercorp.com at ~internet
CC: jon.walters@nolte.com at ~internet
Subject: Restudies, submissions
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Sun, 11 Jan 1998 16:43:31 PST
Received: from camel8.mindspring.com (camel8.mindspring.com [207.69.200.58])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id LAA20538
for <ewallace@nhc-sac.com>; Sat, 10 Jan 1998 11:01:49 -0800 (PST)
Received: from neptune (user-36sacc6.dialup.mindspring.com [205.197.49.134])
by camel8.mindspring.com (8.8.5/8.8.5) with SMTP id OAA15016;
Sat, 10 Jan 1998 14:01:30 -0500 (EST)
Message-Id: <3.0.3.32.19980110110129.0092cb90@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: QUALCOMM Windows Eudora Pro Version 3.0.3 (32)
Date: Sat, 10 Jan 1998 11:01:29 -0800
To: michael.grimm@fema.gov, ngruber@mbakercorp.com
PBUCH-PEDERSEN@mbakercorp.com, EMifflin@mbakercorp.com
From: les sakumoto <lsaku@mindspring.com>
Subject: Restudies, submissions
Cc: ewallace@nhc-sac.com, jon.walters@nolte.com
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Mike, Neal, Ed, Perneille:

For your scheduling purposes, we expect to submit the following two
restudies during the third quarter of FY98 (March-April 1998):

SC: Nolte, San Diego
Communities: Clark County & Henderson, Nv.
Study Reach: Las Vegas Wash, Charleston to Lake Las Vegas

SC: Northwest Hydraulics, Sacramento
Communities: Clark County & North Las Vegas, NV
Study Reach: Upper Las Vegas Wash, ULVW Detention Basin to Interstate 15

If there are any deviations from this schedule, I will notify you via emai.

Les Sakumoto

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
Fax: (916) 371-7475

Date: December 29, 1997 Job 50010

From: Joey Howard

To: Pernille Buch-Pederson

Company: Michael Baker Jr. Inc.

Regarding: Clark Co. FIS

We are sending: [x] attached [ ] separate by:

This is: [ ] as requested [x] for your use

[ ] for approval [ ] for review and comment

Remarks:

As we discussed earlier this month, I have attached photographs showing Lone Mountain Road Bridge in 1995 and 1997 and Craig Road Bridge in 1997. Each photograph has a brief description of the view point of the photograph.

If you have any questions concerning this matter please call me at 916-371-7400.

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

3601 Eisenhower Ave., Suite 600
Alexandria, Virginia 22304

(703) 960-8800
FAX (703) 960-9125

Letter of Transmittal

Mr. Joey Howard Northwest Hydraulic Consultants, Inc. 3950 Industrial Boulevard, Suite 100C West Sacramento, CA 95691 ATTENTION:	DATE: 12/16/97 JOB NO. RE: Lone Mountain LOMR City of North Las Vegas, Nevada

THE INFORMATION DESCRIBED BELOW IS BEING SENT TO YOU VIA:

☐ MAIL ☐ BY HAND ☐ MESSENGER ☒ FEDERAL EXPRESS

NO. OF COPIES	DATE	DESCRIPTION
1		Copy of LOMR dated 11/20/97 with attachments
1		Set of as-built plans
1		Diskette with HEC-RAS model (3053 cfs used for LOMR)

THE INFORMATION IS TRANSMITTED AS CHECKED BELOW:

☐ FOR REVIEW ☒ FOR YOUR USE

☐ FOR APPROVAL ☐ AS REQUESTED BY you

☐ FOR SIGNATURE ☐ AS APPROVED BY

REMARKS: Mr. Howard enclosed is the information requested by you. Please not that we added cross sections 22100 through 22800 to the submitted HEC-RAS model. Please call me at (703) 317-6224 if you have any questions.

IF THE ENCLOSURES ARE NOT AS DESCRIBED, PLEASE NOTIFY US AT ONCE.

Signed Pernille Buch-Pedersen

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 97-09-1181P

The Honorable Michael Montandon
Mayor, City of North Las Vegas
P.O. Box 4086
North Las Vegas, Nevada 89036

Community: City of North Las Vegas, Nevada
Community No.: 320007
Panel Affected: 32003C2176 D
Effective Date of This Revision: NOV 20 1997

102-I-A-C

Dear Mayor Montandon:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated August 7, 1997, Mr. Mark Gookin, P.E., Senior Engineer, BSI Consultants, Inc., requested that FEMA revise the FIRM and FIS report to show the effects of a newly constructed trapezoidal channel along Las Vegas Wash between Lone Mountain Road and Craig Road.

All data required to complete our review of this request were submitted with letters from Mr. Gookin.

We have completed our review of the submitted data and the flood data shown on the effective FIRM and FIS report. We have revised the FIRM and FIS report to modify the elevations, floodplain and floodway boundary delineations, and zone designations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Las Vegas Wash. As a result of the modifications, the base flood elevations (BFEs) for Las Vegas Wash decreased; the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, increased in some areas and decreased in other areas; and the width of the regulatory floodway decreased. The modifications are shown on the enclosed annotated copies of FIRM Panel(s) 32003C2176 D, Profile Panel(s) 25P and 26P, and affected portions of the Summary of Discharges Table and Floodway Data Table. This Letter of Map Revision (LOMR) hereby revises the above-referenced panel(s) of the effective FIRM and the affected portions of the FIS report, both dated August 16, 1995. Please note Profile Panel 26P has been deleted from the FIS report.

The modifications are effective as of the date shown above. The map panel(s) as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 300 feet upstream of Craig Road	1,920	None
Just downstream of Lone Mountain Road	1,940	None

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the modified BFEs will be given in the *Las Vegas Review Journal* on or about January 8 and January 15, 1998. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Las Vegas Review Journal*, a citizen may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs presented in this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria are the minimum requirements and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM and FIS report to which the regulations apply and the modifications described in this LOMR.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by contacting the Director, Mitigation Division of FEMA in San Francisco, California, at (415) 923-7177. If you have any technical questions regarding this LOMR, please contact Mr. Mike Grimm of our staff in Washington, DC, either by telephone at (202) 646-2878 or by facsimile at (202) 646-4596.

Sincerely,

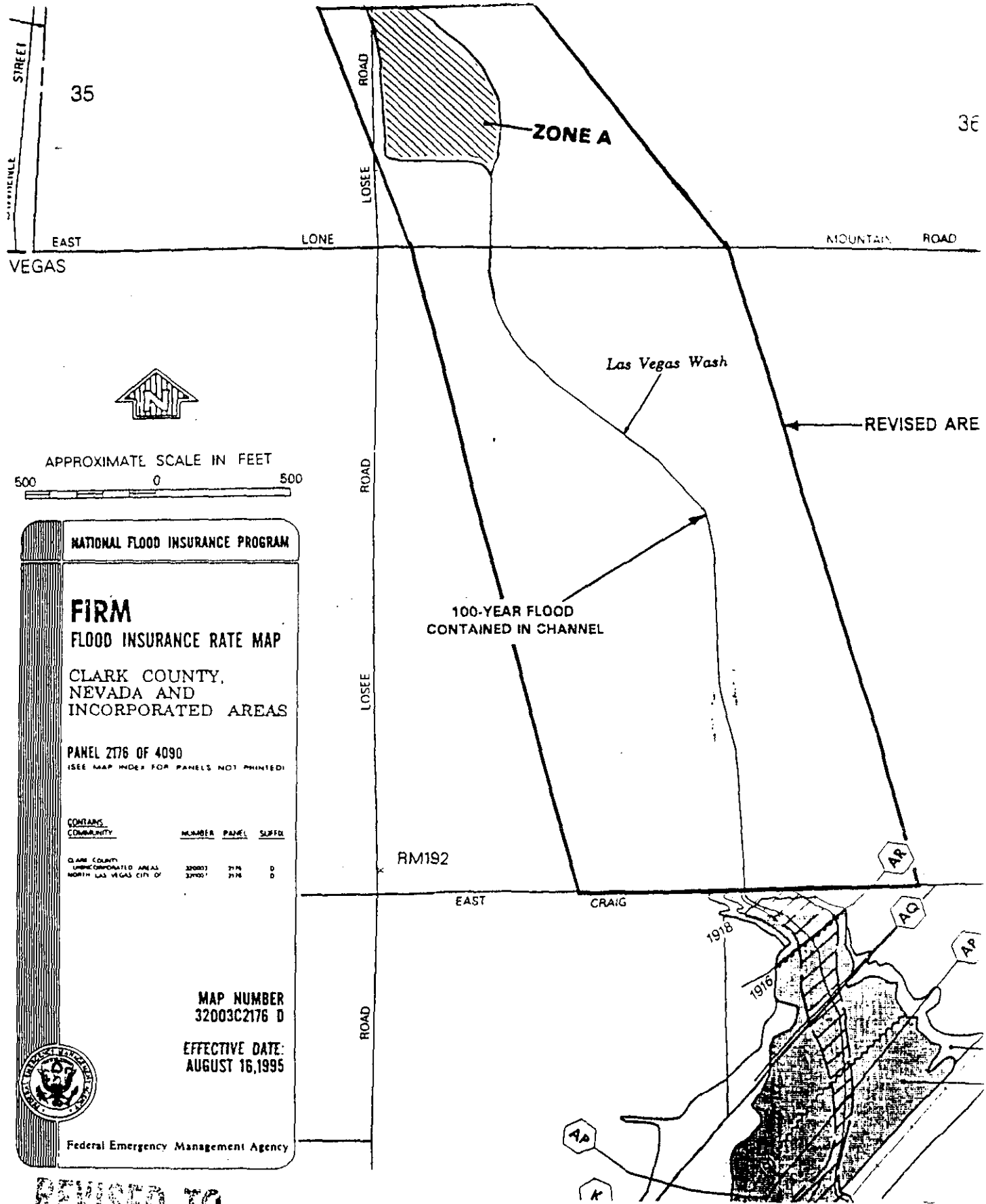
for Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure(s)

cc: Ms. Kelly Chuma, P.E.
Development and Flood Control Coordinator
Department of Public Works
City of North Las Vegas

Mr. Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District

Mr. Mark Gookin, P.E.
Senior Engineer
BSI Consultants



REVISED TO
REFLECT LOMR
DATED NOV 20 1997

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Las Vegas Wash (Cont'd)								
AM	15,795[1]	57	202	10.7	1,897.5	1,897.5	1,897.5	0.0
AN	16,510[1]	65	271	8.0	1,904.7	1,904.7	1,904.7	0.0
AO	16,820[1]	117	416	5.2	1,906.3	1,906.3	1,906.3	0.0
AP	17,690[1]	129	883	2.4	1,913.8	1,913.8	1,913.8	0.0
AQ	18,080[1]	185	530	9.6	1,915.0	1,915.0	1,915.1	0.1
AR	18,300[1]	192	989	5.1	1,916.1	1,916.1	1,917.0	0.9
AS	18,640[1]	295	616	8.2	1,919.1	1,919.1	1,919.1	0.0
AT	18,830[1]	299[2]	657	7.7	1,920.5	1,920.5	1,920.6	0.1
AU	19,200[1]	235	1,189	4.6	1,921.6	1,921.6	1,922.3	0.7
AV	19,610[1]	394[2]	593	8.6	1,922.9	1,922.9	1,923.1	0.2
AW	20,030[1]	320[2]	635	8.0	1,927.6	1,927.6	1,928.1	0.5
AX	20,480[1]	180	590	8.6	1,931.9	1,931.9	1,932.2	0.3
AY	21,010[1]	132	468	10.8	1,937.0	1,937.0	1,937.1	0.1
AZ	21,380[1]	90	422	12.8	1,940.2	1,940.2	1,941.2	1.0
Las Vegas Creek								
A	1,789[3]	33	242	6.6	1,779.9	1,779.9	1,780.9	1.0
B	2,039[3]	20	166	9.6	1,783.4	1,783.4	1,784.4	1.0
C	4,598[3]	19	123	13.0	1,793.8	1,793.8	1,794.8	1.0
D	7,035[3]	26	159	10.1	1,802.7	1,802.7	1,803.7	1.0
E	7,740[3]	30	155	10.3	1,806.8	1,806.8	1,807.8	1.0
	15,157[3]	36	152	10.5	1,870.6	1,870.6	1,871.6	1.0

VISED DATA →

REVISED TO REFLECT LOMR, DATED NOV 20 1997

[1]Feet Upstream of Lake Mead Boulevard
[2]Width Includes Islands
[3]Feet Above Confluence With Las Vegas Wash

TABLE 5

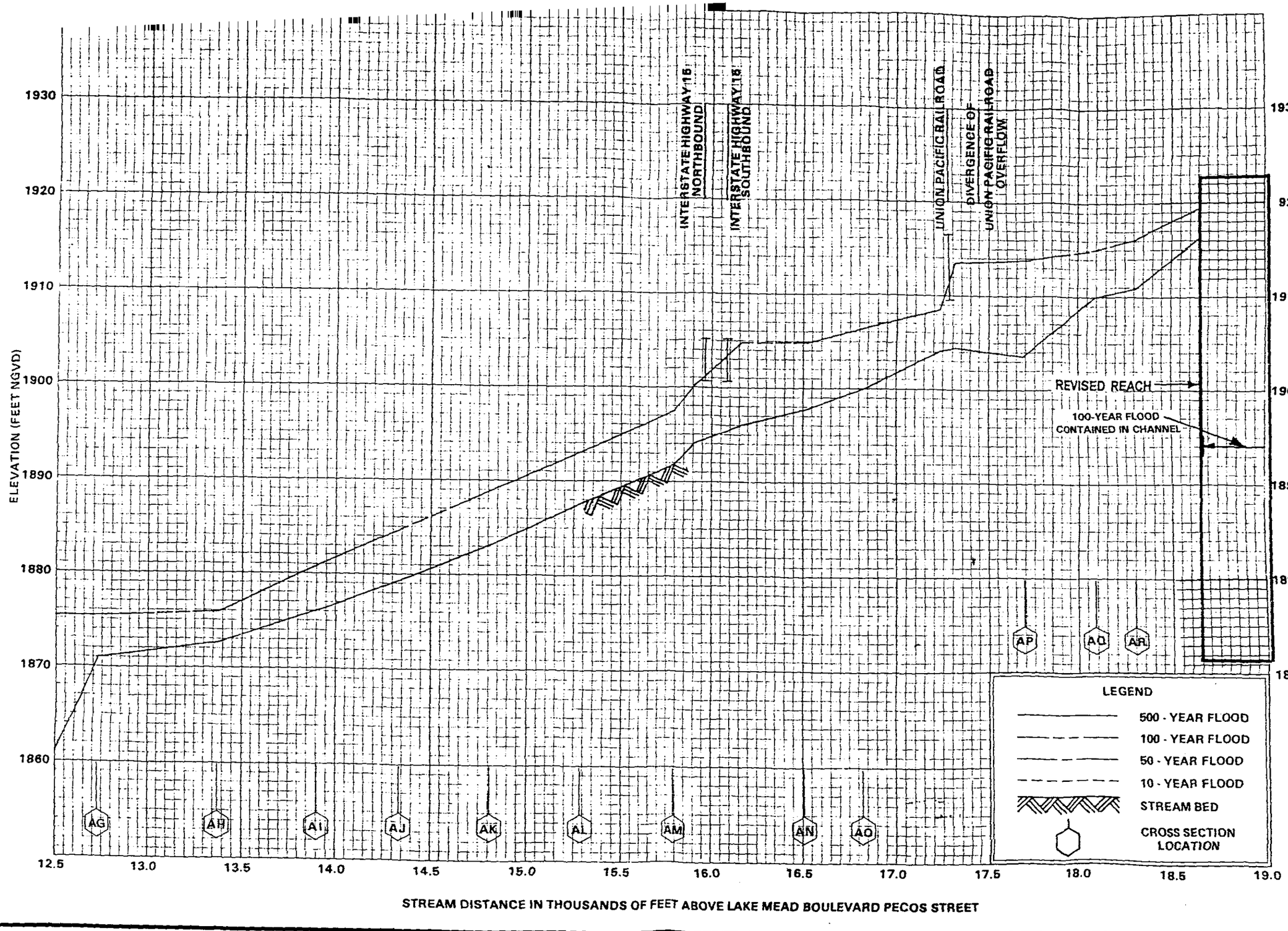
FEDERAL EMERGENCY MANAGEMENT AGENCY

CLARK COUNTY, NV
AND INCORPORATED AREAS

FLOODWAY DATA

LAS VEGAS WASH - LAS VEGAS CREEK

REVISED TO REFLECT LOMR DATED NOV 20 1997



FLOOD PROFILES

LAS VEGAS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLARK COUNTY, NV
AND INCORPORATED AREAS

25P

MAYOR
JAN LAVERTY JONES

COUNCILMEN
ARNIE ADAMSEN
MICHAEL J. MCDONALD
GARY REESE
LARRY BROWN

CITY MANAGER
LARRY K. BARTON



CITY of LAS VEGAS

December 4, 1997

Mr. Joey Howard
Northwest Hydraulic Consultants
3950 Industrial Blvd. Ste. 100C
West Sacremento, CA 95691

Dear Mr. Howard,

Enclosed, please find the **GIS** data you requested. Coverages on the enclosed *cd* are Major Streets for the County and the Incorporated Cities and Unincorporated Townships/Areas of the Las Vegas Valley. Data on the *cd* is in shapefile format, and was generated in ArcView 3.0a.

The *cd* does not have any documentation of our data, so if you should have any questions, please do not hesitate to call.

Sincerely,

Jerome P. Romero
GIS Data Base Coordinator

400 E. STEWART AVENUE • LAS VEGAS, NEVADA 89101-2986
(702) 229-6011 (VOICE) • (702) 386-9108 (TDD)

CLV 7009
3810-015-8/97

Author: Joey Howard at MAIL
Date: 11/12/97 1:55 PM
Priority: Normal
To: kevinrfc@co.clark.nv.us at ~internet
Subject: North Las Vegas Wash FIS
---------- Message Contents ----------

Kevin,

Attached is a portion of the HEC-2 model upstream of the North Las Vegas Detention Basin describing the diversion structure. Les approved the release this portion of the DRAFT HEC-2 model. This model has not been submitted nor reviewed by FEMA. Please limit the use of this model to your investigation of the Las Vegas Detention Basin Flood Control Diversion Weir.

The cross section geometry was developed from the Montgomery 1983 Las Vegas Wash Detention Basin Flood Control Drawings, sheet 7. The stationing in the model begins at 0 along Line "A" and increases in the upstream direction. This stationing differs from the Line "A" stationing shown on sheet 7. However, comment cards in the model relate the two stationing conventions to one another.

Author: Joey Howard at MAIL
Date: 11/5/97 1:45 PM
Priority: Normal
TO: kevinrfc@co.clark.nv.us at ~internet
Subject: LAS VEGAS WASH FIS DRAFT HYDROLOGY

---------- Message Contents ----------

Attached are copies of the HEC-1 input and output files used to in the draft hydrology submittal to FEMA. The hydrology has not yet been approved by FEMA and should not be used for purpose other than review.

Please see the README file for a description of the HEC-1 files.

Please contact Ed Wallace or myself (916-371-7400) if you have any questions concerning this matter. Thank you.

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
Fax: (916) 371-7475

Date: December 31, 1997 Job 50010

From: Joey Howard

To: Lenny Badger

Company: CNLV

Regarding: Lone Mountain Road Bridge

We are sending: [x] attached [ ] separate by:

This is: [ ] as requested [x] for your use

[ ] for approval [ ] for review and comment

Remarks:

Attached are photographs of the inlet channel to Lone Mountain Road taken in December of 1995 and 1997. The 1995 photographs show the inlet channel to Lone Mountain Bridge relatively free from deposition. The 1997 photographs show approximately 2 to 2.5' of deposition along the concrete inlet channel to about 50' downstream of the bridge. The apparent source of the deposited material is directly upstream of the channel as witnessed by the headcut in the 1997 photograph.

Please call me so that we may discuss this matter. Thank you

Mayor
Michael L. Montandon

Council Members
William E. Robinson
John K. Rhodes
Paula L. Brown
Stephanie S. Smith

City Manager
Linda Hinson

Deputy City Manager
Patrick P. Importuna

CITY OF NORTH LAS VEGAS
Public Works Department • Gary W. Holler, P.E., Director
2266 Civic Center Drive • North Las Vegas, Nevada 89030-6316
Telephone: (702) 633-1200 • Fax: (702) 649-4696

November 3, 1997

Hayward Anderson
Northwest Hydraulic Consultants Inc.
3950 Industrial Boulevard, Suite 100C
West Sacramento, CA 95691

RE: Community Maps for Las Vegas Wash

Dear Hayward,

Per your request, included herewith is a CD-ROM containing AUTOCAD drawings of the topography, digital aerial images, DXF files of the property lines, DXF files of the text, all within in the area you requested.

If you have any questions or need any assistance please call me at 1-702-633-1232.

Sincerely,

Randal D. Cagle
Manager Property Management

KENNY AERIALS
CITY OF NORTH LAS VEGAS

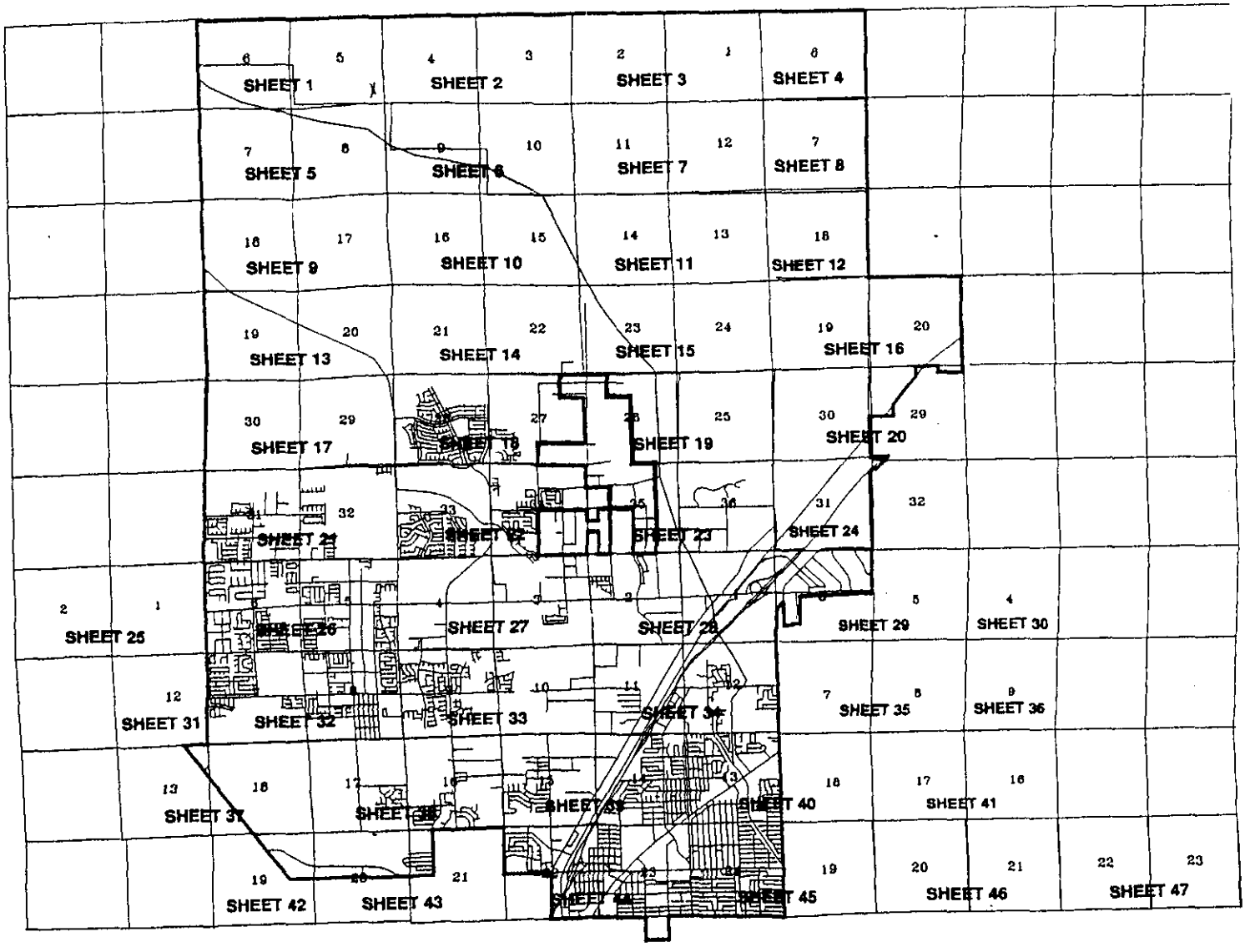


Photo Date 3/15/95

50010.~~14~~
Correspondence

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

To: Ed / Joey

From: Les Sakumoto, P.E.
Civil Engineer

Date: 11/1/97

I'll call you on this.

Les

FAX TRANSMITTAL COVER SHEET

DATE:	**October 14, 1997**
TO:	**Les Sakumoto**
FIRM:	**FEMA Region IX**
FAX #:	**(415) 923-7147**
FROM:	**Pernille Buch-Pedersen**
FIRM:	**MICHAEL BAKER JR., INC.**

THIS FAX CONSISTS OF 3 PAGES, INCLUDING THIS SHEET.

SPECIAL INSTRUCTIONS:

Les, attached is a copy of the July 11, 1985, letter regarding the North Las Vegas Detention Basin. I am still searching if we ever received an operation and/or maintenance plan for the structure. I will let you know as soon as I find out. Please let me know if you have any questions.

Pernille Buch-Pedersen

Federal Emergency Management Agency

Washington, D.C. 20472

JUL 11 1985

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Honorable James Seastrand
Mayor, City of North Las Vegas
2200 Civic Center Drive
North Las Vegas, Nevada 89030

Dear Mayor Seastrand:

This is in regard to a letter dated April 16, 1985, from Ms. Fay L. Holland of James M. Montgomery, Consulting Engineers, Inc. (JMM), concerning the "Las Vegas Wash Detention Basin Flood Control Project" in the City of North Las Vegas, Nevada. In her letter, Ms. Holland responded to our letter of December 18, 1984, to Mr. Chip Paulson of JMM, concerning the design of the diversion dike that was constructed as part of the aforementioned project. Ms. Holland described the construction and operation of individual project components, and with her letter provided copies of construction plans and contract documents, photographs of the basin, and documents that list the design criteria for the project.

In our letter of December 18, we informed Mr. Paulson that unless it could be shown that the dike was constructed to dam-design specifications, the effects of the dike could not be included in the analysis of Las Vegas Wash being performed by JMM as part of the Flood Insurance Studies (FISs) for Clark County and the City of Las Vegas, Nevada. The reason for this requirement was that the dike would not provide 3 feet of freeboard above the 100-year flood elevation as required by our Levee Policy.

Based on our review of the information provided by Ms. Holland, we believe that the dike has been adequately constructed and will function as a dam. However, we cannot consider, for flood insurance purposes, the effects of the flood control project on the 100-year flood until we receive evidence that the project, including the dike, will be operated and/or maintained by the City of North Las Vegas. This evidence should be in the form of an ordinance or other legally adopted instrument that specifies the operation and/or maintenance activities to be performed, the frequency of their performance, and the community officials responsible for their performance. If the detail or complexity of such maintenance activities precludes their incorporation in an ordinance, an ordinance should be prepared referencing a maintenance plan that contains the required information.

If the city is able to provide the necessary maintenance information, we will direct JMM to consider the effects of the Flood Control Project in the analyses performed for the Clark County and Las Vegas FISs. Should you wish the Federal Emergency Management Agency to revise the effective Flood Insurance Rate Map (FIRM) and FIS report for the City of North Las Vegas to reflect the effects of this project, we ask that you provide the following information for the portion of Las Vegas Wash located within the City of North Las Vegas.

1. A hydrologic analysis showing the effects of the flood control project on the 10-, 50-, 100-, and 500-year flood discharges.

2. Backwater computations, based on the effects of the flood control project and the discharges identified in Item 1, for the 10-, 50-, 100-, and 500-year floods and floodway.

3. Delineations of the revised 100- and 500-year flood boundaries and 100-year floodway on a topographic map of suitable scale an contour interval to provide reasonable accuracy.

All of the information provided by the City of North Las Vegas should be consistent with that developed by JMM for the Clark County and Las Vegas FISs. If we receive the requested information, we will prepare and issue a revised FIRM and a revised FIS report for the City of North Las Vegas.

Should you have any questions regarding this matter, please call members of our Headquarters Office staff, in Washington, D.C., at (202) 646-2769.

Sincerely,

Brian R. Mrazik, Ph.D.
Acting Assistant Administrator
Office of Risk Assessment
Federal Insurance Administration

Author: lsaku@pop.mindspring.com at ~internet
Date: 10/31/97 12:49 AM
Priority: Normal
To: Edward Wallace at MAIL
Subject: Re: clark county hydrology
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Fri, 31 Oct 1997 00:49:16 PST
Received: from camel14.mindspring.com (camel14.mindspring.com [207.69.200.64])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id AAA22804
for <ed@nhc-sac.com>; Fri, 31 Oct 1997 00:24:48 -0800 (PST)
From: lsaku@pop.mindspring.com
X-ccAdmin: Teresa Webster@eagle
Received: from asus_t2p4 (user-36saceu.dialup.mindspring.com [205.197.49.222])
by camel14.mindspring.com (8.8.5/8.8.5) with SMTP id DAA14416
for <ed@nhc-sac.com>; Fri, 31 Oct 1997 03:24:43 -0500 (EST)
Message-Id: <3.0.1.32.19971031002442.00928b10@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: Windows Eudora Light Version 3.0.1 (32)
Date: Fri, 31 Oct 1997 00:24:42 -0800
To: "Edward Wallace" <ed@nhc-sac.com>
Subject: Re: clark county hydrology
In-Reply-To: <9709218774.AA877455957@nhc.nhc-sac.com>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Ed:
Go ahead.
Les
==========

At 10:45 AM 10/21/97, you wrote:
>
> Les -
> Steve Mano from Montgomery Watson called to request backup information
> on Upper Las Vegas Wash. He has a copy of our April 28 memo, but it
> does not include the attachment (our draft hydrology). The draft
> hydology report would help him undertstand the differences in peak
> flow estimates using the Spring Mountain and Interbasin storms. Since
> your memo to Kevin asked him to confirm that our assumptions regarding
> hydrology are correct, I assume it would be ok to release this
> information. If possible, could you confirm this with an e-mail reply?
> M-W seems anxious to get this info as soon as possible. Thanks,
>
> Ed
>
>

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
Fax: (916) 371-7475

Date: October 30, 1997 Job 50010-14

From: Joey Howard

To: Kevin Eubanks

Company: Clark County Flood Control

Regarding: North Las Vegas Wash FIS

We are sending: [x] attached [ ] separate by:

This is: [ ] as requested [ ] for your use

[ ] for approval [ ] for review and comment

Remarks:

Attached is a copy of the draft hydrologic analysis for the North Las Vegas Wash Flood Insurance Study. This preliminary analysis is currently being reviewed by FEMA and has not yet been approved. Use of this analysis should be limited to the Flood Control District's confirmation of hydrologic assumptions as described in Les Sakumoto's May 5, 1997 letter to you, see attached. Circulation of this document should also be limited to those who are working on this matter.

Please contact Ed Wallace or myself if you have any questions concerning this matter.

MEMORANDUM

TO: File

FROM: Joey Howard

DATE: September 15, 1997

SUBJECT: Clark Co. FIS

On September 11, 1997 I received a phone call from Les Sakumoto, FEMA Project Officer. He requested that I fax Marty Yoemans at Baker copies of the cover letter and Kevin Eubanks' response to comments regarding the diversion dike attached to the North Las Vegas Detention Basin. I faxed these documents to Marty and called to confirm that he had received them on September 12, 1997. He said that there was a complaint from people in the North Las Vegas area that the study had taken longer than it should have taken. I explained to him that there were two main delays the first was a question regarding FEMA's acceptance of the West Range Wash Diversion Dike and Upper Las Vegas Diversion Dike and the second being a question regarding the diversion dike diverting water into the North Las Vegas Detention Basin. He said he hoped that there would be no further delays.

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: 9/11/97

Job Number: 50010

From: Joey Howard

Pages to Follow: 3

To: Marty Yaemans

Original via: _____

Company: Baker Engrs

Fax: 703-960-9125

Telephone: _____

Subject: Clark Co FIS

Please call immediately if you do not receive all pages of this transmission.

Following this page is the cover letter I sent with our package to CCRFCD and the response we received.

If you have any questions or need more back up data please contact Ed Wallace or Myself.

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: 9/11/97 Job Number: 50010

From: Joey Howard Pages to Follow: & 3

To: Marty Yoemans Original via: _____

Company: Baker Engrs

Fax: 703-960-9125

Telephone: _____

Subject: Clark Co FIS

Please call immediately if you do not receive all pages of this transmission.

Les asked me to fax the following letter. Please call if you have any questions

file copy

northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 28, 1997

Subject: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

This letter provides an update on the status of our study of Upper Las Vegas Wash in Clark County, Nevada, and suggests an approach for completion of the study. In August, 1996 Northwest Hydraulic Consultants (NHC) submitted notes summarizing our preliminary review of three diversion structures in the Upper Las Vegas Wash Study Area for FEMA's review. The purpose of this summary was to identify uncertainties in the flood control performance of these structures and to request assistance from the Technical Evaluation Contractor (TEC) in clarifying the methods to be used in evaluation of the structures for study purposes. After initial conversations with the TEC, work on the study was suspended pending their receipt of additional data from Clark County Regional Flood Control District.

The Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike have now both been reviewed by the TEC as part of other studies. For the purposes of our study, we will assume that they remain in place at all discharges. Based on telephone conversations with the TEC in March and April, we understand that the North Las Vegas Detention Basin Diversion Dike has not been reviewed. Failure of this structure would significantly influence peak flows in and downstream of our study area. Our preliminary analysis of this structure and suggested approach for its evaluation in the study are described below.

Hydrology

NHC submitted draft hydrology for the Upper Las Vegas Wash in May, 1996 (copy attached). The draft hydrology report describes modifications made to existing HEC-1 models to develop recommended FIS discharges. NHC updated models developed by James M. Montgomery (1991) and Black & Veatch (1993) to represent existing flood control facilities, and extended the models where necessary to include the full range of flood frequencies required for the FIS. NHC made no changes to previously defined model input parameters for rainfall, runoff, or channel routing, all of which appear to be consistent with the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

The Spring Mountain Storm is used to estimate peak flows into the ULVDB. The estimated 100-year peak inflow to the ULVDB is approximately 14,700 cubic feet per second (cfs) and the 100-year outflow is 5,020 cfs.

The peak inflow to the North Las Vegas Detention Basin is produced by the Interbasin Storm. This storm is modeled as a 54 square mile storm covering the North Las Vegas Wash Tributary Area between the Upper and North Las Vegas detention basins. A single Interbasin Storm model had been previously developed by Black & Veatch (1993) to represent 100-year storm conditions. This model was extended to other flood frequencies by NHC. The 100-year peak discharge from this model is approximately 8,500 cfs.

The Spring Mountain Storm produces the highest peak discharges downstream of the North Las Vegas Detention Basin due to larger total volume than the Interbasin Storm. The 100-year peak discharge downstream of the North Las Vegas Detention Basin is approximately 2,800 cfs.

The discharges from both the Spring Mountain and Interbasin storms are consistent with the Corps of Engineers regional analysis curve. The results of the modified HEC-1 models have been used by NHC for preliminary hydraulic analysis in the study area.

NLVDB Diversion Dike Description

The diversion structure is 700 feet long, and intercepts flow in the wash at approximately a 45 degree angle. A trapezoidal channel along the dike has a bottom width of 75 feet. A control structure (115 feet long) is located at the downstream end of the dike, where the trapezoidal channel is narrowed to a bottom width of 35 feet. The invert slope changes from approximately 1 percent in the wash to 0.2 percent in the 75 foot wide trapezoidal channel, and steepens to 0.76 percent in the 35 foot wide trapezoidal channel. The narrower channel continues for approximately 1750 feet into the NLVDB. The diversion dike and channels are shown in the attached construction drawings.

The channel along the diversion dike and the control structure have a 6-inch thick concrete lining with 4:1 side slopes. The concrete lining extends over the top of the right bank and down the opposite side of the embankment at a 2.5:1 slope. An 8-foot deep cutoff wall is located at the toe of the embankment. The top of the diversion dike has a constant elevation of 2142. At the upstream end, the channel has a depth of 12.5 feet below the top of the diversion dike and gradually deepens to 14 feet at the control structure.

Hydraulics

NHC used HEC-2 to develop a preliminary water surface profile at the diversion dike structure. Cross sections for the HEC-2 model were obtained from the record drawings. A Manning's 'n' of 0.025 was used for the channel roughness. HEC-2 results for the 100-year peak discharge indicate that supercritical flow would occur downstream of the control structure. Computed velocities, assuming minimum specific energy in this channel, are 15 feet per second (fps) with depths around 10 feet. Upstream of the control structure, flow is subcritical at a depth of

approximately 14 feet and a velocity of 5 fps. The computed water surface profile is shown in Figure 1. This water surface is at or above the diversion dike top for its entire length. Based on this preliminary analysis, the dike does not meet FEMA freeboard criteria for levees, and does not appear to be designed to withstand sustained overflows.

The preliminary analysis does not include other factors that would increase the potential for overflow of the dike. These factors include the effect of momentum of the flow towards the structure, and the potential for sediment deposition at the change in flow direction and velocity on the upstream face of the dike. Our preliminary evaluation did not include quantification of these influences on the water surface profile.

Study Approach

Based on the information available, we are unable to confirm that the dike would withstand overflow without failure. Assuming that the dike is not in place would produce 100-year peak discharges in the downstream portion of the wash of 8,500 cfs, compared to approximately 2,800 cfs with the dike in place. This assumption would therefore substantially increase the areas within flood hazard areas downstream of the structure.

NHC recommends the following approach to completion of the Upper Las Vegas Wash study:

1) Contact the Clark County Regional Flood Control District and the City of North Las Vegas to review the draft hydrology and the results of preliminary analysis of the diversion dike. Confirm that the District concurs with the preliminary hydrology and hydraulic analysis.

2) Proceed with flood plain mapping based on water surface profiles computed with and without the diversion dike in place, as described in Chapter 7 of *Guidelines and Specifications for Study Contractors*.

This approach will require hydrologic and hydraulic analysis beyond the original scope of our study, and may require additional mapping to cover the larger flood plain boundaries. If you concur with the approach suggested above, we will continue the hydraulic analysis for the study, and will estimate the costs of required additional services.

Please call with any questions regarding our preliminary analysis or proposed study approach.

Sincerely,
Northwest Hydraulic Consultants, Inc.

Edward E. Wallace, P.E.
Principal

53010.14

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT



Gale Wm. Fraser, II, P.E.
General Manager / Chief Engineer

BOARD OF DIRECTORS

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Bruce L. Woodbury
Clark County

June 26, 1997

Les Sakumoto
FEMA Region IX, Bldg. 105
Presidio
San Francisco, CA 94129

Las Vegas Wash, Change in Flow Rates

Dear Mr Sakumoto:

I am writing in response to your letter dated May 5, 1997 regarding the effectiveness of the North Las Vegas Detention Basin (NLVDB) to reduce flow rates downstream therefrom. I have since met with representatives of the City of North Las Vegas, the City of Las Vegas and Clark County (Entities) to discuss your concerns. Your letter included preliminary calculations and analysis prepared by Northwest Consultants which indicated that the structure which directs flow to the NLVDB would be marginally overtopped if subjected to a 100-Year runoff with no consideration for the effects of sediment. In fact, the intended function of the diversion structure was to direct no more than the 100-year flow to the basin thus reducing emergency spillway costs at the NLVDB. This fact was previously acknowledged by FEMA in a letter to the City of North Las Vegas, dated July 11, 1985. Therefore, the results of Northwest Consultant's preliminary work came as no surprise. Additionally, questions were raised regarding the stability of the structure if overtopped and what impacts sediment would have on the capacity of the structure to deliver flow to the NLVDB. These are valid concerns which, we agree, warrant consideration.

First, I would like to assure you that it is the District's and the entities' desire to have the NLVDB recognized by FEMA as being effective in reducing flow rates to downstream areas. Anything less would be unacceptable. Secondly, we offer to achieve this by preparing additional analyses for the NLVDB which demonstrate its effectiveness and conformity to NFIP regulations or propose remedial measure which, once implemented, would meet NFIP requirements.

It is our intention to complete the necessary work in the most expeditious manner possible at no cost to FEMA. Although there are many variables involved at this point which can affect the schedule for this effort, the goal is to be successful within 6 months

301 E. Clark Avenue, Suite 301 • Las Vegas, Nevada 89101
(702) 455-3139 • FAX: (702) 455-3870

to one year. This should allow you to proceed with the study of the Upper Las Vegas Wash without further delay under the assumption that the NLVDB is effective. The effective date of map revisions for areas downstream of the NLVDB (Upper Las Vegas Wash Study and the Las Vegas Wash LMMP) would then follow FEMA's acceptance of the District's work.

Close coordination with your agency will be valuable to our timely completion of this work. We will be contacting you, once we have retained the services of an engineering consultant, to discuss our approach and your specific requirements. Thank you for the opportunity to address your concerns regarding this important project. Should you need further information or have questions, feel free to contact me at (702)-455-3139.

Sincerely,

Kevin Eubanks, P.E.
Assistant General Manager

CC: Karl Mohr, FEMA
Ed Wallace, Northwest Consultants
Kelly Chuma, North Las Vegas
Randy Fultz, Las Vegas
Steve Parrish, Clark County

KLE:csm

File: LMMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

To: Kevin Eubanks, P.E.
Clark County Regional Flood Control District

From: Les Sakumoto, P.E.
Civil Engineer

Date: May 5, 1997

Re: Las Vegas Wash, Change in Flow Rates

Kevin:

This letter is keep you informed of an unexpected development that occurred during our mapping of the Las Vegas Wash in the area between the Upper Las Vegas (ULV) and the North Las Vegas (NLV) detention basins. I am enclosing a copy of the recommendations by our Study Contractor (SC) Northwest Hydraulics. FEMA concurs with their recommendations but we would like your confirmation on our hydrologic assumptions. We respectfully request that you get back to us, either by telephone or letter, on or before May 23, 1997. If there are data which we may have overlooked, please bring this to our attention in the telephone call or letter. If you would like additional clarification, we could arrange a conference call between FEMA, the Study Contractor and your office. As stated in the enclosures, because of the large differences between the old and new assumptions (2800 cfs vs 8500 cfs) we will need to expand the scope of our mapping and make some schedule changes in the review of the downstream studies. The Region will request that the Technical Evaluation Contractor (TEC) temporarily suspend the review of the LMMP study by Ensign & Buckley (E&B) that extended from Interstate 15 to Charleston Boulevard until we can quantify the new floodplains and judge what the effects will be downstream of Interstate 15. At this point in time, we can no longer say that the work maps from the Ensign & Buckley LMMP study represent the "best available data". No matter what the outcome of the new mapping, the community always has the option of submitting a LOMR if revisions are made to lessen the Special Flood Hazard Areas. As we would like to keep this study moving forward, we trust that you will give this matter your utmost priority.

Thank you for your attention in this matter.

cc: Baker Engineers-E. Mifflin/T. Smith/Perneille BP
City of Las Vegas-Fultz/Moyer
City of North Las Vegas-Gary Holler/Kelly Chuma
Clark County- Robert Thompson/Phu Simpson
FEMA HQ-Mohr/Magnotti
FEMA RIX-Chau/Puziss/Crawford

no copy

northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 28, 1997

Subject: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

This letter provides an update on the status of our study of Upper Las Vegas Wash in Clark County, Nevada, and suggests an approach for completion of the study. In August, 1996 Northwest Hydraulic Consultants (NHC) submitted notes summarizing our preliminary review of three diversion structures in the Upper Las Vegas Wash Study Area for FEMA's review. The purpose of this summary was to identify uncertainties in the flood control performance of these structures and to request assistance from the Technical Evaluation Contractor (TEC) in clarifying the methods to be used in evaluation of the structures for study purposes. After initial conversations with the TEC, work on the study was suspended pending their receipt of additional data from Clark County Regional Flood Control District.

The Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike have now both been reviewed by the TEC as part of other studies. For the purposes of our study, we will assume that they remain in place at all discharges. Based on telephone conversations with the TEC in March and April, we understand that the North Las Vegas Detention Basin Diversion Dike has not been reviewed. Failure of this structure would significantly influence peak flows in and downstream of our study area. Our preliminary analysis of this structure and suggested approach for its evaluation in the study are described below.

Hydrology

NHC submitted draft hydrology for the Upper Las Vegas Wash in May, 1996 (copy attached). The draft hydrology report describes modifications made to existing HEC-1 models to develop recommended FIS discharges. NHC updated models developed by James M. Montgomery (1991) and Black & Veatch (1993) to represent existing flood control facilities, and extended the models where necessary to include the full range of flood frequencies required for the FIS. NHC made no changes to previously defined model input parameters for rainfall, runoff, or channel routing, all of which appear to be consistent with the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

The Spring Mountain Storm is used to estimate peak flows into the ULVDB. The estimated 100-year peak inflow to the ULVDB is approximately 14,700 cubic feet per second (cfs) and the 100-year outflow is 5,020 cfs.

The peak inflow to the North Las Vegas Detention Basin is produced by the Interbasin Storm. This storm is modeled as a 54 square mile storm covering the North Las Vegas Wash Tributary Area between the Upper and North Las Vegas detention basins. A single Interbasin Storm model had been previously developed by Black & Veatch (1993) to represent 100-year storm conditions. This model was extended to other flood frequencies by NHC. The 100-year peak discharge from this model is approximately 8,500 cfs.

The Spring Mountain Storm produces the highest peak discharges downstream of the North Las Vegas Detention Basin due to larger total volume than the Interbasin Storm. The 100-year peak discharge downstream of the North Las Vegas Detention Basin is approximately 2,800 cfs.

The discharges from both the Spring Mountain and Interbasin storms are consistent with the Corps of Engineers regional analysis curve. The results of the modified HEC-1 models have been used by NHC for preliminary hydraulic analysis in the study area.

NLVDB Diversion Dike Description

The diversion structure is 700 feet long, and intercepts flow in the wash at approximately a 45 degree angle. A trapezoidal channel along the dike has a bottom width of 75 feet. A control structure (115 feet long) is located at the downstream end of the dike, where the trapezoidal channel is narrowed to a bottom width of 35 feet. The invert slope changes from approximately 1 percent in the wash to 0.2 percent in the 75 foot wide trapezoidal channel, and steepens to 0.76 percent in the 35 foot wide trapezoidal channel. The narrower channel continues for approximately 1750 feet into the NLVDB. The diversion dike and channels are shown in the attached construction drawings.

The channel along the diversion dike and the control structure have a 6-inch thick concrete lining with 4:1 side slopes. The concrete lining extends over the top of the right bank and down the opposite side of the embankment at a 2.5:1 slope. An 8-foot deep cutoff wall is located at the toe of the embankment. The top of the diversion dike has a constant elevation of 2142. At the upstream end, the channel has a depth of 12.5 feet below the top of the diversion dike and gradually deepens to 14 feet at the control structure.

Hydraulics

NHC used HEC-2 to develop a preliminary water surface profile at the diversion dike structure. Cross sections for the HEC-2 model were obtained from the record drawings. A Manning's 'n' of 0.025 was used for the channel roughness. HEC-2 results for the 100-year peak discharge indicate that supercritical flow would occur downstream of the control structure. Computed velocities, assuming minimum specific energy in this channel, are 15 feet per second (fps) with depths around 10 feet. Upstream of the control structure, flow is subcritical at a depth of

approximately 14 feet and a velocity of 5 fps. The computed water surface profile is shown in Figure 1. This water surface is at or above the diversion dike top for its entire length. Based on this preliminary analysis, the dike does not meet FEMA freeboard criteria for levees, and does not appear to be designed to withstand sustained overflows.

The preliminary analysis does not include other factors that would increase the potential for overflow of the dike. These factors include the effect of momentum of the flow towards the structure, and the potential for sediment deposition at the change in flow direction and velocity on the upstream face of the dike. Our preliminary evaluation did not include quantification of these influences on the water surface profile.

Study Approach

Based on the information available, we are unable to confirm that the dike would withstand overflow without failure. Assuming that the dike is not in place would produce 100-year peak discharges in the downstream portion of the wash of 8,500 cfs, compared to approximately 2,800 cfs with the dike in place. This assumption would therefore substantially increase the areas within flood hazard areas downstream of the structure.

NHC recommends the following approach to completion of the Upper Las Vegas Wash study:

1) Contact the Clark County Regional Flood Control District and the City of North Las Vegas to review the draft hydrology and the results of preliminary analysis of the diversion dike. Confirm that the District concurs with the preliminary hydrology and hydraulic analysis.

2) Proceed with flood plain mapping based on water surface profiles computed with and without the diversion dike in place, as described in Chapter 7 of *Guidelines and Specifications for Study Contractors*.

This approach will require hydrologic and hydraulic analysis beyond the original scope of our study, and may require additional mapping to cover the larger flood plain boundaries. If you concur with the approach suggested above, we will continue the hydraulic analysis for the study, and will estimate the costs of required additional services.

Please call with any questions regarding our preliminary analysis or proposed study approach.

Sincerely,
Northwest Hydraulic Consultants, Inc.



Edward E. Wallace, P.E.
Principal

RECORD OF TELEPHONE CONVERSATION

DATE: March/April 1997 JOB: 50010

Individual	Organization	Telephone No.
FROM: Pernille Buch-Pedersen	Baker	(703) 960-8800
TO: Joey Howard	nhc	

SUBJECT: No. Las Vegas Basin Diversion Dike

NOTES:

Pernille said she did not locate any information indicating the North Las Vegas Detention Basin Diversion Dike had been revicwed by Baker.

(continued on back)

ACTIONS REQUIRED:

Author: les sakumoto <lsaku@mindspring.com> at ~internet
Date: 3/28/97 1:23 AM
Priority: Normal
To: Joey Howard at MAIL
TO: PBUCH-PEDERSEN@MBAKERCORP.COM at ~internet
Subject: North Las Vega Detention Struc and Lomrs for NLV, LV & Clark
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Fri, 28 Mar 1997 01:23:07 PST
Received: from brickbat9.mindspring.com (brickbat9.mindspring.com
[207.69.200.12])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id AAA21817
for <jhoward@nhc-sac.com>; Fri, 28 Mar 1997 00:44:05 -0800 (PST)
Received: from roadwarrior (ip164.sacramento3.ca.pub-ip.psi.net [38.28.6.164])
by brickbat9.mindspring.com (8.8.5/8.8.5) with SMTP id DAA27646;
Fri, 28 Mar 1997 03:43:53 -0500 (EST)
Message-Id: <1.5.4.32.19970328084346.008ccc7c@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: Windows Eudora Light Version 1.5.4 (32)
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
Date: Fri, 28 Mar 1997 00:43:46 -0800
To: PBUCH-PEDERSEN@MBAKERCORP.COM
From: les sakumoto <lsaku@mindspring.com>
Subject: North Las Vega Detention Struc and Lomrs for NLV, LV & Clark Co
Cc: jhoward@nhc-sac.com

Bernielle: 12:43a

I met with Northwest Hydraulics today. We discussed their restudy for Las Vegas Wash upstream of the freeway. In their analysis they discovered that a storm centering between the two upstream detention basins would produce a q100 that is greater than the 6500cfs that was assumed to be appropriate for the LMMP that was done by E&B for LV Wash from the freeway to Charleston. NWH's q100 for the storm is about 8500 cfs and this is compounded by the insufficient freeboard at the North Las Vegas Detention Structure. I asked Joey Howard and Ed Wallace to give you a call and fill you in on the details because if we indeed need to be using the 8500 cfs then the work d/s by E&B would be invalid.

Les

Author: les sakumoto <lsaku@mindspring.com> at ~internet
Date: 3/28/97 1:23 AM
Priority: Normal
To: Joey Howard at MAIL
Subject: Pernielle
---------- Message Contents ----------

Received: by ccmail
Received: from eagle by nhc-sac.com (UUPC/extended 1.11) with UUCP;
Fri, 28 Mar 1997 01:23:05 PST
Received: from brickbat9.mindspring.com (brickbat9.mindspring.com
[207.69.200.12])
by eagle.ns.net (8.8.5/8.8.5) with ESMTP id AAA21561
for <jhoward@nhc-sac.com>; Fri, 28 Mar 1997 00:35:25 -0800 (PST)
Received: from roadwarrior (ip164.sacramento3.ca.pub-ip.psi.net [38.28.6.164])
by brickbat9.mindspring.com (8.8.5/8.8.5) with SMTP id DAA27081
for <jhoward@nhc-sac.com>; Fri, 28 Mar 1997 03:35:16 -0500 (EST)
Message-Id: <1.5.4.32.19970328083508.008d81c4@pop.mindspring.com>
X-Sender: lsaku@pop.mindspring.com
X-Mailer: Windows Eudora Light Version 1.5.4 (32)
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
Date: Fri, 28 Mar 1997 00:35:08 -0800
To: jhoward@nhc-sac.com
From: les sakumoto <lsaku@mindspring.com>
Subject: Pernielle

Joey:

Here is Pernille's correct spelling and her email address.

Pernille Buch-Pedersen <PBUCH-PEDERSEN@MBAKERCORP.COM>

The general number at Baker is 703-960-8800

I'll email her direct number when I get it.

MEMORANDUM

TO: Gary Finnie

FROM: Joey Howard

DATE: March 26, 1997

SUBJECT: Clark County FEMA Mapping

In response to our conversation last week, the final billing for this project can be submitted once NHC receives and reviews the survey support data FEMA requests in Appendices 4 and 7 of the Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995. A copy of our July 15, 1996 FAX requesting this information is attached. For your convenience I am including a copy of the Metadata file format with the items in red that are pertinent to the survey portion of the file.

If you have any questions please call. Thank you

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

COPY

FAX MESSAGE

Date:	July 15, 1996	Job Number: 50010	
From:	Joey Howard	Number of Pages: 3	
To:	Gary Finnie	Original via:	
Company:	Kenny Aerial		
Fax Number:	602-340-1877		
Telephone No:	602-258-6471		
Subject:	Survey Requirements		

Please call immediately if you do not receive all pages of this transmission.

Remarks:
In preparation for final submittal of the North Las Vegas Wash FIS restudy, I have prepared a list of items that must be included as part of the survey portion of the study. This list was compiled from Appendices 4 and 7 in the Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995. It is imperative that a representative of Kenny Aerial read through these chapters to ensure that the necessary items be provided to NHC for submittal to FEMA. The following list outlines the type of material required for submittal and does not represent a comprehensive list of submittal requirements.

1. Maximum flight altitude used
2. C-Factor ratio limitations
3. Aerotriangular adjustment criteria

COPY

4. Comparison with ASPRS 1990 standards
   - A. Horizontal accuracies
     - a. limiting RMSE in x & y
     - b. horizontal survey standards control and check
     - c. relative accuracy
   - B. Relative accuracies
     - a. vertical RMSE
       - i. interpolated between workmap contours
       - ii. spot heights, ERMs, ERPs
     - b. Vertical survey standards (order) control and check surveys
   - C. Photogrammetric planning with analytical plotter, 6" focal length
     - a. max C-factor
     - b. max flight height
     - c. aerotriangular accuracy
       - i. horizontal
       - ii. vertical

5. Accuracy labeling page A4-6
   - A. Tested RMSE in x, y, & z
   - B. Compiled to meet RMSE in x, y & z

6. Photo control contact prints see page A4-7

7. Survey records
   - A. Field book (complete copy), see page A4-9 section B-4a.
   - B. GPS documentation
     B-file, D-file, G-file, R-file, see page A4-10 section B-4b.
   - C. Computations and adjustments of
     horizontal and vertical control points, see page A4-10 section B-4c.
   - D. Control diagram schematic control diagram of the survey records on a photo index for all basic horizontal and vertical control, see page A4-10 section 4d.
   - F. Analytical Aerial Triangulation data , see page A4-12 section D, including Control Photographs with a list of photo control points.

8. Aerial triangulation report with:
   - A. flight lines
   - B. exposure stations or model layout
   - C. all control points appropriately labeled w/station designations
   - D. computer designations (?)
   - E. agency responsible for establishing stations

   Results must include items a.-f. on page A4-14

COPY

9. Metadata file for each file type (i.e. basemap files, survey files), see pages A7-8 through A7-10

10. Check to ensure the Base Map Files meet the required specifications outlined in Appendix 7 for Digitizing Specifications Option 2

In addition to items we discussed regarding the field survey data, NHC did not receive any information on Section corner 34, 35, 3, 2 to tie in the Upper Las Vegas Detention Basin Plans.

Should you have any questions please call me at 371-7400. Thank you for your assistance.

FIGURE A7-2

METADATA FILE

In order to facilitate the use of the Federal Spatial Data Transfer Standard (SDTS) to transfer data files between users, a Metadate file shall accompany all digital data submissions. Only one Metadata file is required for each FIS, however, data providers may find it advisable to submit one Metadata file for each submitted file type (base map files, FIS files, etc.) as each file type may have very different origins. The Metadata file shall be in the form of a read.me file on the electronic medium containing the data files. It should follow the following format and contain all listed items.

Read.me Metadata File Specifications

- Data Set Identity: Digital Flood Insurance Study
  or Base Map
  or DEM, etc.
- County and State: Name of county and state covered by enclosed files
- Theme Keywords: Flood Insurance Study
  or Base Map
  or DEM, etc.
- Representation Model: Vector, raster, vector topologic, etc.
- Spatial Object Types: Point, node, tic, chain, arc, polygon, cell, etc.
- Data Set Size: In megabytes
- Transfer Format: DXF, DLG, DGN, EOO, or DWG
- Data Set Description: A description of the data set.
- Intended Use: Synopsis of the purposes or applications for which the data set was created.
- Data set extent: The limits of coverage of the data set expressed as latitude and longitude in decimal degrees, followed by the horizontal datum.

  Example: 41.125, -87.875, 41.25, -87.5 North American Datum of 1927
- List of file names included: A complete listing of all file names included.
- Intended Scale of Use: The scale at which the data can most accurately be applied, based on the scale or resolution of the source data used to generate the data set.
- Resolution of Data: The dimension of the smallest resolvable object in the data set.

FIGURE A7-2

METADATA FILE

- Projection Name: VTM, State Plane, Geographic, etc.
- Horizontal Datum: The coordinate system used for horizontal control.

  Example: North American Datum of 1927
- Vertical Datum: The reference system for the Z component of spatial coordinates.

  Example: National Geodetic Vertical Datum of 1929
- Projection Units: Meters, feet, etc.
- Zone Number: UTM or State Plane zone number. Plus sign is used to indicate Northern Hemisphere.

  Example: UTM +16
- Coordinate Precision: Single or Double
- Contact Type: Originator, distributor, etc.
- Contact organization:
- Contact person and title:
- Contact mailing address:
- Contact telephone:
- Transfer Mode: 8mm tape, 9-track tape, diskette, etc.
- Transfer Instructions: Type and density of tape or disk, archiving instructions, etc.
- Computer Type and Operating System:
- Completion Status: Status of completion of the county studied.
- Completion Date: Month, year.
- Geographic Area Completed: Name(s) of county area(s), streams, etc., completed.
- Hardcopy Product Availability: Enclosed

FIGURE A7-2

METADATA FILE

•	Copyright Status:	Public domain, copyrighted, etc.
•	Policy Status:	Description of ownership policy if data set is not in the public domain.
•	Table Definition Source:	Source document from which data base tables were defined.
•	Attribute Definition Source:	Source document from which feature attributes were defined. FEMA, Guidelines and Specifications for Study Contractors, etc.
*•	Source Name:	Descriptive name of source material
*•	Source Scale:	Expressed as a ratio, e.g., 1:12,000
*•	Source Medium:	Mylar, paper, electronic medium, etc.
*•	Creator of Source:	
*•	Date of Source Material:	Day, month, year.
•	Source Projection:	Projection name and parameters of source material.

*Note: All source data is to be repeated as necessary.

•	Processing Procedures:	Include Root Mean Square Error if transformations were performed.
•	Procedure Tolerances:	Description of processing tolerances applied.
•	Positional Accuracy:	± a value
•	Positional Accuracy Method:	Method by which positional accuracy was determined.
•	Attribute Accuracy:	Measure of confidence in percentage.
•	Data Model Integrity:	Explanation of integrity of relationships between objects in the data set.
	Example:	Data is topologically structured polygon data with nodes at all intersections.
•	Completeness:	Information about selection criteria, etc.
	Example:	Streams less than 100 meters long were not included.
•	Metadata Date:	Day, month, year.
•	Metadata Contact:	

5910 Clark Correspondence

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

3601 Eisenhower Ave., Suite 600
Alexandria, Virginia 22304

(703) 960-8800
FAX (703) 960-9125

Letter of Transmittal

MR. EO WALLACE	DATE: 2/6/97 JOB NO.
NORTHWEST HYDRAULIC CONSULTANTS	RE: Letter of Map Revision FEMA Case No. 96-09-483P
ATTENTION:	

THE INFORMATION DESCRIBED BELOW IS BEING SENT TO YOU VIA:

☒ MAIL ☐ BY HAND ☐ MESSENGER ☐ FEDERAL EXPRESS

NO. OF COPIES	DATE	DESCRIPTION
1		LOMR 96-09-483P, dated 1/28/97

THE INFORMATION IS TRANSMITTED AS CHECKED BELOW:

☐ FOR REVIEW
☐ FOR APPROVAL
☐ FOR SIGNATURE
☐ FOR YOUR USE
☒ AS REQUESTED BY MR. LES SAKUMOTO, FEMA
☐ AS APPROVED BY _____

REMARKS: Enclosed is a copy of the LOMR for Range Wash in Clark County, Nevada.

IF THE ENCLOSURES ARE NOT AS DESCRIBED, PLEASE NOTIFY US AT ONCE.

Signed Pamela Burch-Robinson

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable James K. Seastrand
Mayor, City of North Las Vegas
P.O. Box 4086
North Las Vegas, Nevada 89036

IN REPLY REFER TO:
Case No.: 96-09-483P

Community: City of North Las Vegas, Nevada
Community No.: 320007
Panels Affected: 32003C1790 D,
32003C2176 D, and
32003C2180 D
Effective Date of
This Revision: JAN 28 1997

102-I-C

Dear Mayor Seastrand:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 20, 1996, Mr. Kevin L. Eubanks, P.E., Assistant General Manager, Clark County Regional Flood Control District, requested that FEMA revise the FIRM to show the effects of the construction of the Range Wash Diversion Dike, channel improvements, hydrologic and hydraulic analyses, and updated topographic information along Range Wash.

All data required to complete our review of this request were submitted with letters from Mr. Eubanks. Because this Letter of Map Revision (LOMR) shows the effects of a publicly sponsored flood-control project that reduces flooding to existing development, fees were not assessed for the review.

We have completed our review of the submitted data and the flood data shown on the effective FIRM. We have revised the FIRM to modify the floodplain boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Range Wash from just downstream of East Craig Road to approximately 1,500 feet upstream of East Ann Road. As a result of the modifications, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, for Range Wash increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copies of FIRM Panels 32003C1790 D, 32003C2176 D, and 32003C2180 D. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

The modifications are effective as of the date of this letter. The map panels as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

A review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

Because this project also affects the unincorporated areas of Clark County, a separate LOMR was issued for that community on the same date as this LOMR.

We will not physically revise and republish the FIRM and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications made by this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. Karl Mohr of our staff in Washington, DC, either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosures

cc: Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District

Mr. Randall S. Tarr, P.E.
Development and Flood Control Coordinator
Department of Public Works
City of North Las Vegas

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of
Public Works

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-483P

The Honorable Yvonne Atkinson Gates
Chairperson, Clark County Board
of Commissioners
225 East Bridger Avenue, Sixth Floor
Las Vegas, Nevada 89155

Community: Clark County, Nevada
Community No.: 320003
Panel Affected: 32003C2180 D
Effective Date of
This Revision: JAN28 1997

102-I-C

Dear Ms. Gates:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 20, 1996, Mr. Kevin L. Eubanks, P.E., Assistant General Manager, Clark County Regional Flood Control District, requested that FEMA revise the FIRM to show the effects of the construction of the Range Wash Diversion Dike, channel improvements, hydrologic and hydraulic analyses, and updated topographic information along Range Wash.

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We have completed our review of the submitted data and the flood data shown on the effective FIRM. We have revised the FIRM to modify the floodplain boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Range Wash from just upstream of North Las Vegas Boulevard to just downstream of East Craig Road. As a result of the modifications, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, for Range Wash increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copy of FIRM Panel 32003C2180 D. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

The modifications are effective as of the date of this letter. The map panel as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

A review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

Because this project also affects the City of North Las Vegas, a separate LOMR was issued for that community on the same date as this LOMR.

We will not physically revise and republish the FIRM and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications made by this LOMR. Our records show that your community has met this requirement.

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Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. Karl Mohr of our staff in Washington, DC, either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

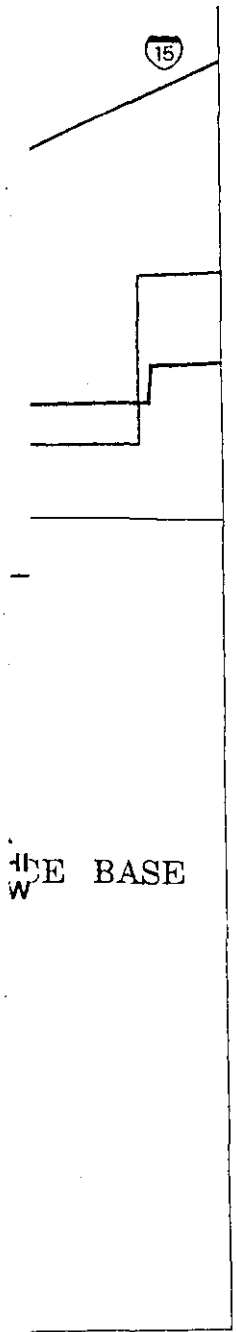
Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure

cc: Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of Public Works

Mr. Randall S. Tarr, P.E.
Development and Flood Control
Coordinator
Department of Public Works
City of North Las Vegas



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1790 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

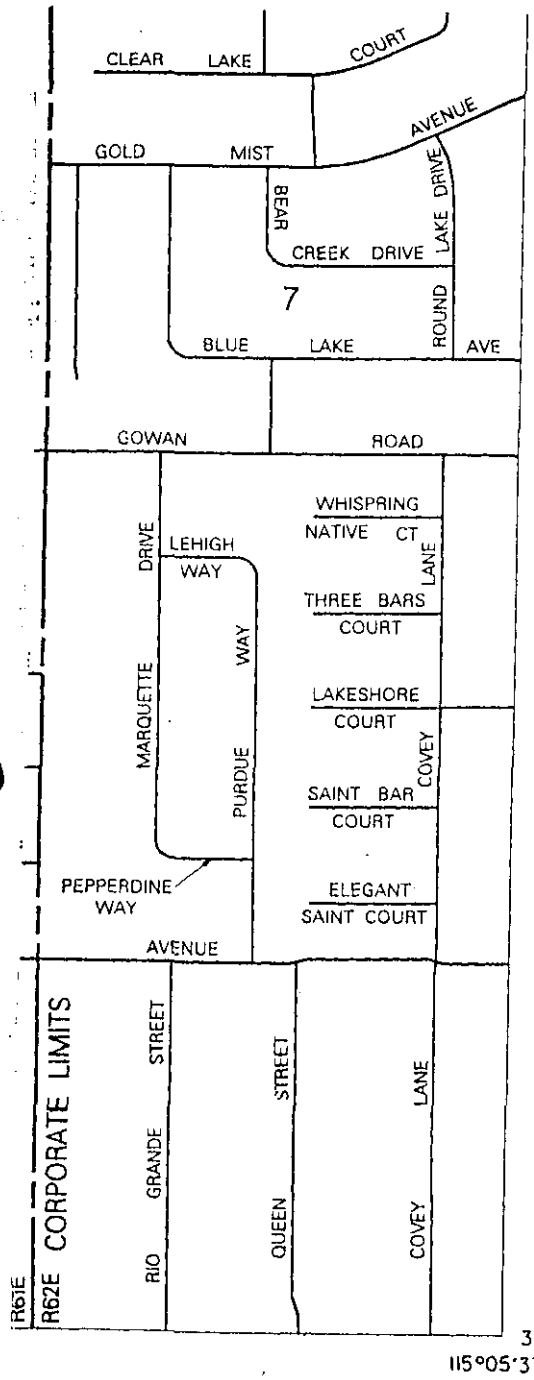
CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	1790	D
NORTH LAS VEGAS, CITY OF	320007	1790	D

REVISED TO REFLECT LOMR DATED JAN 28 '97

MAP NUMBER 32003C1790 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2176 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

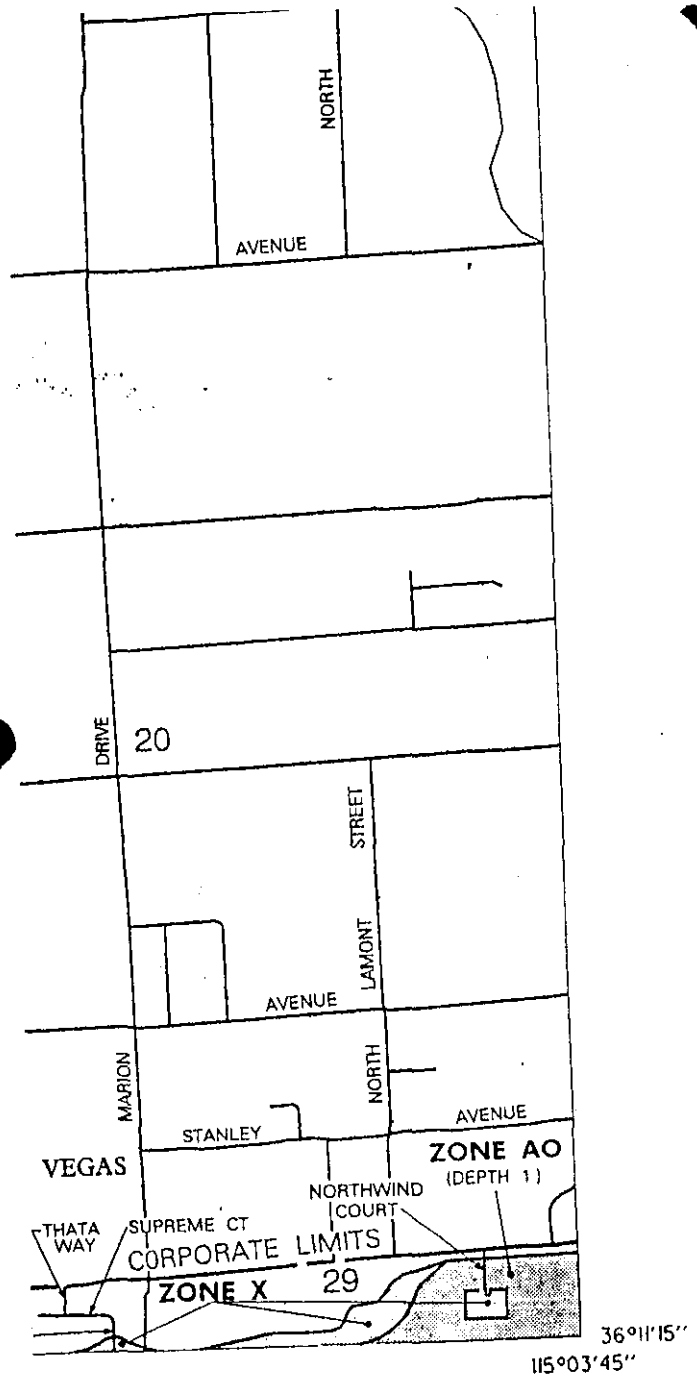
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NORTH LAS VEGAS, CITY OF	320007	2176	D

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MAP NUMBER 32003C2176 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2180 OF 4090
(SEE MAP INDEX FOR PANELS NOT PRINTED)

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LAS VEGAS, CITY OF	325276	2180	D
NORTH LAS VEGAS, CITY OF	320007	2180	D

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MAP NUMBER 32003C2180 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

Date: 17 November 1996

To: Kevin Eubanks, P.E.
Clark County Regional Flood Control District

From: Les Sakumoto, P.E.,
Civil Engineer, Region IX

Kevin:

This letter is to inform you that we have temporarily stopped work on the restudy for the upper Las Vegas Wash. This is the work being done for FEMA by Northwest Hydraulics. The restudy will be resumed after the CLOMR for the Range Wash diversion levee is resolved. Also, because the LMMP for Las Vegas Wash between Interstate 15 and Charleston was predicated on accreditation of all upstream structures, we will postpone the Preliminary FIRMs for this area until the CLOMR is resolved. If you have any questions about this matter, please give me a call at 415-923-7183.

File Copy

cc: Tom Smith & Pernil B.

File: CCFCD001

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FAX TRANSMITTAL COVER SHEET

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the individual or entity to which it is addressed, and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please immediately notify us by telephone to arrange the return of these documents.

DATE:	**September 16, 1996**
TO:	**Les Sakumoto → Ed, Bob, Joe @ NHC**
FIRM:	**FEMA Region IX**
FAX #:	**(415) 923-7147**
FROM:	**Tom Smith**
FIRM:	**MICHAEL BAKER JR., INC.**

THIS FAX CONSISTS OF 3 PAGES, INCLUDING THIS SHEET.

SPECIAL INSTRUCTIONS:

FYI

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 05 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:

Mr. Kevin L. Eubanks
Assistant General Manager
Clark County Regional Flood Control District
301 East Clark Avenue, Suite 301
Las Vegas, Nevada 89101

Case No.: 96-09-483P
Communities: City of North Las Vegas and
Clark County, Nevada
Community Nos.: 320007 and 320003

316-AD

Dear Mr. Eubanks:

This is in reference to your February 20, 1996, request for a Letter of Map Revision (LOMR) to the Flood Insurance Rate Map (FIRM) for the above-referenced communities. You requested that the Federal Emergency Management Agency revise the effective FIRM for Clark County, Nevada and Incorporated Areas to show the effects of the construction of the West Range Wash Diversion Dike (WRWDD), updated topography, hydrologic and hydraulic analyses, and channel modifications along the eastern and western branches of Range Wash from just upstream of Las Vegas Boulevard to approximately 800 feet upstream of the Union Pacific Railroad. We are also reviewing a request for a Conditional Letter of Map Revision for the Range Wash Confluence Detention Basin and a request for a Letter of Map Revision Based on Fill for Magnolia Estates west of Sloan Channel and south of Stewart Avenue.

We have reviewed the submitted information and determined that a revision to the effective FIRM may be warranted. The WRWDD is located in an area subject to alluvial fan flooding, which is characterized by high-velocity flows, erosion, sediment transport and deposition, and unpredictable flow paths. The WRWDD is intended to intercept and divert flows from the western tributary of Range Wash and direct them to the North Las Vegas Detention Basin (NLVDB). Data requirements for map revision requests involving structural flood-control measures in areas subject to alluvial fan flooding are described in Section 65.13 of the National Flood Insurance Program regulations.

Boyle Engineering Corporation (BEC) used the HEC-6 scour and deposition computer model to estimate the sediment load that may be deposited along the diversion dike. BEC estimated the volume of that deposit to be approximately 32.1 acre-feet, 37 percent of which occurs at the peak flow. Thus, a total of 11.8 acre-feet of sediment was assumed to accumulate at the dike during the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for a discharge of 7,028 cubic feet per second.

BEC modeled the flows from the apex of the fan to just upstream of the dike as conveyed in a single channel approximately 330 feet wide. A trapezoidal channel along the upstream face of the diversion dike conveys the base flood westward into the NLVDB. To model the transition from the single channel along the alluvial fan to the channel along the upstream face of the dike, an average of both channel widths (approximately 232 feet) was used in the computations. The results from the HEC-6 model, the alluvial fan model, and procedures for determining scour geometry below dam outlet structures were used to estimate the height of sediment deposition. According to BEC's calculations, the sediment deposition at the diversion dike is approximately 5.6 feet high. This was based on the total area of the sediment deposit (determined from the volume of deposition and the average channel width) and the change in slope between the alluvial fan and the grade along the upstream face of the dike. Post, Buckley, Schuh and Jernigan, Inc., prepared the hydrologic analysis for this LOMR request based on the results of BEC's analyses.

We believe BEC's approach is reasonable but are concerned that because the flow is intercepted by a flood-control structure located perpendicular to the direction of flow, velocities at the structure are approximately zero and the accompanying sediment load will be deposited where the flow changes direction. In this case the sediment load will not deposit continuously along the upstream face of the dike, as indicated by BEC's one-dimensional analysis.

We are concerned that the sediment deposition at the dike may be high enough to prevent the structure from operating properly. If the dike is overtopped by flows during the base flood, the submitted hydrologic analyses will not be valid for areas downstream of the dike. Unless we receive information that verifies that the facility will operate properly, that the sediment deposition approaching the dike in a perpendicular direction will not jeopardize the function of the dike and that the flow is diverted to NLVDB, we cannot credit this structure as providing protection for the base flood. The information must also demonstrate that there will be 3 feet of freeboard at any given time during the base flood.

We are also concerned that the left bank (looking downstream) of the diversion channel located along the WRWDD between stations 58+00 and 62+00, as shown on the construction plans entitled "West Range Wash Diversion Dike" prepared by BEC, dated January 1993, may erode as a result of increased flow velocity, change in channel width, and channel alignment. Please submit information on the erosion protection provided along this reach of the channel.

Before a final determination on revising the effective FIRM can be made, we must receive the information stated above. Please send the required data directly to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Attention: Ms. Pernille Buch-Pedersen
(703) 317-6224

For identification purposes, you must include the case number referenced above on all correspondence.

If you have any questions regarding this matter, please contact Mr. Karl Mohr of our staff in Washington, DC either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

Michael Buckley

Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

cc: The Honorable Yvonne Atkinson Gates
Chairperson
Clark County Board of Commissioners

The Honorable James K. Seastrand
Mayor, City of North Las Vegas

Mr. Randall S. Tarr, P.E.
Administrator of Development and Flood Control
City of North Las Vegas

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of Public Works

Mr. Donald W. Davis, P.E.
Project Manager
Post, Buckley, Schuh & Jernigan, Inc.

bcc: Regional Director R9-MT
MT-HZ-ID Chron MT-HZ-ID
MBJ Case File/PBP/HSS
MBJ Project File

Concurrences: MT-HZ-ID De Coca MT-HZ-ID Mohr

Kenney Aerial Mapping Inc.

1139 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7874 Fax: (702) 873-4185

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Peter A. Dyroff, VICE-PRESIDENT

To: NORTHWEST HYDRAULIC CONSULTANTS
3950 INDUSTRIAL BLVD #100C
WEST SACRAMENTO, CA 95691

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Date: 9/4/96
Attention: MR WALLACE
Re: UPPER LAS VEGAS WASH
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LASVEG2.DWG " " 7.DWG
" " 3.DWG " " 8.DWG
" " 4.DWG DTMADD.DWG
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From: SK Received by Tony Howard Date 9/4/96

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To L. J. Howard | From CNLV-Public Works
Co./Dept. NW Humane | Co.
Phone # | Phone # 633-1210
Fax # 916-371-1400 | Fax # 649-4696
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Published phone numbers
AUGUST 29, 1996

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Badger, Lenny	Develop/Flood Control Coordinator	633-1223
Bell, Jim	Deputy Director	633-1200
Bogan, Kirk	*Drafter II*	633-1230
Brady, Thomas	Eng Designer	633-1227
Breakroom		633-1239
Burke, Ray	Administrator	633-1238
Cagle, Randal	Administrator	633-1232
Chuma, Kelly	Administrator	633-1224
Conference Room		633-1241
Conference Room		633-1216
Conservation hotline		390-4403
Contreras, Irene	Admin Secretary	633-1210
Daffen, Dale	Geo-Technical Engr	633-1533
FAX Line		633-1236
FAX Line		649-4696
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Mira, Arthur	Eng. Design Tech.	633-1221
Olinger, Conni	Sr. Mgmt Analyst	633-1240
Rura, Lisa	Eng. Projects Coordintr	633-1234
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Tsouras, Diana	Exec Secretary	633-1200

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MEMORANDUM

TO: Les Sakumoto, FEMA Region IX

FROM: Ed Wallace, NHC

DATE: August 29, 1996

SUBJECT: Review of flood control diversion structures, Las Vegas Wash Study Area

---

The attached notes summarize our preliminary review of three diversion structures in the Upper Las Vegas Wash study area. The notes are based on site reconnaissance and review of design information provided by the local agencies, the Technical Evaluation Contractor (TEC) and other sources. This information is provided for the purpose of facilitating discussion of anticipated performance of the structures between you, appropriate TEC staff, and NHC. We strongly recommend that its distribution be limited to these individuals.

Please note that the attached notes are not intended to be a complete design review or performance evaluation. Rather, they summarize our thought regarding the performance of the structures based on the information we have reviewed. Although we believe that we have conducted a through information search, additional relevant information could be available. We have not, for example, directly contacted design engineers to request design information.

The field reconnaissance, information search, and review of available information have been accomplished according to the budget allocated to these tasks in our scope of work. After completion of our review, we are unable to conclude with certainty that the structures will preform adequately during major flood events. Failure of two of these structures would not affect peak discharges downstream in our study area. However, we recommend that uncertainties in the performance of all three structures, and their effects on regional flood hazards, be discussed with the TEC.

We are available for a telephone conference to discuss these topics on September 12, as you suggested in our August 13 meeting. If necessary for effieicent review of plans and site maps, we would also be available for a personal meeting with you and the TEC on that date or other date by arrangement.

cc Tom Smith, Michael Baker Jr., Inc.
Will Thomas, Michael Baker Jr., Inc.

c:\5001_\50010\8-29les.fax

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Clark County FIS
Review Notes
Diversion Structures on Alluvial Fans

1. General Description

A. Upper Las Vegas Wash Interception Berm

- 300' bottom width
- bottom slope 0.0067 ft/ft; 0.01ft/ft at downstream end
- drop structure used to control gradient
- 12" RCC slope protection on right bank, 6' toe down protection, 12" nominal riprap on the left bank
- flow enters at 45 degree angle to channel
- inflowing wash surface slope approximately 0.015 ft/ft, distributed flow in wash between fans

B. North Las Vegas Detention Basin Diversion Dike

- located on Las Vegas Wash channel approximately 2000 feet upstream of detention basin
- flow makes a 45 degree bend to the right at diversion dike; bed slope of influent wash channel is approximately 0.01 ft/ft; width is 140 feet
- transition to constructed channel is made in control structure; channel bed slope at diversion dike is 0.002 ft/ft, increases to 0.0076 ft/ft downstream of control structure; channel decreases from 70 feet width along the diversion to 35 feet downstream of the control structure
- diversion dike and control structure have 6" thick concrete slope protection with 5' and 8' deep cutoff walls on upstream and downstream sides; channel downstream has soil cement lining to 300' upstream of basin
- top elevation of diversion dike is 2142; top of embankment at detention basin is 2144; spillway crest is 2134
- The control structure forces a transition to supercritical flow, and controls the water surface elevations upstream at the diversion dike.

C. Range Wash Diversion Dike

- 120' bottom width
- bottom slope approximately 0.01 ft/ft in collection channel; 0.02 ft/ft at

downstream end
- dike slope unprotected in collection section; 12" - 24" soil cement in downstream section at higher gradient
- flow enters at 90 degree angle
- inflowing fan slope approximately 0.04

2. Available Information

A. Upper Las Vegas Wash Interception Berm

1. Black & Veatch Pre-Design Report, 1989 (No Design Report Available)
2. Supplement to CLOMR prepared by Black & Veatch, 1991
   - used computed 100-year flow depth (4.5') plus 3 feet plus 0.75 feet inflowing velocity head to determine height of berm above channel bed
   - gabion protection on left bank, mentioned in CLOMR, not constructed, replaced with riprap
   - channel velocities 10-11 fps
   - compared sediment transport on the fan to transport in the channel to evaluate potential for deposition and erosion - used Meyer, Peter and Muller (MPM) and Toffaleti
   - MPM at fan apex for 100-year hydrograph gives 9.46 af ; in interception channel gives 8.11 af - - 1.35 af of deposition, assumed to occur over 1,000 feet of channel area - gives 2 to 3 inches of deposition
   - Toffaleti at fan apex gives 49 af and in channel gives 61 af ; degradation of 12 af. Used USBR 3-slope method to estimate degradation of 3.9 feet
   - Estimated degradation volume using MPM and Toffaleti (in channel only) and applied USBR 3-slope method to estimate degradation depths of 3.2 and 8.7 feet over 970 and 2,700 foot reaches - assumed conservative because no contribution used from fan. Averaged two methods to get 6.0 feet of degradation.
   - Used four methods from USBR to estimate scour, averaged results to get 4.7 feet of scour
   - Used degradation and scour estimates to set toe down protection depth of 6 feet on right bank

B. North Las Vegas Detention Basin Diversion Dike

1. Design flows into the NLVDB are available from HEC-1 modeling by Black & Veatch. The 100-year design flow was 14,900 cfs; generated by the Sheep Mountain Storm. This flow has been reduced by construction of the Upper Las Vegas Detention Basin.

2. The Interbasin storm produces the highest peak discharge in the channel between the two basins under existing conditions, as shown in draft hydrology by NHC. The 100-year peak flow is approximately 8,500 cfs.

3. No design report is available for the NLVDB, and no information has beenreceived by NHC regarding hydraulic or sediment transport design of the diversion dike, control structure and inflow channel.

C. West Range Wash Diversion Dike

1. Flood Insurance Restudy for West Range Wash, Post, Buckley, Schuh, & Jernigan, 1996, TSDN (Contains Boyle Engineering design documentation)

- PSIA method used to estimate sediment yield, multiplied by a factor of 7 to obtain 100-year event yield. Average annual yield in the range of 0.3 to 0.5 af/sq mi
- Used Dawdy equation to estimate channel geometry on fan surface for the purpose of computing transport capacity. Computed channel is 330' wide.
- Used HEC-6 to develop inflowing load based on equilibrium conditions
- Compared hand computations using Yang equation to HEC-6 result
- Also computed average annual sediment yield by integrating event yields based on transport relationships
- Computed deposition in channel by comparing fan transport and dike transport - 65,000 tons - used time of peak as critical point - 36.8% of total event transport
- Used USBR method for estimating degradation below dams to estimate depth of deposition - result is 5.64 feet
- Sized dike by adding deposition depth, energy head and 3 feet of freeboard
- Scour not explicitly addressed in FIS TSDN

3. Evaluation of Available Information

A. Consequences of Failure

1. For both the Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike, failures would result in flooding outside the study area. The most conservative assumption for the purpose of computing flows in Las Vegas Wash is that the dikes remain in place.

2. Failure of the diversion dike at the North Las Vegas Detention Basin would significantly increase peak discharges downstream due to loss of control from the detention basin. 100-year peak flows could be more than tripled.

B. Upper Las Vegas Wash Interception Berm

1. Performance questions relate to unsteady flow and local sediment transport conditions as flows enter the interception channel. Comparison of sediment transport at the apex of the fan and in the channel at steady state does not address the question of whether deposition that affects capacity or stability will occur as flow enters the channel.

2. The two methods used yield opposite results - MPM predicts deposition while Toffaleti predicts scour. Confidence in either result should be very low based on the opposite trends indicated.

3. The USBR 3-slope method applies to degradation below dams, and is intended for use in predicting long term degradation based on bankfull channel flows. It is not applicable to this situation where flows are infrequent, vary rapidly, and inflowing sediment loads may be very high.

4. Four USBR methods for estimating scour were averaged to design the toe-down protection (calculation not reviewed). Calculations may have been based on the constructed channel geometry, rather than the channel configuration likely to occur in a flood. Local deposition along the north bank could train the flow along the south bank, increasing scour potential.

5. The orientation of the interception channel at 45 degrees to the entering flow will reduce the chance of local deposition that would completely block the channel or result in ramping over the south bank. The ground adjacent to the channel along the north bank is 2-4 feet lower than the top of the berm on the

south bank. If deposition occurs locally, flows could go around deposited sediments across adjacent ground. The general ground slopes to the southeast at 45 degrees to the channel alignment.

6. Flow reaching the interception berm has already turned to parallel fan contours in the wash between coalescing and opposing fans. It is unlikely that flow would enter the channel at a single point, but would more likely be distributed among several inlet channels.

7. Based on geomorphic inspection, the structure appears likely to function adequately to divert the 100-year design storm to the basin. This is based on the orientation of the channel, width of the channel, likelihood of distributed inlet flows, relatively small change in bed slope between the wash and constructed channel, and presence of bank and toe protection on the southern bank. However, the methodology used for estimated deposition and scour in the channel may not accurately predict its performance. The lack of performance history and/or more detailed assessment of unsteady flows with high sediment/debris loads leads to considerable uncertainty in expected performance.

B. North Las Vegas Detention Basin Diversion Dike

1. HEC-2 modeling results using the Interbasin storm show critical depth at some sections upstream of the diversion dike. The computed energy grade line for the 100-year flow in the channel just upstream of the diversion dike exceeds the top of the dike by 0.3 feet, and the computed water surface elevation at the dike is 2141.9. The top of the dike is elevation 2142.

2. The diversion dike is protected by a 6" thick concrete facing, but has no structure for energy dissipation or apron on its downstream side. Flow over the dike has the potential to undermine the 8 foot cutoff wall. In some areas the bottom of the cutoff wall is at elevation 2131, approximately 5 feet above the wash invert elevation of 2126. The design of the structure is not typical of hydraulic structures such as spillways or diversion weirs associated with dams.

3. The change in flow direction, channel dimensions, and slope that occur at the dike make its performance difficult to predict. However, there is potential for deposition of sediments as the transition occurs from flow in the natural wash to the constructed channel. Deposition would increase the likelihood for the dike to be overtopped.

4. Computed velocities in the constructed channel downstream of the control structure for the 100-year Interbasin storm are up to 20 fps. The integrity of the soil cement channel lining to withstand these velocities is questionable.

5. Performance of the dike under the 100-year Interbasin storm is uncertain. If considered a levee, FEMA standards for freeboard are not met. If considered a hydraulic structure, the design does not appear to conform to typical standards. Failure of the dike would significantly increase peak discharges downstream, from approximately 2,300 cfs to as high as 8,500 cfs.

C. West Range Wash Diversion Dike

1. Event sediment yield was estimated using the PSIA method, adjusted by a factor; and by computing transport in theoretical channel on the fan. Results agree reasonably well, but considerable uncertainty still exists in the event estimate on this steep fan surface (4%).

2. Deposition volume in the channel was computed by comparing HEC-6 results for a theoretical channel on the fan and the constructed channel. This analysis assumes a quasi-steady state sediment transport equilibrium. Actual flood conditions would be unsteady, and local hydraulic conditions at the junction of the fan channel and constructed channel can not be adequately analyzed using HEC-6.

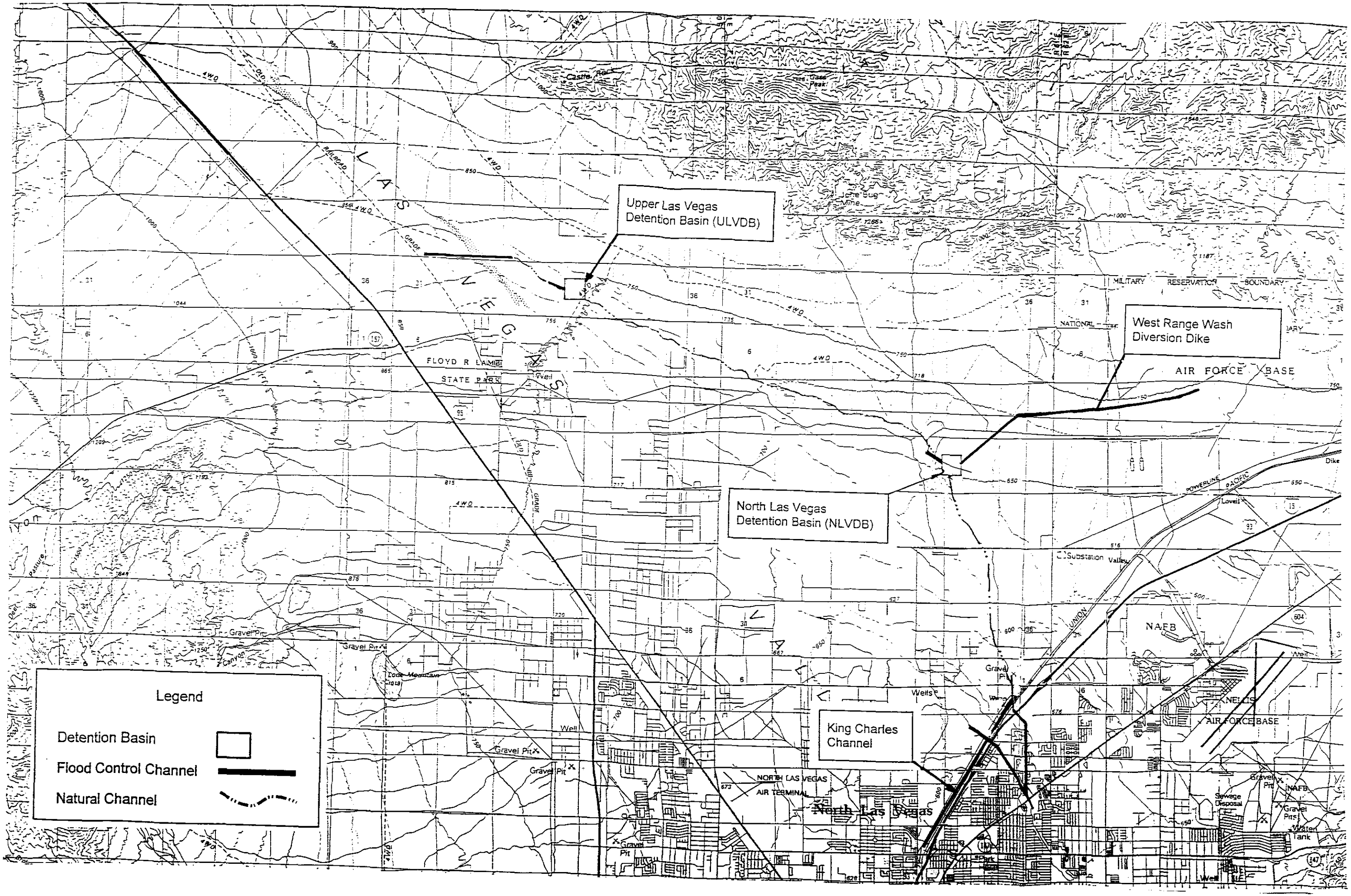
3. HEC-6 computed 36.8% of the total deposition occurs at the peak discharge of 7050 cfs. However, within 1 hour of the peak discharge 72% of the total deposition occurs at a discharge of 5900 cfs. Therefore, the greatest combined depth of deposits and flow may occur following the peak of the hydrograph.

4. The energy grade line of the incoming channel is near the top of the diversion dike, and the intersection occurs at 90 degrees. An alternative method for computing theoretical channel dimensions (Edwards & Thielmann, 1982) yields a higher energy grade line, exceeding the top of the dike.

5. Deposition is likely to occur locally near the north bank of the channel, causing the flow to split and potentially to be trained against the south bank of the channel. This channel slope is unlined and could erode rapidly where local turbulence or channel migration occurs.

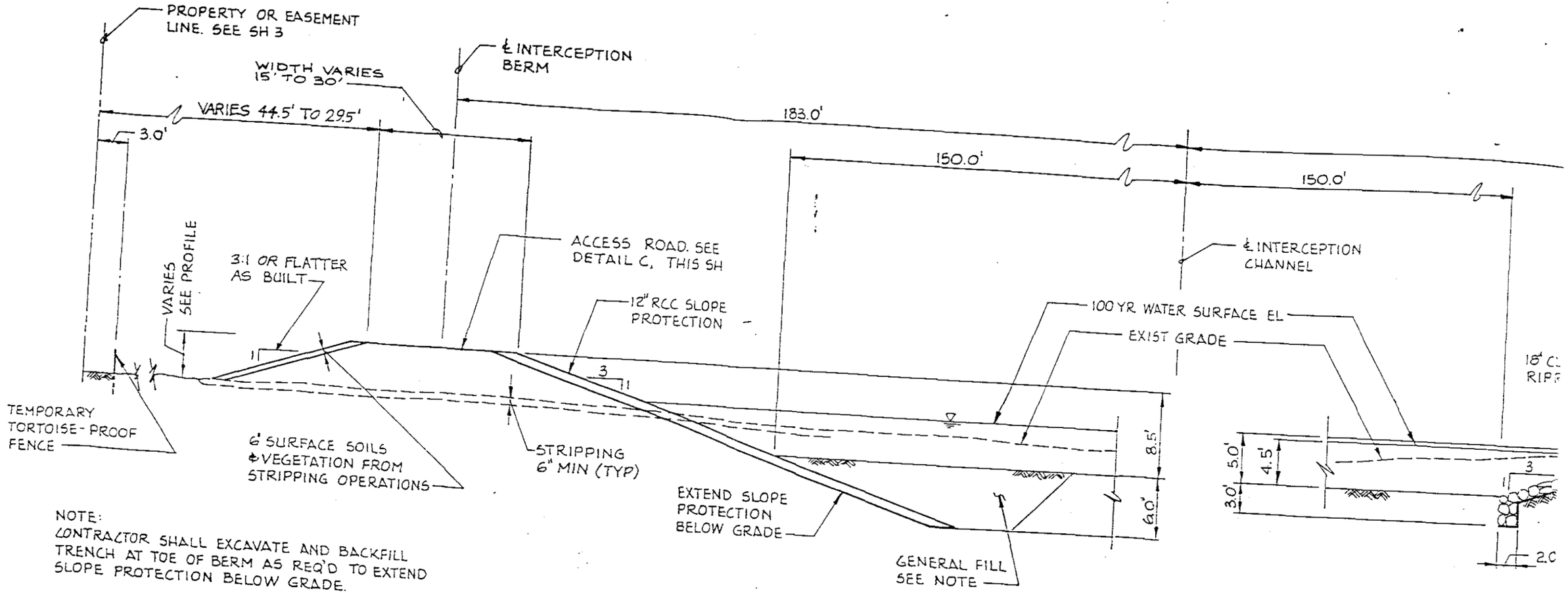
6. In some areas, the flow entering the diversion channel is deflected to the east (or upstream direction) by remnant gunnery berms upstream of the diversion channel. This change in direction will likely cause deposition at the confluence of the diversion channel and the incoming channel. Scour will likely occur downstream of the confluence as the flow gains energy.

7. The design estimates for the amount of deposition at the confluence of the fan and the diversion channel may be low. More conservative assumptions indicate flow could ramp over the berm. High energy flows will likely result in significant scour of the unlined diversion channel. The combined effects of local deposition and scour make performance of the dike uncertain.



Location Map

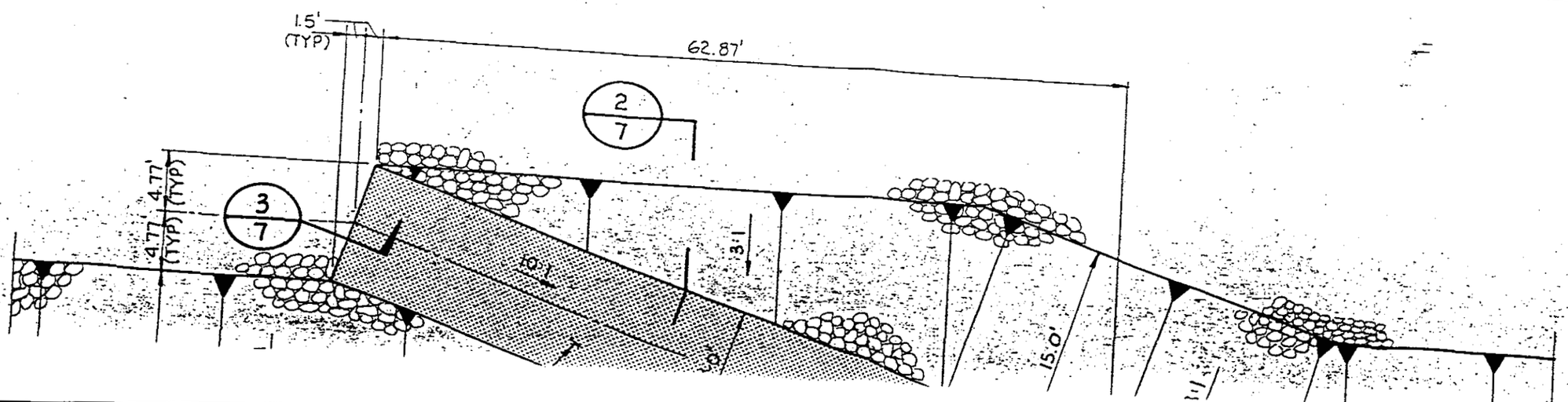
Upper Las Vegas Det. Basin



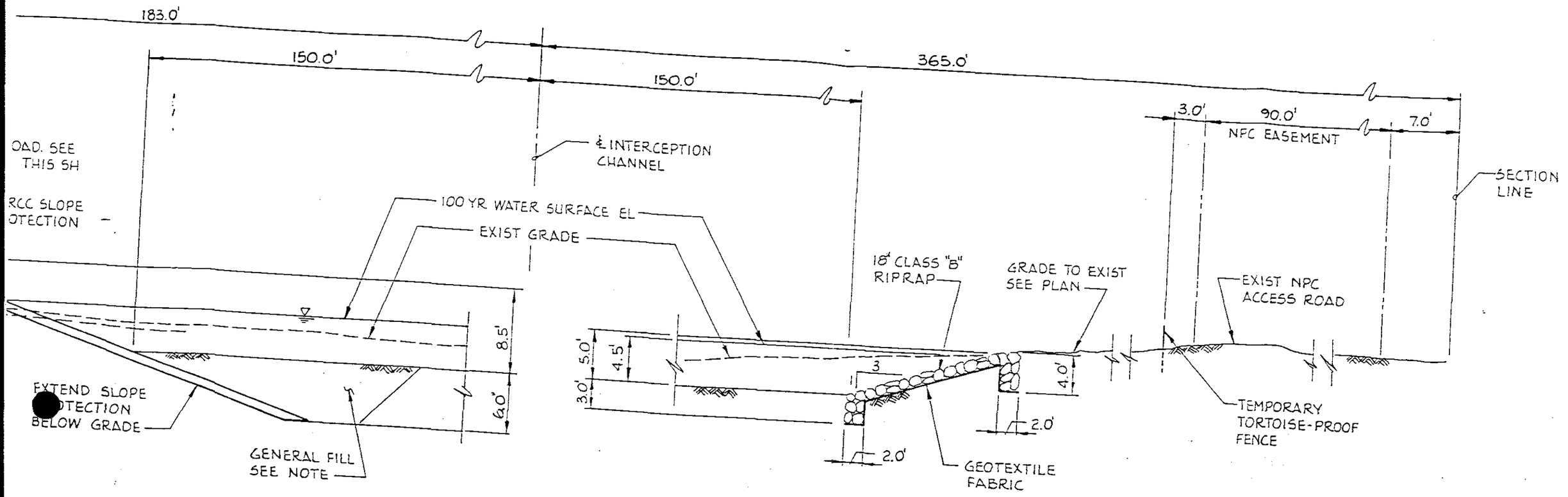
NOTE:
CONTRACTOR SHALL EXCAVATE AND BACKFILL TRENCH AT TOE OF BERM AS REQ'D TO EXTEND SLOPE PROTECTION BELOW GRADE.

INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1" = 10'

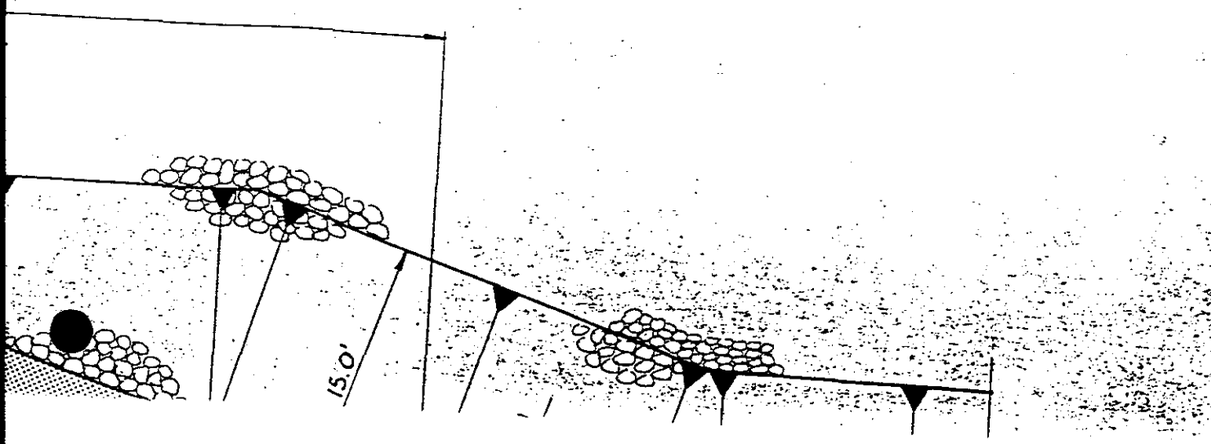


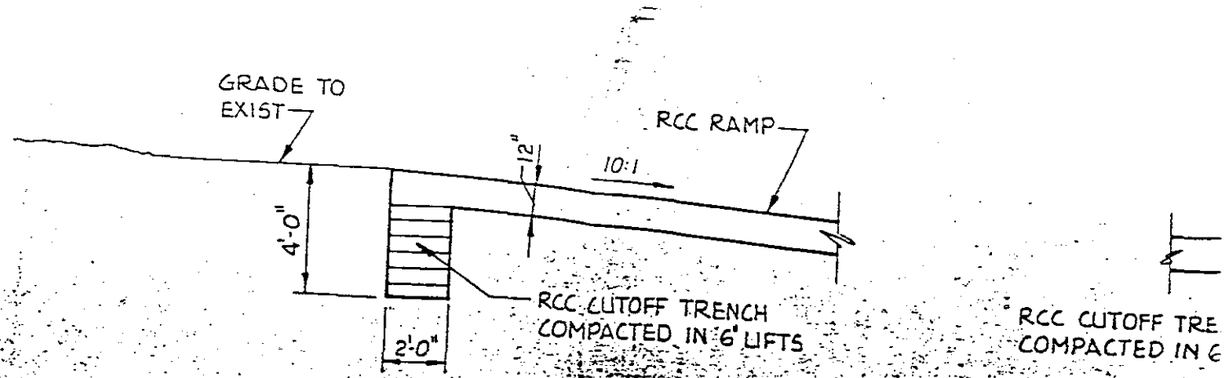
Upper Las Vegas Det Basin



INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1" = 10'

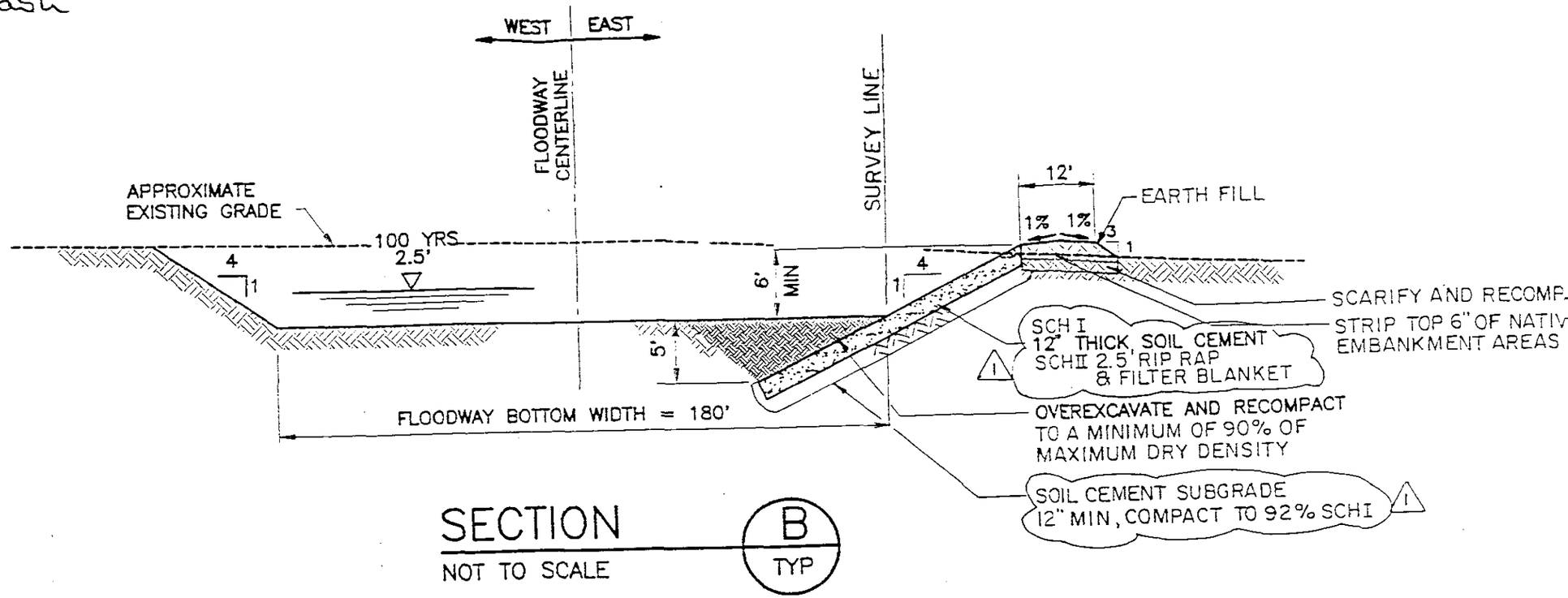




NOT TO SCALE

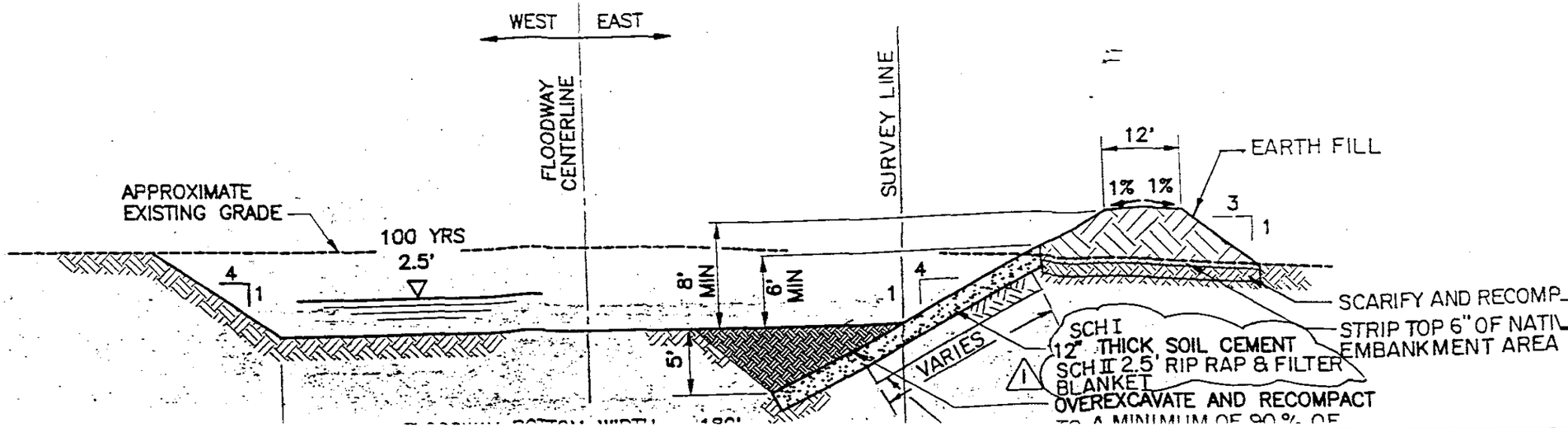
Sht DT-1

West Range Wash



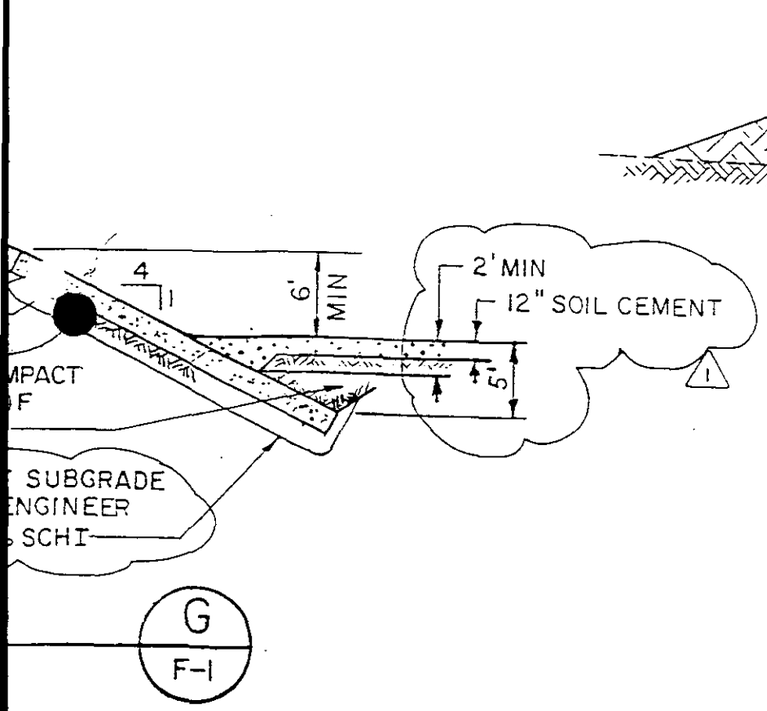
SECTION B TYP

NOT TO SCALE

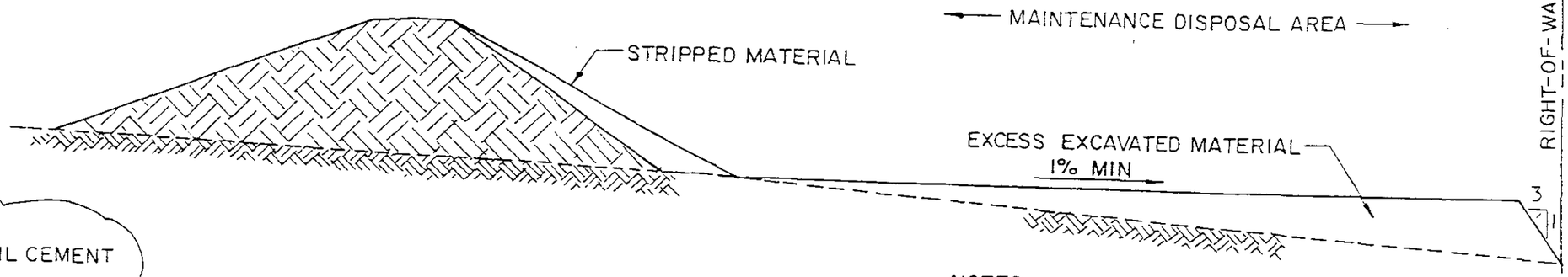


Sht DT-1

West Ranga Wash



G
F-1



NOTES

1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING.~~ 1
2. EXCESS EXCAVATED MATERIAL SHALL BE PLACED IN MAINTENANCE DISPOSAL AREA. COMPACT TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY.

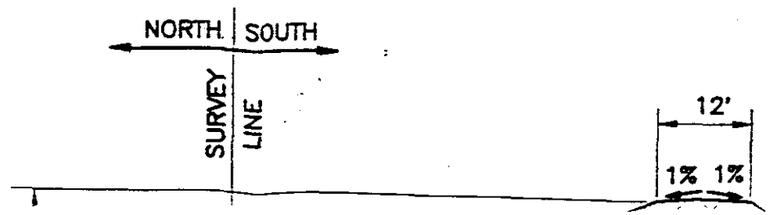
SECTION

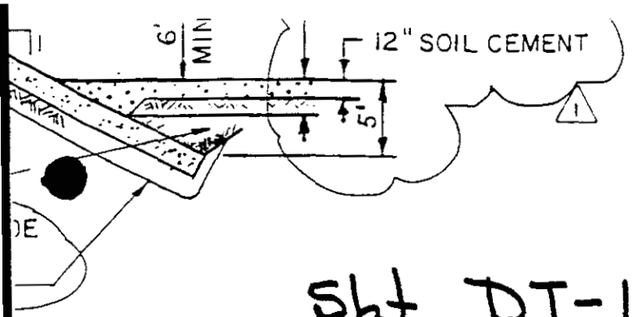
NOT TO SCALE

D
—

EXISTING GRADE

100 YRS





Sht DT-1

West Range Wash

G / F-1

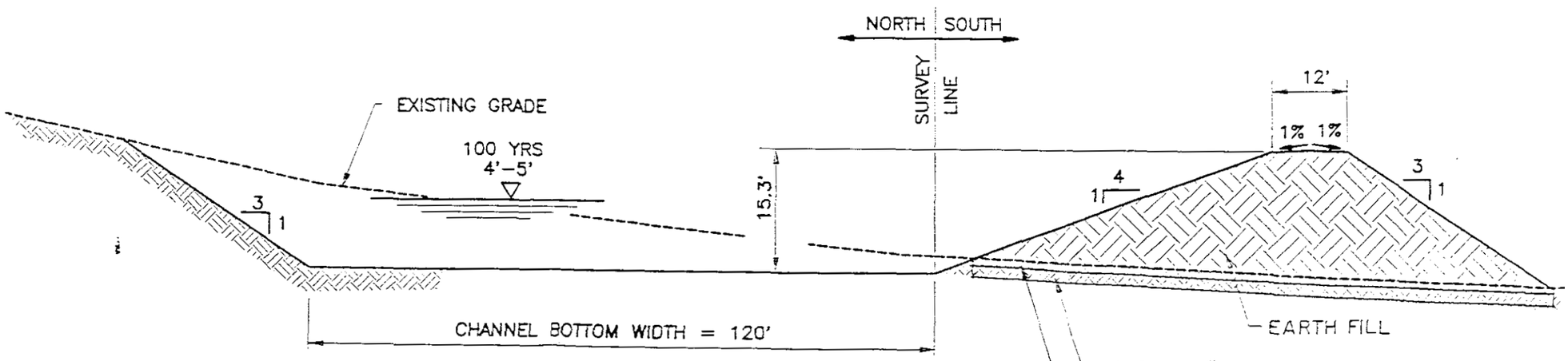
NOTES

1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING.~~ (1)
2. EXCESS EXCAVATED MATERIAL SHALL BE PLACED IN MAINTENANCE DISPOSAL AREA. COMPACT TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY.

SECTION

NOT TO SCALE

D / —



RECOMPACT 9" MIN DEPTH
F NATIVE SOILS BENEATH
AREAS.

SECTION

NOT TO SCALE

E / TYP

WEST | EAST

REGISTERED PROFESSIONAL ENGINEER STATE OF
STERLING
WORTSWORTH
1-29-92

August 29, 1996 Memorandum
Review of Flood Control Structures
For Additional Attachments, see Section in TSDN -

Flood Control Structure Review

Mayor
James K. Seastrand

Councilmen
Theron H. Goynes
Mary J. Kincaid
William E. Robinson
John K. Rhodes

City Manager
Linda Hinson

Deputy City Manager
Patrick Importuna

City of North Las Vegas
Public Works Department - Development & Flood Control Division
2266 Civic Center Drive • North Las Vegas, Nevada 89030-6307
Telephone: (702) 657-2265 • Fax: (702) 649-4696

August 22, 1996

received
AUG 27 1996

Joey Howard
Northwest Hydraulic Consultants, Inc.
3950 Industrial Boulevard, Suite 100C
West Sacramento, CA 95691

RE: NORTH LAS VEGAS WASH FIS - SUPPLEMENTAL INFORMATION

Dear Mr. Howard:

On August 9, 1996 the City of North Las Vegas received a facsimile from your office to Kelly Chuma requesting additional information to assist in the completion of the North Las Vegas Wash Flood Insurance Study. Of particular concern were graded areas and newly paved streets that showed up on recent aerial photography. Diagrams were included with the facsimile to indicate the areas of concern.

The subject areas have been identified by City of North Las Vegas staff as the Golden Triangle Industrial Park. All grading plans for the entire project as well as flood control channel plans have been forwarded to your office. No other proposed developments that significantly impact the floodplain can currently be identified. If any arise in the near future, those plans will also be forwarded to your office.

If you have any questions or require additional information, please do not hesitate giving me a call at (702) 657-2286.

Sincerely,

Lenny M. Badger

Lenny M. Badger, E.I.T.
Development and Flood Control Coordinator

Enclosures

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

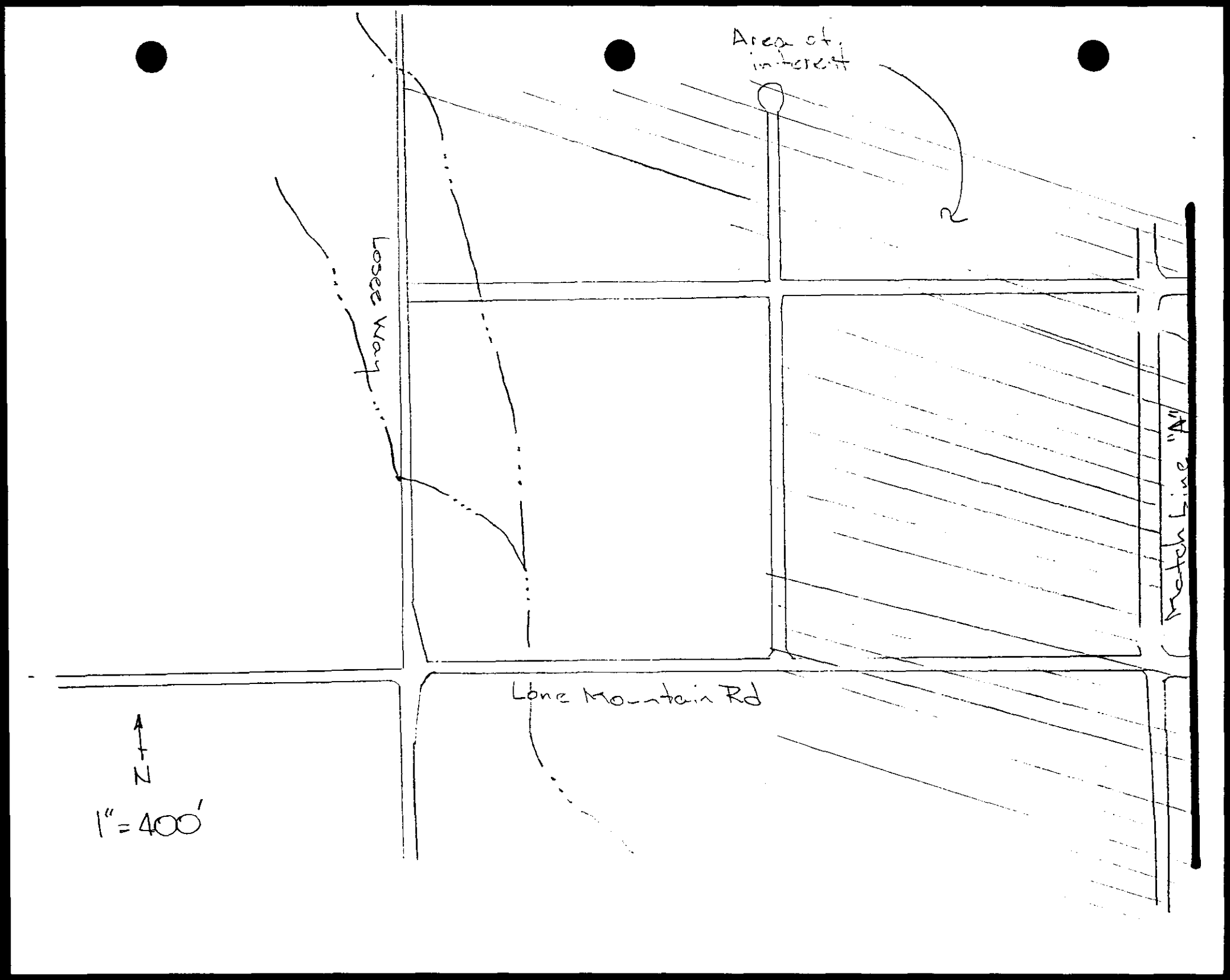
Date:	August 9, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 4
To:	Kelly Chuma	Original via:
Company:	City of North Las Vegas	
Fax Number:	702-649-4696	
Telephone No:	702-657-2265	
Subject:	North Las Vegas Wash FIS	

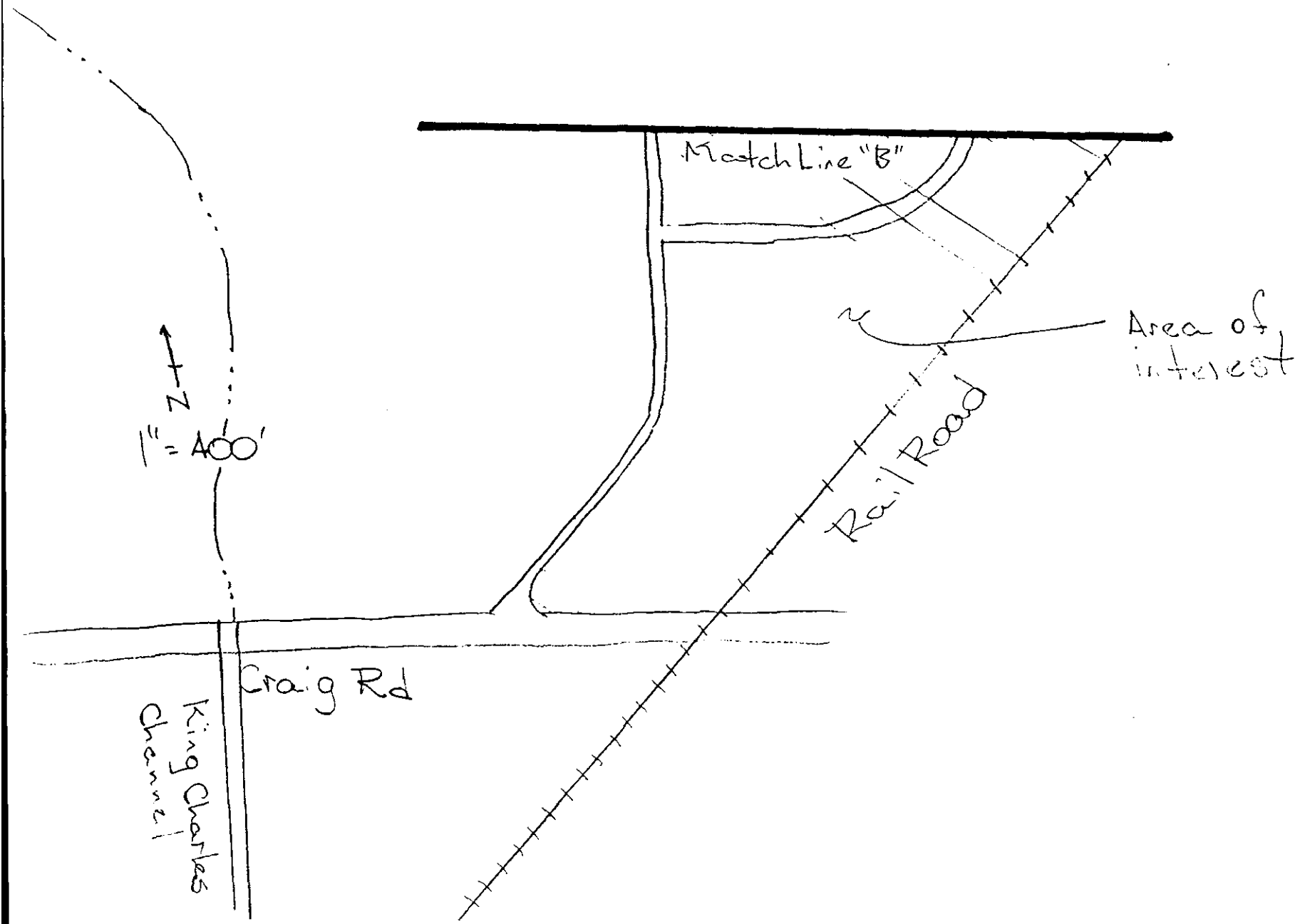
Please call immediately if you do not receive all pages of this transmission.

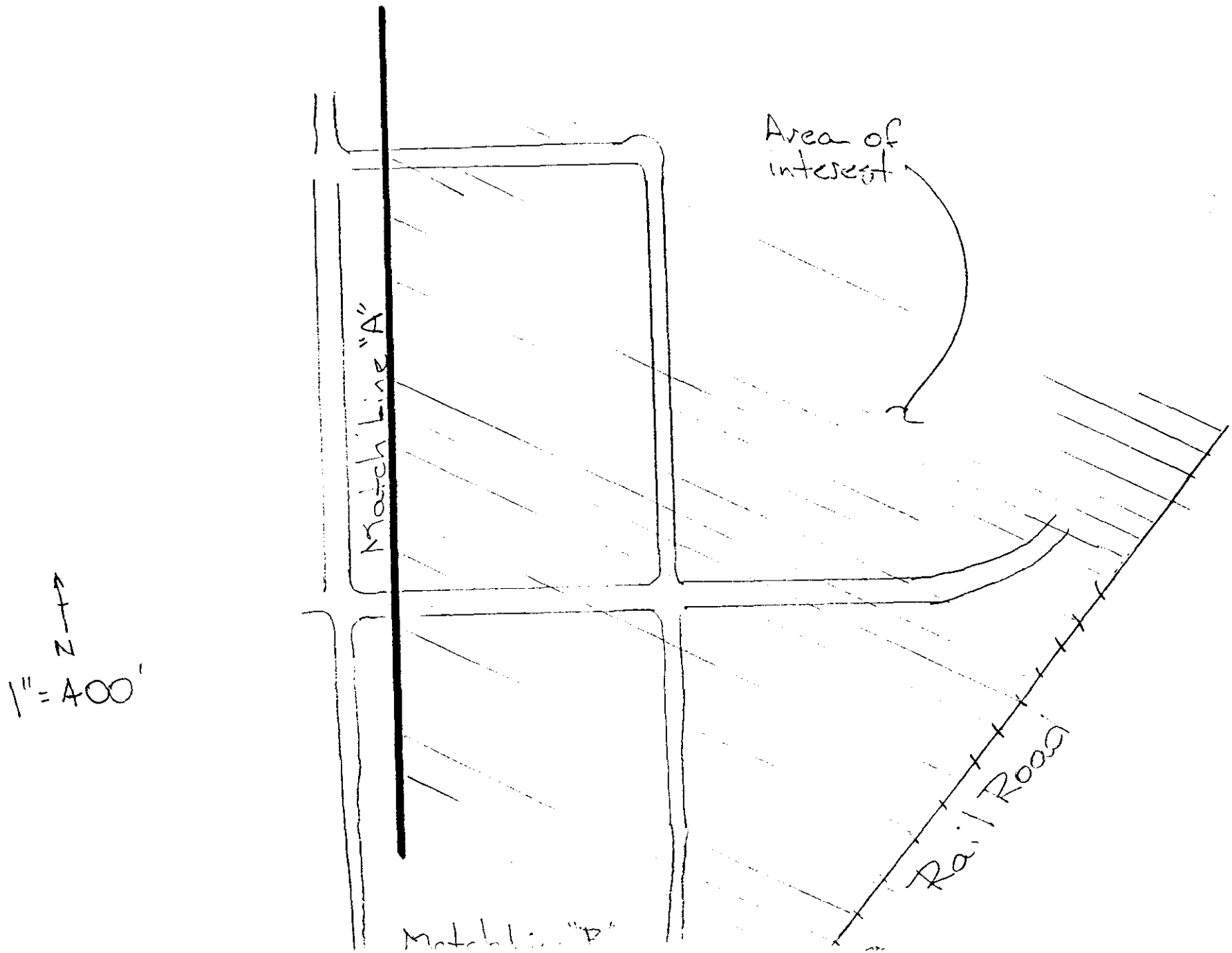
Remarks:

Aerial photography of an area east of Losee Way, near Lone Mountain Road, shows some recently graded areas and newly paved streets. It would be of great help if you could provide NHC with as-built grading plans or any other plans that would show the proposed grades in this area. Realizing this is a relatively large area, we are interested in keeping the number of sheets covering this area to a minimum. The hatched areas delineated on the following sheets show the general areas of interest. In addition, please send us any other proposed development that may impact the floodplain.

We are looking to complete this portion of the mapping by the middle of August. Please call me if you have any questions concerning this matter. Thank you for your assistance.


Area of interest
Losee Way
Lone Mountain Rd
Metro Line "A"
N
1" = 400'


Match Line "B"
Area of interest
Rail Road
N
1" = 400'
Craig Rd
King Charles Channel


Area of interest
Match Line "A"
Match Line "B"
Rail Road
N
1" = 400'

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

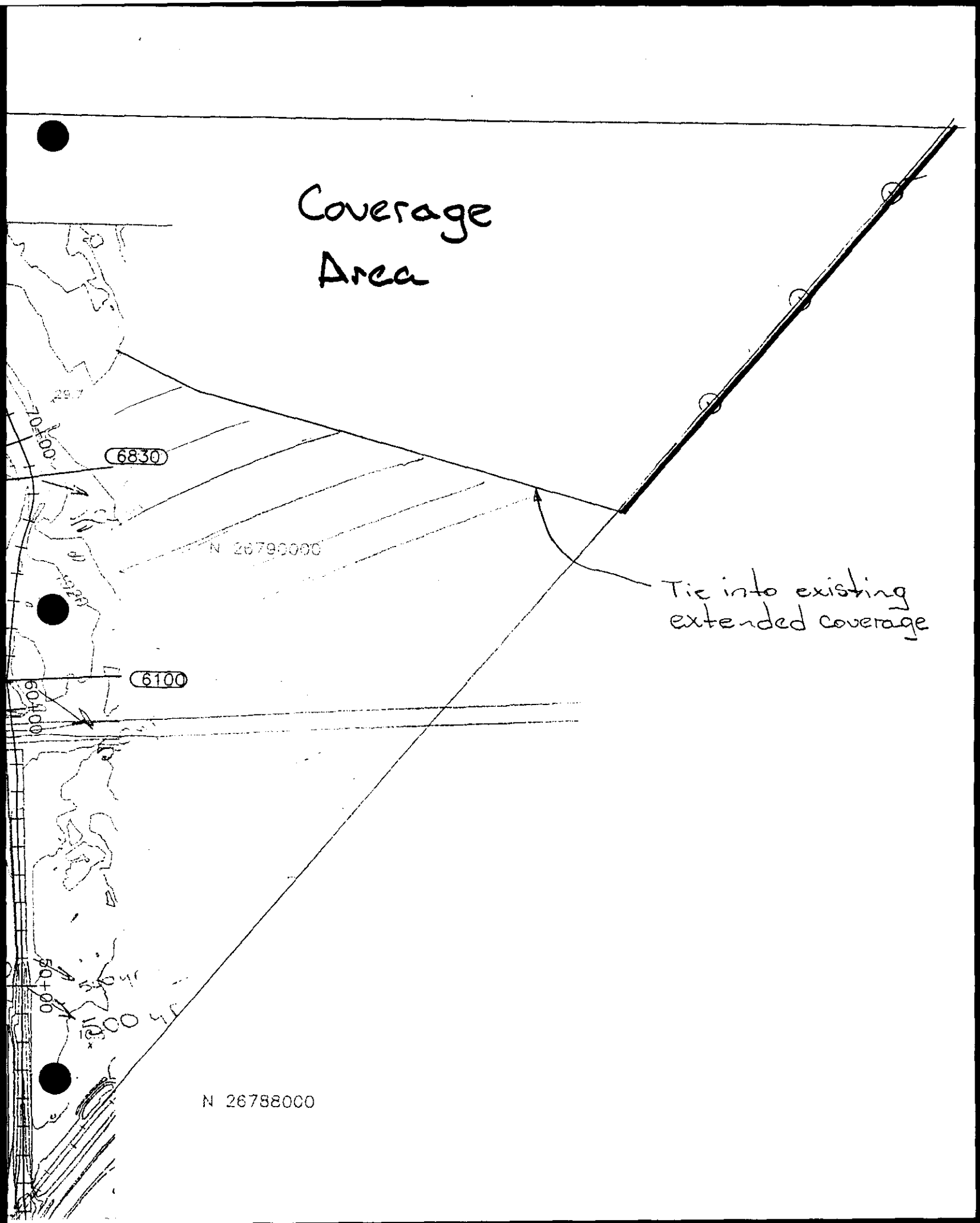
Date:	August 9, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 4
To:	Gary Finnie	Original via:
Company:	Kenny Aerial	
Fax Number:	1-602-340-1877	
Telephone No:	1-602-258-6471	
Subject:	Mapping coverage	

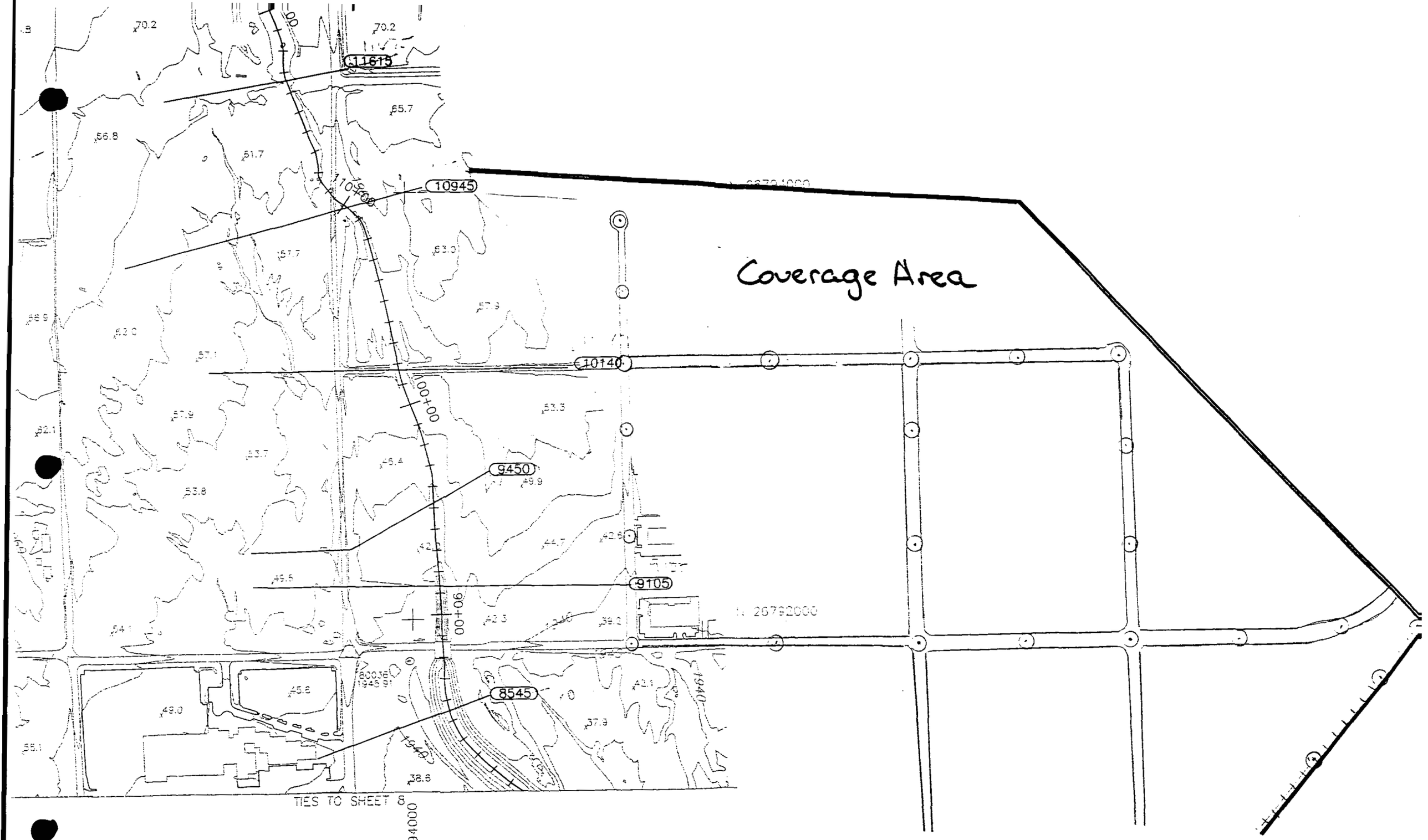
Please call immediately if you do not receive all pages of this transmission.

Remarks:

Following our conversation yesterday, I had some question as to the extent that the mapping coverage could be extended. It would greatly help me if you would mark the approximate limit on the following sheets and fax that back to me.

Please call if you have any questions regarding this matter. Thank you.


Coverage
Area
6830
6100
N 26790000
N 26788000
Tie into existing
extended coverage



SHEET 7 UPPER LAS VEGAS WASH

0 200' 400' 800'

JOB NO. 960104

KENNEY AEP

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

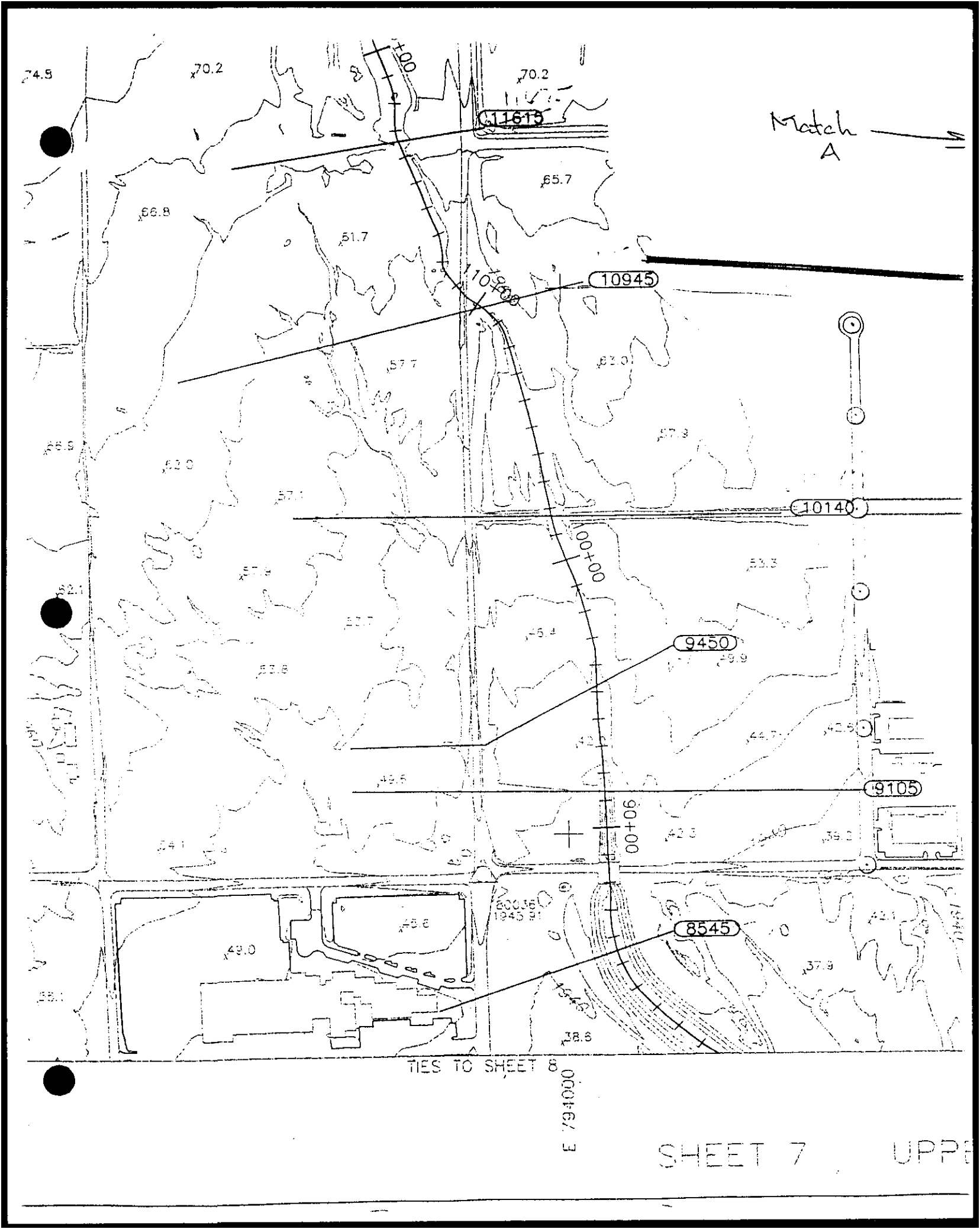
Date:	August 8, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 4
To:	Gary Finnie	Original via:
Company:	Kenny Aerial	
Fax Number:	1-602-340-1877	
Telephone No:	1-602-258-6471	
Subject:	Additional Spot Elevations	

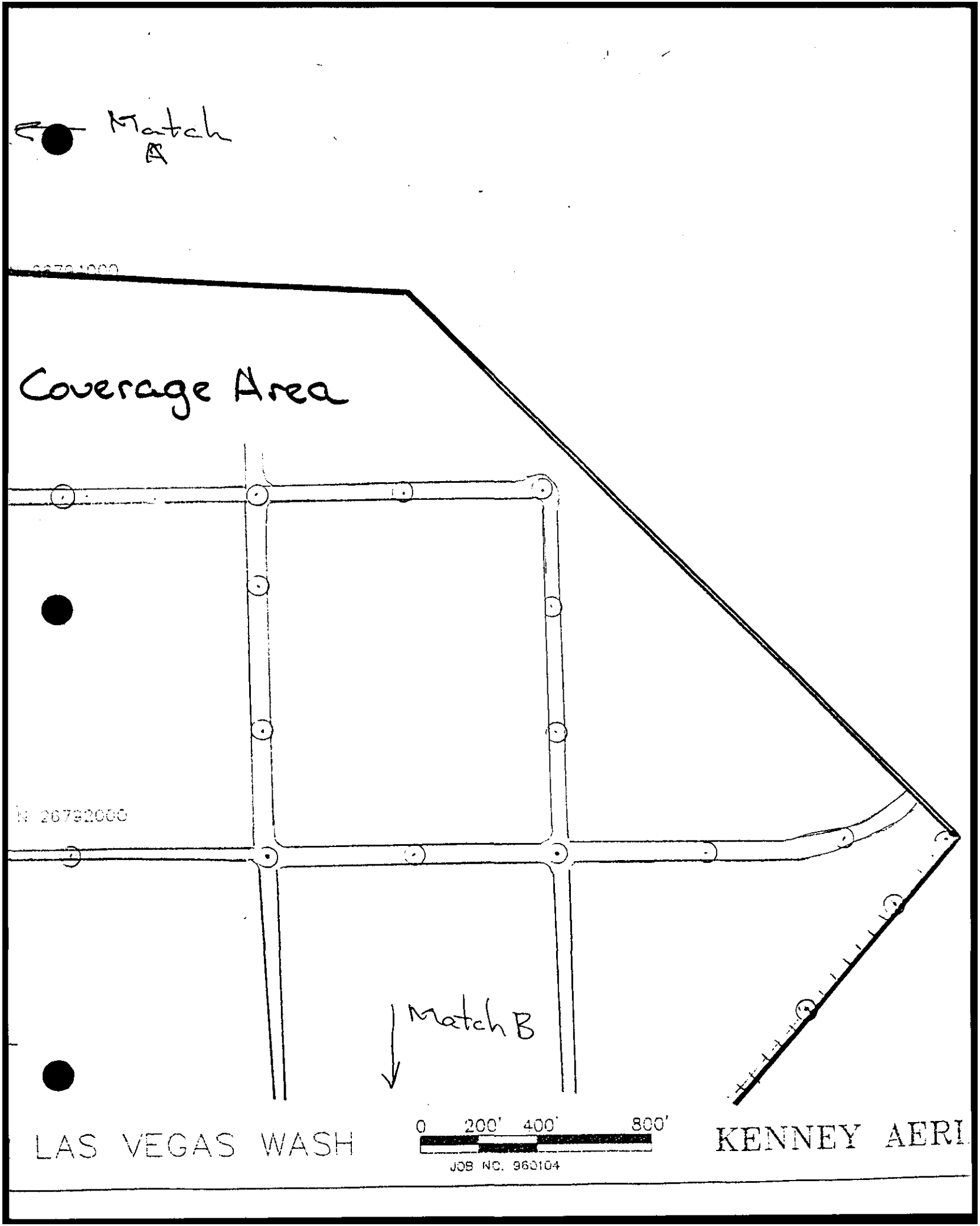
Please call immediately if you do not receive all pages of this transmission.

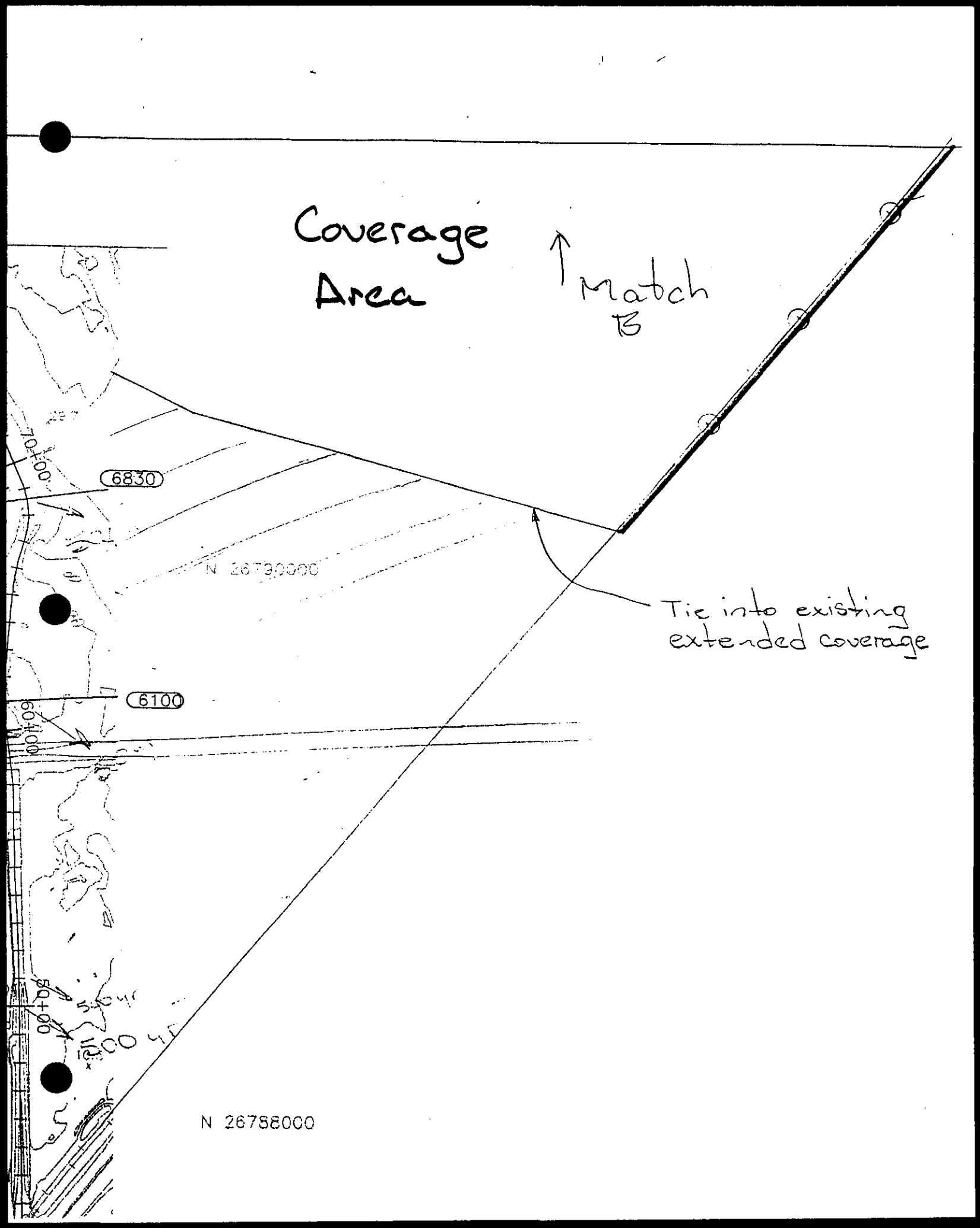
Remarks:

Gary, I have located an area where the 500 year flow could potentially break out and may need coverage in this area. The following sheets delineate the area where we may need some spot elevations and additional coverage. Spot elevations will be necessary at approximately 500' to 700' increments along the roads and railroad in addition to any ground spots normally placed on topographic coverage. This may be outside of your control boundary. If so, please check to see if you can tie into any surrounding mapping that would allow you to extend the control boundary to fit within this area. Please review the figures to determine what the additional cost will be and notify me as to the amount.

I apologize for the fragmented requests for mapping. Please call if you have any questions regarding this matter. Thank you.


Match
A
11615
10945
10140
9450
9105
8545
110+00
100+00
90+00
80+00
70+00
TIES TO SHEET 8
SHEET 7


Match A
Coverage Area
N 26792000
Match B
LAS VEGAS WASH
0 200' 400' 800'
JOB NO. 960104
KENNEY AERI


Coverage Area
Match B
6830
6100
N 26788000
Tie into existing extended coverage
N 26788000

5007@ -10.

Kenney Aerial Mapping Inc.

[redacted]est Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

August 6, 1996

Mr. Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS, INC.
3950 Industrial Boulevard Suite 100C
Sacramento, California 95691

Re: UPPER LAS VEGAS WASH MAP EXTENSIONS

Dear Ed,

This is to confirm our quote for providing photogrammetric services for the above listed project.

SERVICES TO BE RENDERED:

Utilizing existing black and white aerial photography and ground control we will provide the following:

Photogrammetric stereo compilation covering the extended area to the limits of the photography as shown on your FAX transmittal. Mass points will be digitized at high, low and intermediate positions in order to best depict the ground. Supplemental mass points will be added in order to densify the point network.

Additionally, 3-D breaklines will be used to supplement DTM. Four foot contours will be computer generated and interpolated using Intergraph Site Works software, then run through our contour smoothing software as a final step. Additional spot elevations will be digitized at the approximate locations shown.

Planimetric detail will also be digitized. Text scale will be 1"=400'.

The above data will be provided in AutoCAD 12 drawing file on IBM 3-1/2" diskette. Mass points and breakline data will be on separate layers.

Areas that may be obscured due to dense trees, brush or dark shadows may not be identified (i.e. dashed contours or labeled) on DTM products. These areas may contain weak x,y,z data and require field survey check or verifications.

Provide one cross section extension in HEC II format for the area shown on your FAX transmittal. This task will be completed now at no charge to avoid future model setups which may require additional charges. ASCII data will be delivered on IBM 3 1/2" diskette.

Final ink-jet drawings on stable base mylar at 1"=400'.
Sheet size 24"x36" -- Approximately 2 sheets.

These sheets will replace the two sheets which were completed before we changed layering schemes.

Re: *UPPER LAS VEGAS WASH MAP EXTENSIONS*

NOTES:

Magnetic media and digital map files must be reviewed within 30 days of receipt to insure that map coverage and data is complete. Please notify us immediately if there are any discrepancies. This policy enables us to better satisfy our customers and eliminates possible costs to regenerate the data.

It is our policy to map to the given control panel locations. If this does not meet your map limit requirements, please submit a drawing or diagram that shows exactly what area you want mapped. It is understood that mapping outside control boundaries may not meet standard mapping accuracies.

PAYMENT AGREEMENT:

Fee: $ 300.00

As per this agreement, payment for the above services will not exceed 30 days from date of invoice.

Project fees may need to be adjusted if this project is not initiated within 270 calendar days.

In the event our photogrammetric services are not paid within the agreed time frame as outlined in this letter, there will be a 1-1/2% per month late fee added to the unpaid balance.

JOB SCHEDULE:

We anticipate completion of this project to be 12 consecutive working days after we are in receipt of this signed contract.

It is important to both your firm and our company that work schedule estimates are on time. Our current number of working days to complete this project may need to be adjusted if this project is not initiated within 30 calendar days.

Your assistance in helping us serve you is appreciated. Please contact John Cahoon should you have any questions concerning this proposal, survey control requirements or to arrange a flight schedule.

Further communication on this project should be with our Production Manager, Gary Finnie who will supervise the project.

All services and finished materials will be prepared in strict accordance with generally accepted photogrammetric standards.

If this meets with your approval, please sign below, initial any appropriate options and return the enclosed copy.

Sincerely,

Ellis O. Hyde
KENNEY AERIAL MAPPING INC.

Accepted by

Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS, INC.

EOH/jc

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

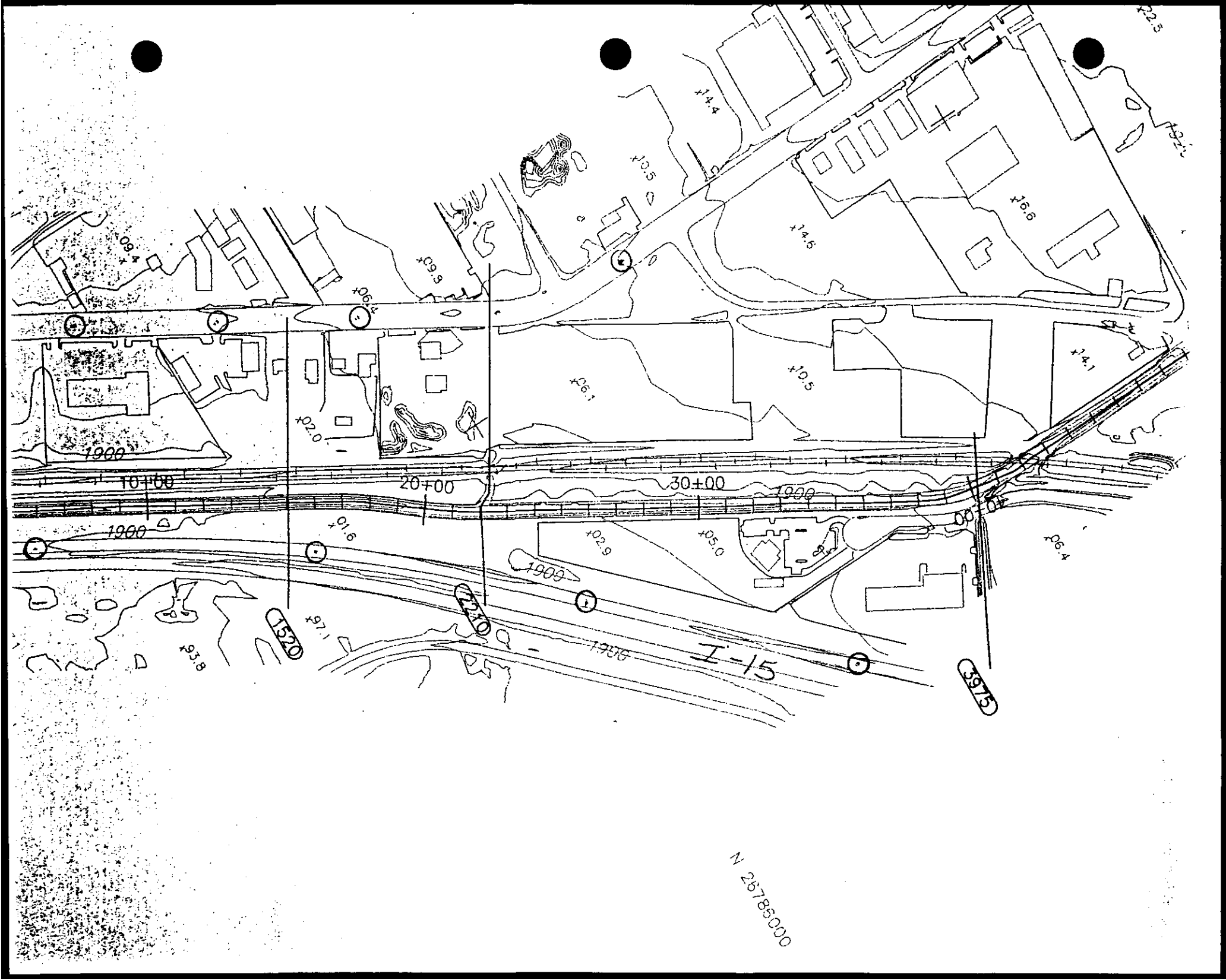
Date:	August 5, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 4
To:	Gary Finnie	Original via:
Company:	Kenny Aerial	
Fax Number:	1-602-340-1877	
Telephone No:	1-602-258-6471	
Subject:	Additional Spot Elevations	

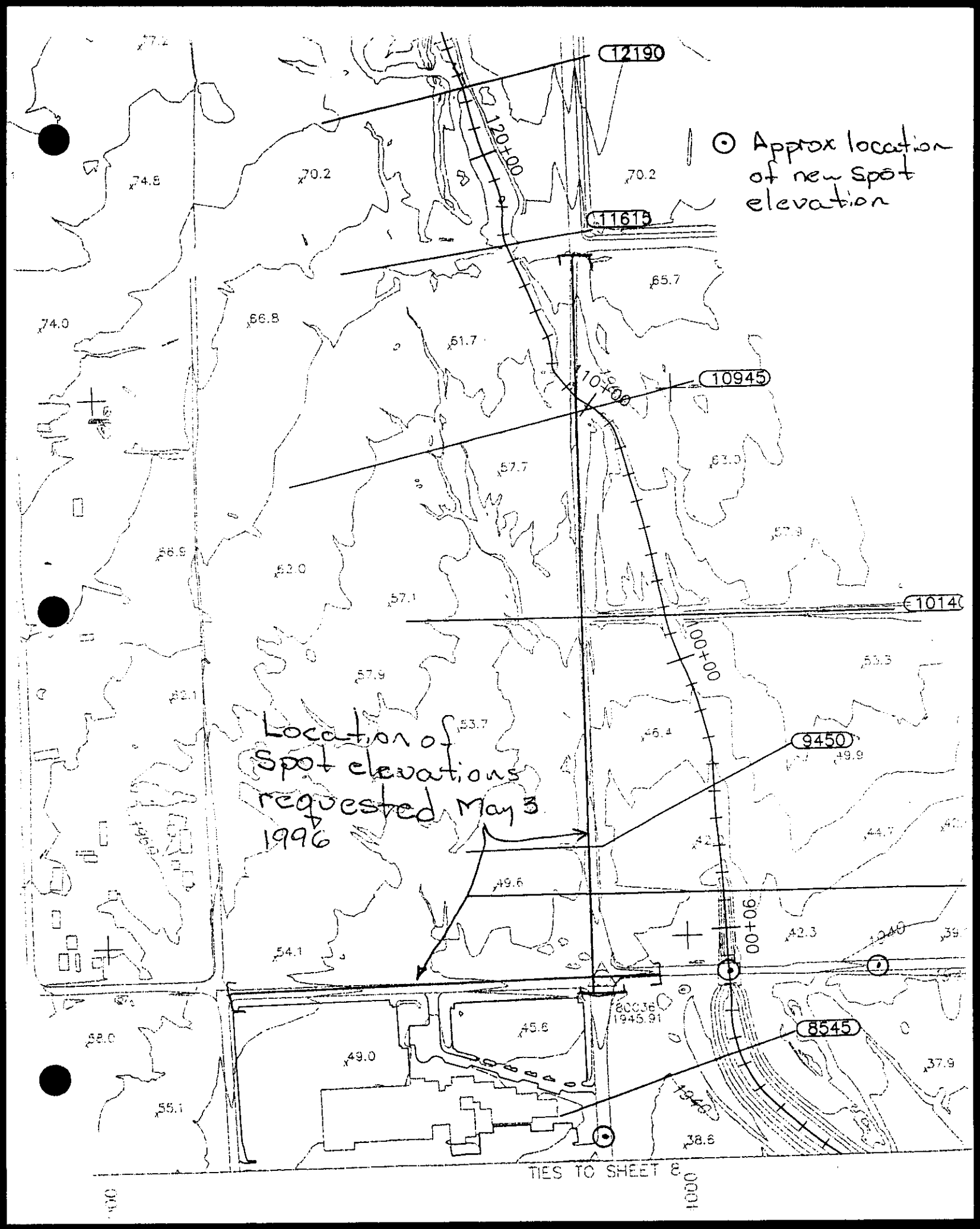
Please call immediately if you do not receive all pages of this transmission.

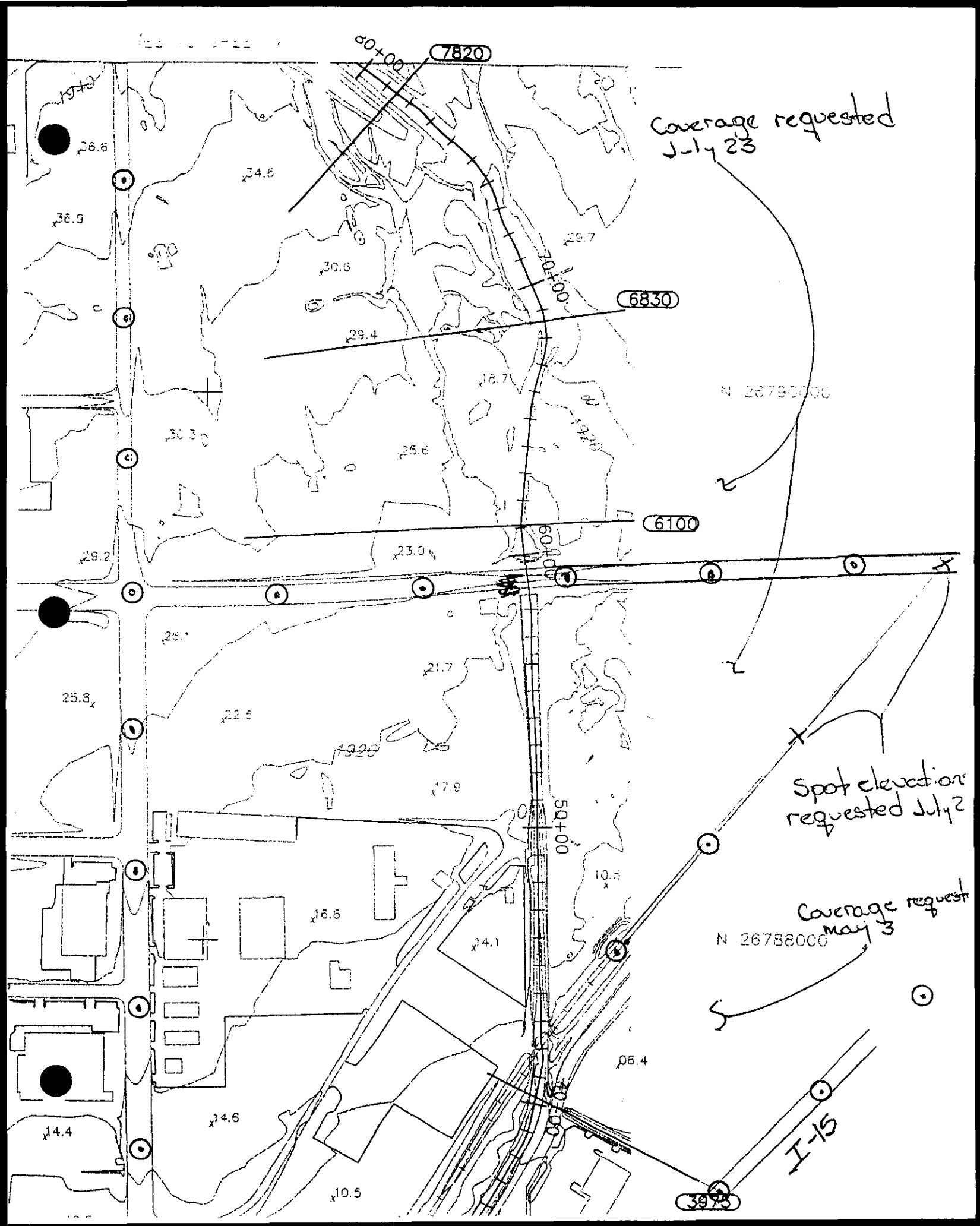
Remarks:

The following sheets delineates the area where additional spot elevations are required. Providing we do not have to extend cross section 6125, this should be the last request for data. Please review the figures to determine if there will be any additional cost, if so please notify me as to the amount.

Please call if you have any questions regarding this matter. Thank you.


10+00
20+00
30+00
1900
1320
2240
3975
I-15
N 26785000


12190
11615
10945
10140
9450
8545
120+00
110+00
100+00
90+00
⊙ Approx location of new spot elevation
Location of Spot elevations requested May 3 1996
TIES TO SHEET 8


Coverage requested July 23
Spot elevation requested July 2
Coverage request May 3
N 26788000
N 26790000
I-15
7820
6830
6100
3975
80+00
70+00
60+00
50+00
26.6
24.6
36.9
29.7
30.6
29.4
18.7
30.3
25.6
29.2
23.0
26.1
21.7
25.8
22.6
17.9
16.6
14.1
10.6
26.4
14.6
14.4
10.5

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

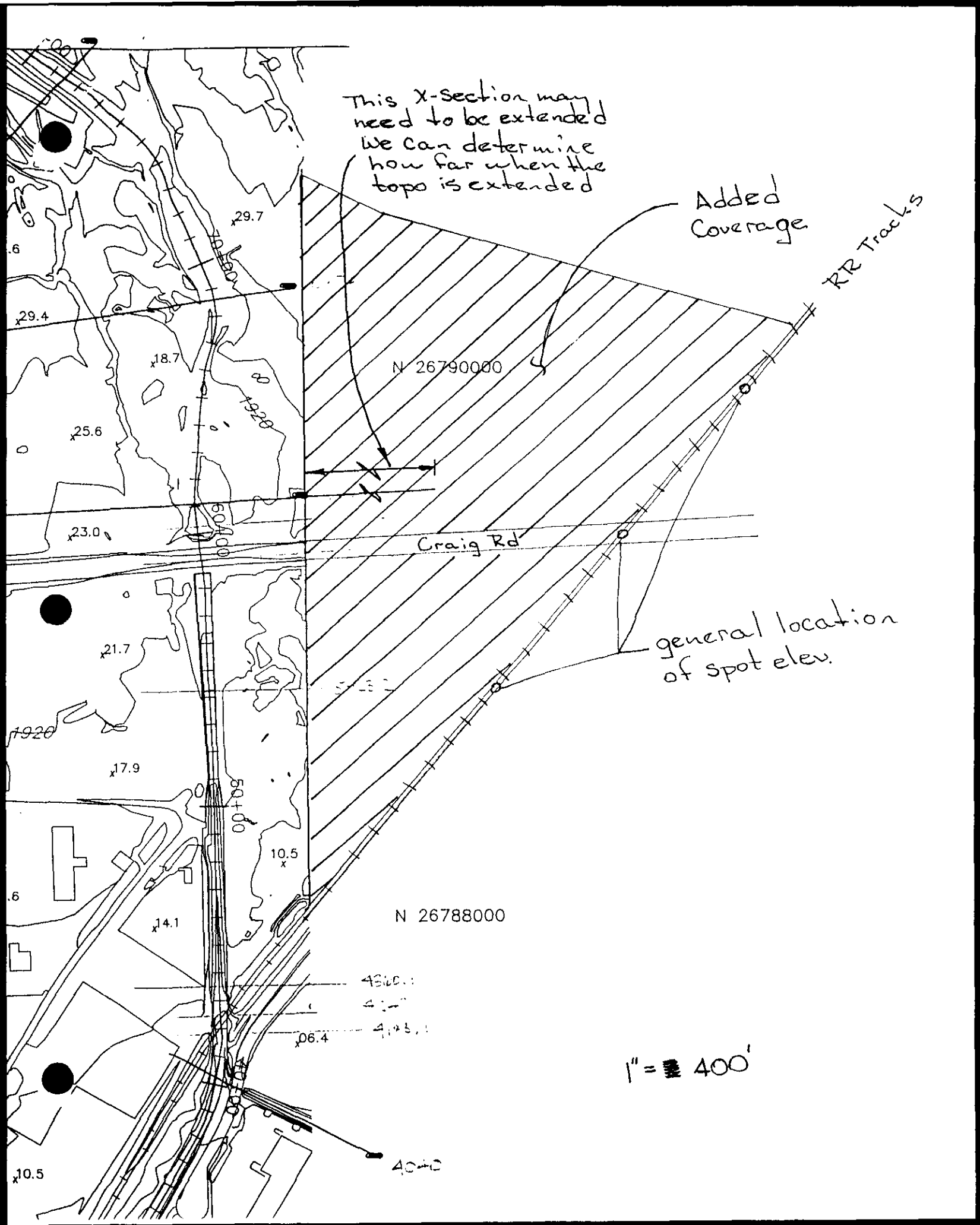
Date:	July 23, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 2
To:	Gary Finnie	Original via:
Company:	Kenny Aerial	
Fax Number:	1-602-340-1877	
Telephone No:	1-602-258-6471	
Subject:	Additional Coverage	

Please call immediately if you do not receive all pages of this transmission.

Remarks:

The following sheet delineates the area where additional coverage is required. Once the coverage is extended it can be determined how far cross section 6125 will need to be extended. In addition, three spot elevations will be necessary along the railroad embankment, see attached figure. Please review the figure to determine if there will be any additional cost, if so please notify me as to the amount.

Please call if you have any questions regarding this matter. Thank you.


This X-Section may need to be extended we can determine how far when the topo is extended
Added Coverage
RR Tracks
N 26790000
Craig Rd
general location of spot elev.
N 26788000
1" = 400'
x29.7
x29.4
x18.7
x25.6
x23.0
x21.7
x17.9
x14.1
x10.5
x06.4
x10.5
1920
50+00

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date:	July 23, 1996	Job Number: 50010	
From:	Joey Howard	Number of Pages: 1	
To:	Gary Finnie	Original via:	
Company:	Kenny Aerial		
Fax Number:	1-602-340-1877		
Telephone No:	1-602-258-6471		
Subject:	Spot Elevations		

Please call immediately if you do not receive all pages of this transmission.

Remarks:

In preparation for the HEC-2 modeling, we will need the spot elevations requested in our May 3, 1996 memo to John Cahoon. Please send this data as soon as possible as it is a critical part of the hydraulic evaluation.

Please call if you have any questions regarding this matter. Thank you.

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3308 W Spring Mountain Rd, Suite 60, Las Vegas, Nevada 89102
Phone (702) 368-7574 Fax (702) 873-4165

PHOTOGRAMMETRIC SERVICES SINCE 1965

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

FAX COVER LETTER

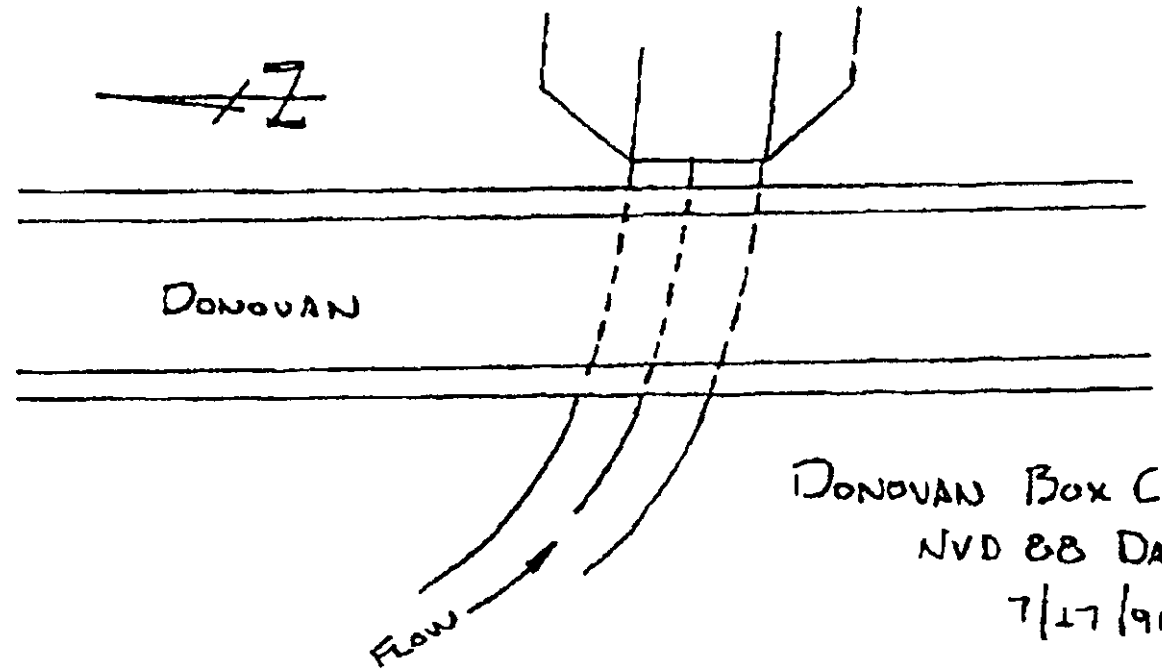
TO:	FROM:
Name: JOEY HOWARD	Name: GARY FINNIE
At: NW HYDRAULIC CONS.	Date:
	Time:

Project number: _____
Project name: LV. WASH
Number of pages, (including this one): 3

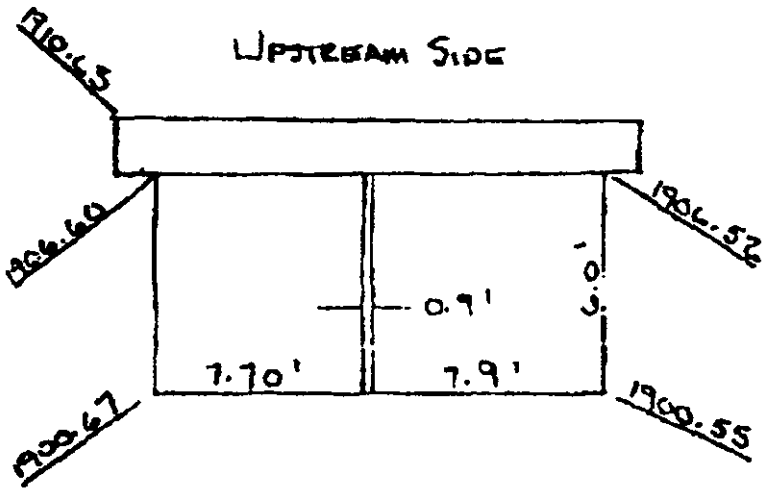
MESSAGE

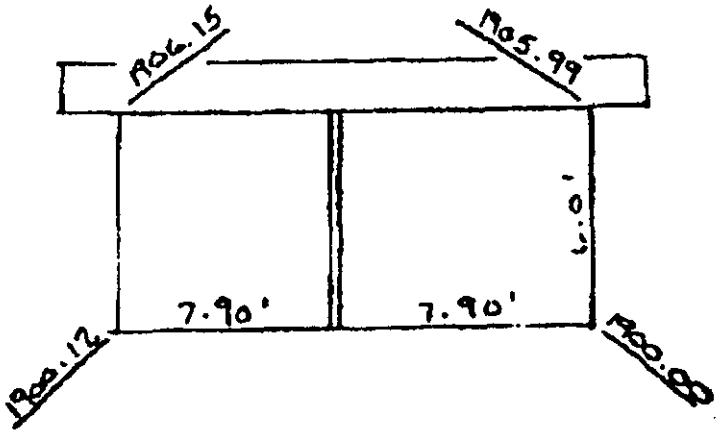
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TOTAL P.03



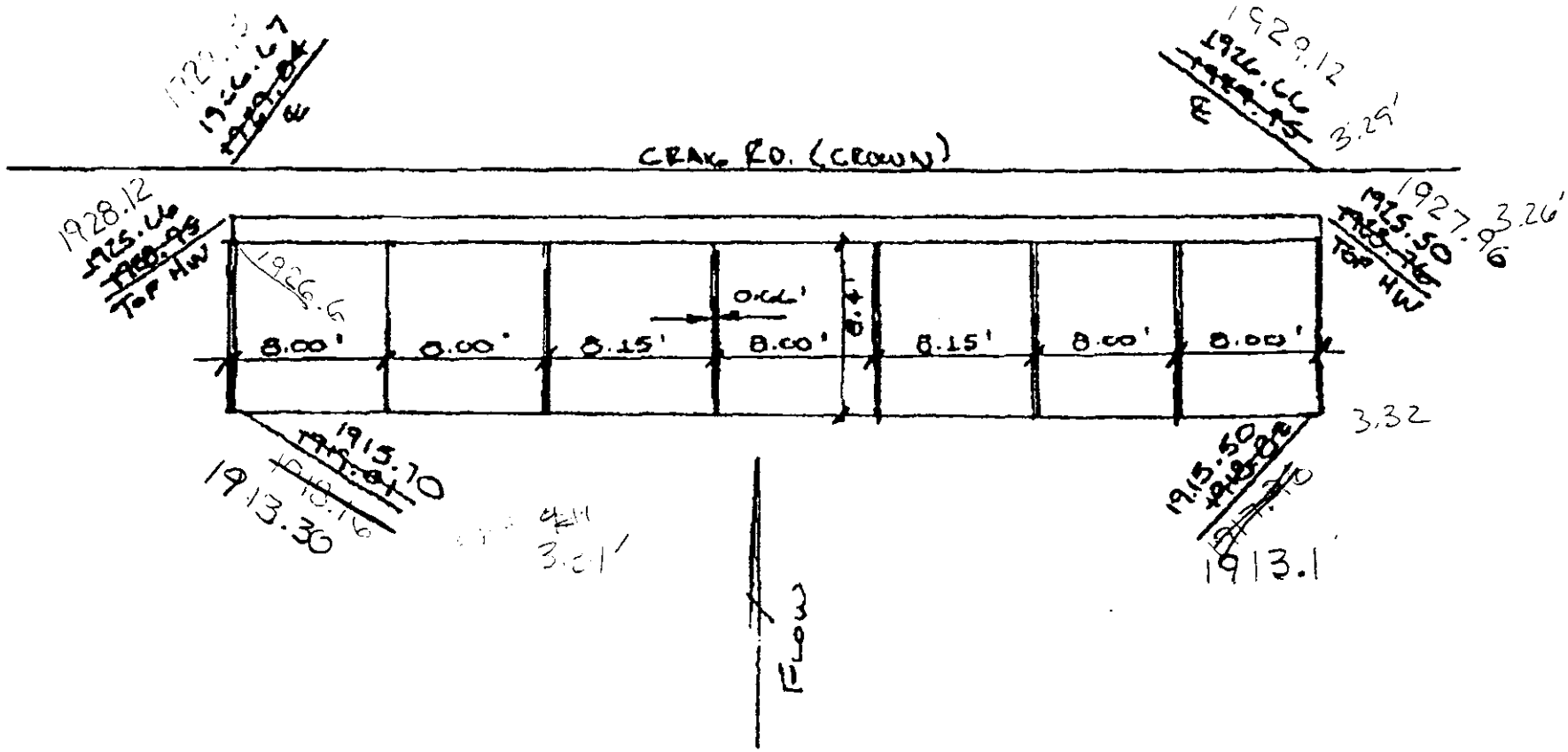
DONOVAN BOX CULVERT
NVD 88 DATUM
7/17/96





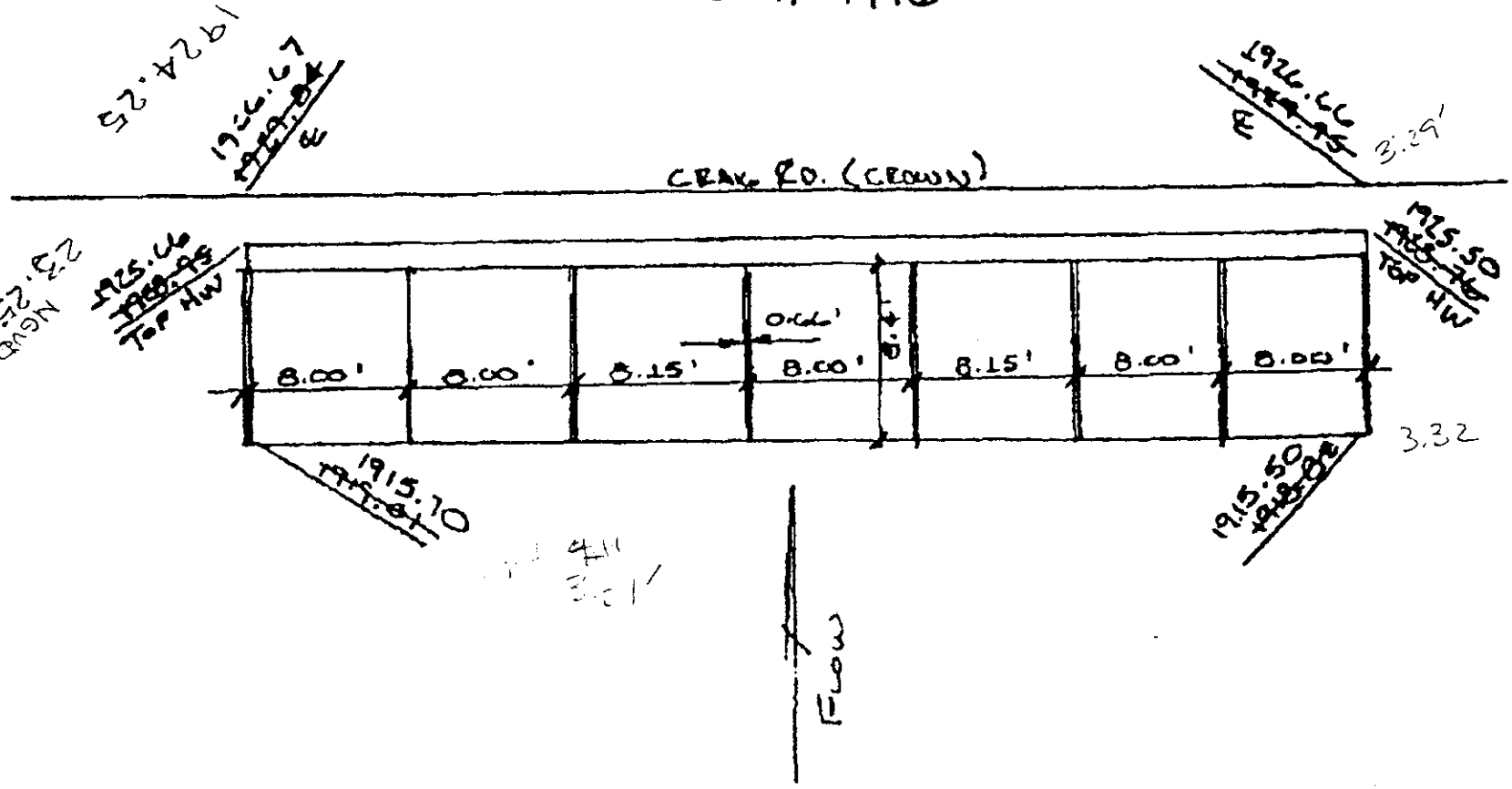
DOWNSTREAM SIDE

CRAIG RD BRIDGE
NVD 88 DATUM
~~7/17/96~~
REV. 1 7/17/96

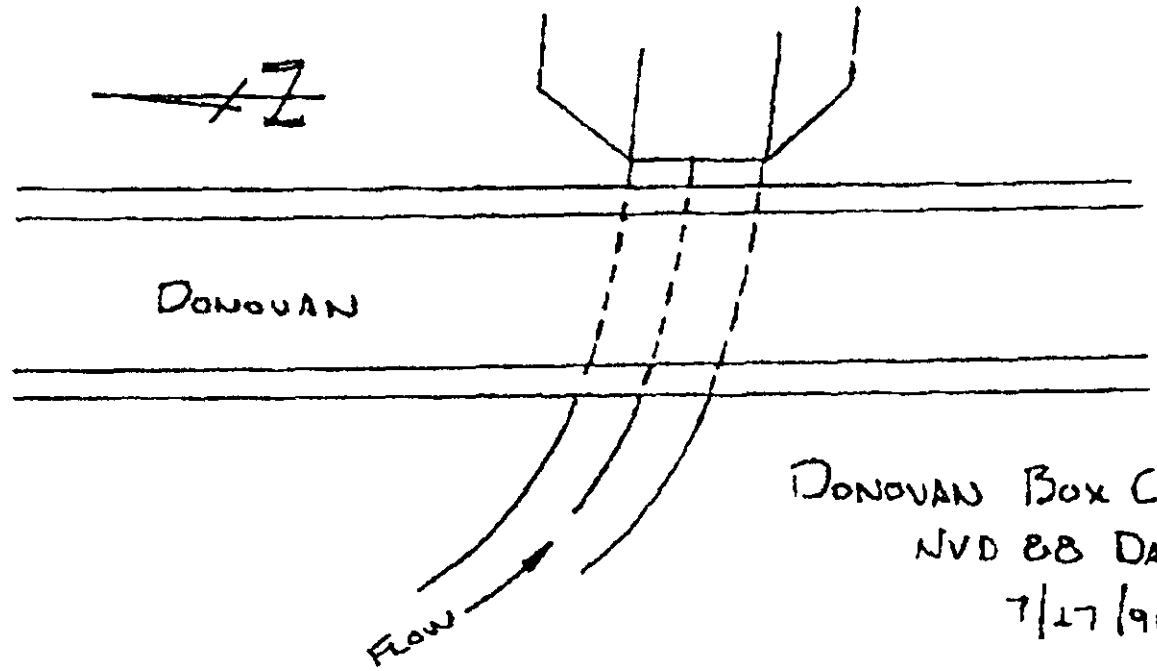


NAVD88 - NGVD29 = 2.46 +/-

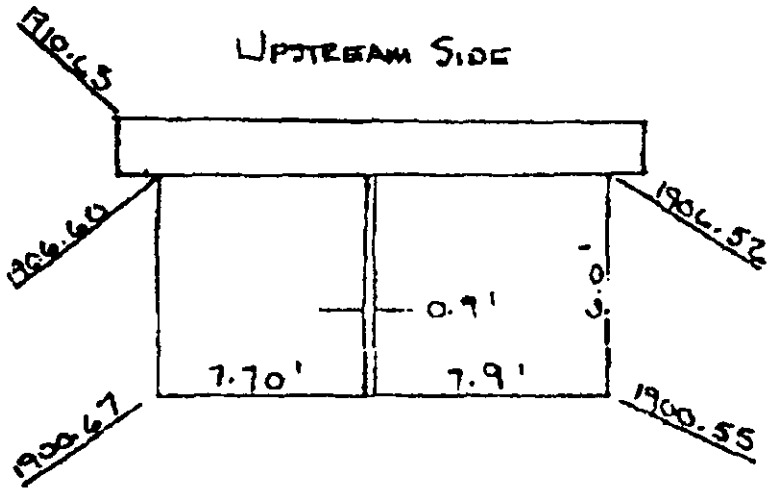
CRAIG RD BRIDGE
NVD 88 DATUM
~~7/16/96~~
REV. 1 7/17/96

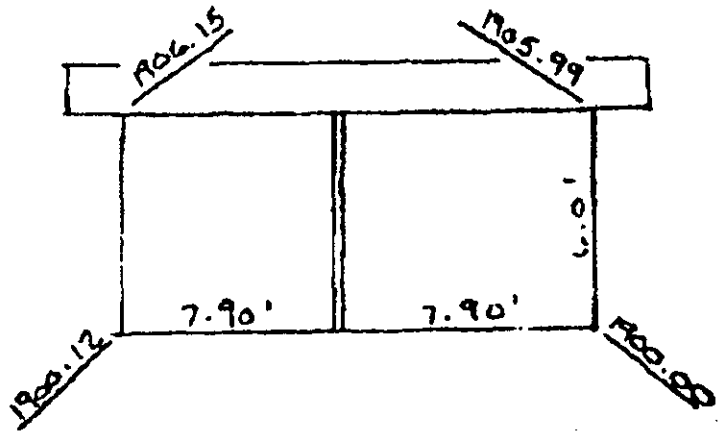


TOTAL P.03

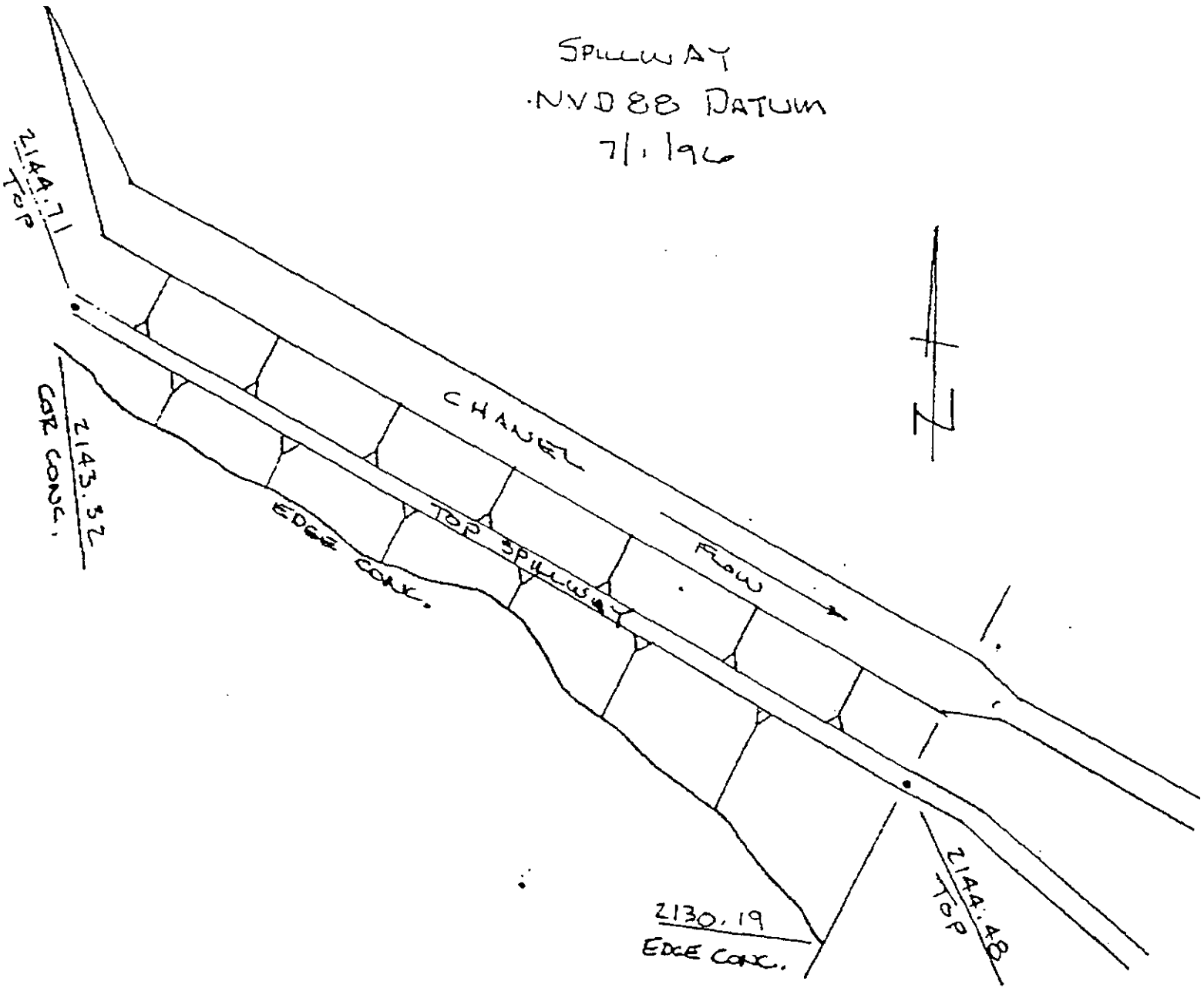


DONOVAN BOX CULVERT
NVD 88 DATUM
7/17/96

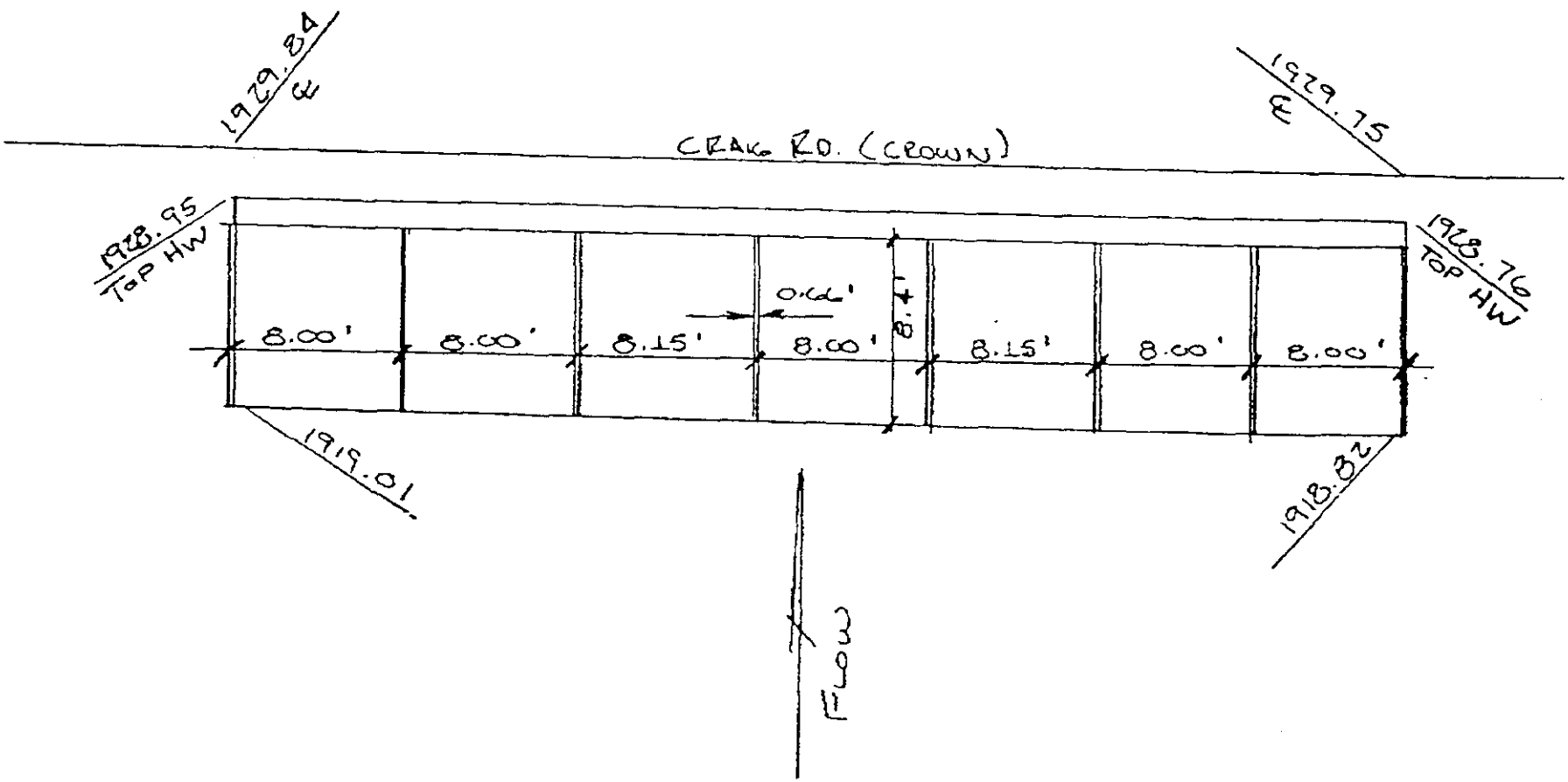


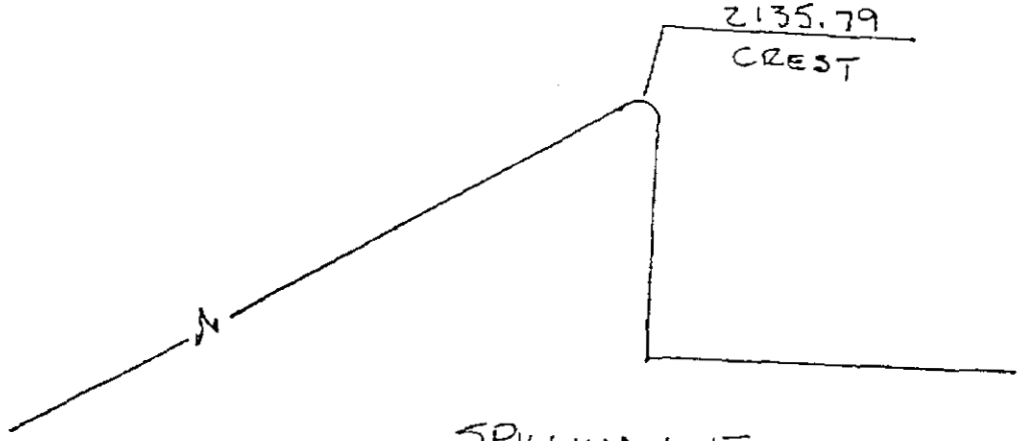


DOWNSTREAM SIDE

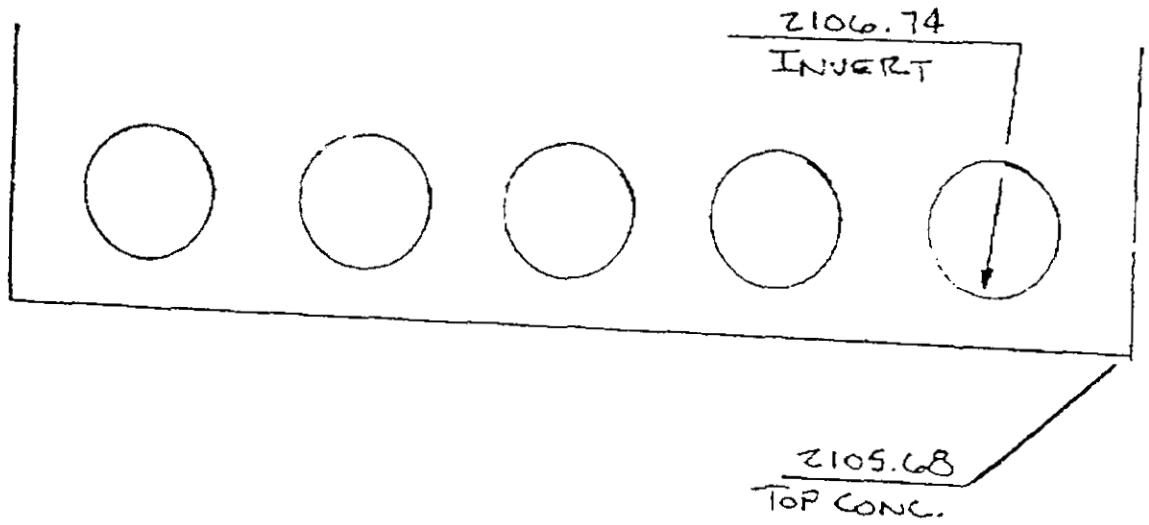

SPILLWAY
NVD88 DATUM
7/.196
2144.71
TOP
2143.32
CONC.
EDGE CONC.
CHANNEL
TOP SPILLWAY
FLOW
2130.19
EDGE CONC.
2144.48
TOP

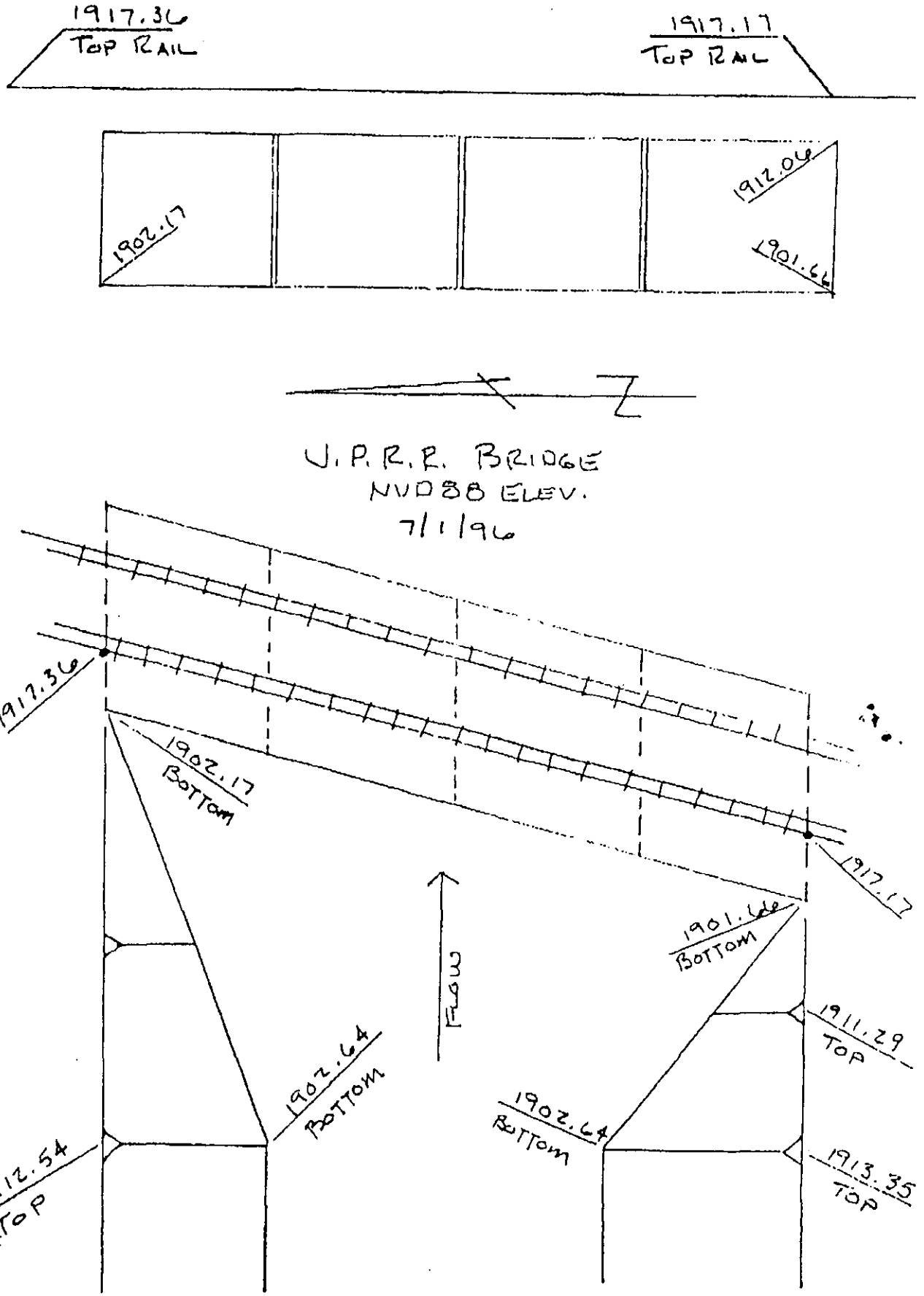
CRAIG RD BRIDGE
NVD 88 DATUM
7/1/96

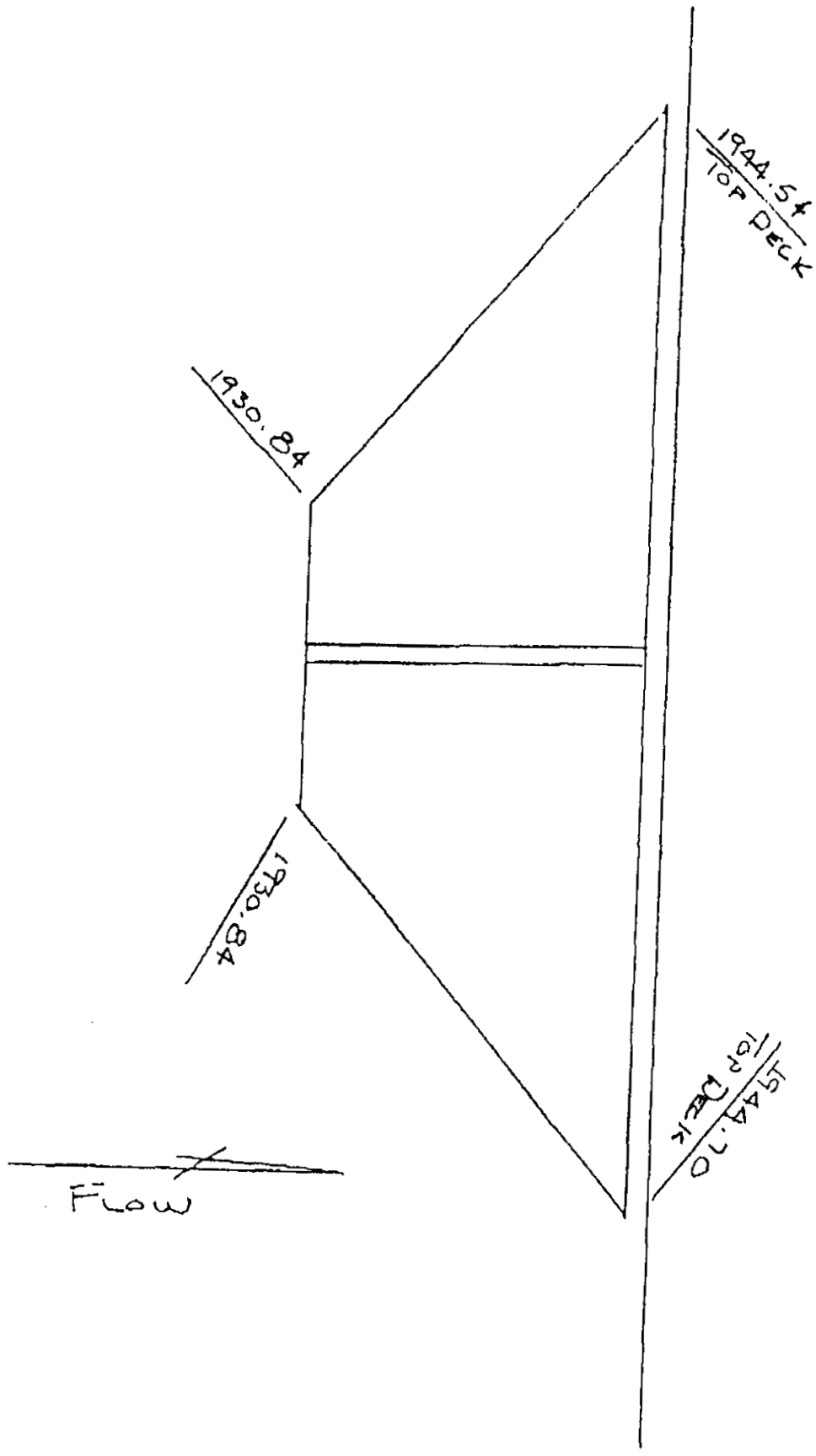




SPILLWAY ELEVS.
NVD 88 DATUM
7/1/96




1917.36
TOP RAIL
1917.17
TOP RAIL
1902.17
1912.04
1901.64
U.P.R.R. BRIDGE
NVD88 ELEV.
7/1/96
1917.36
1902.17
BOTTOM
1917.17
1901.64
BOTTOM
FLOW
1902.64
BOTTOM
1911.29
TOP
1912.54
TOP
1902.64
BOTTOM
1913.35
TOP



LONE WATN RD. BRIDGE
NVD 88 ELEV
7/1/96

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date:	July 15, 1996	Job Number: 50010	
From:	Joey Howard	Number of Pages: 3	
To:	Gary Finnie	Original via:	
Company:	Kenny Aerial		
Fax Number:	602-340-1877		
Telephone No:	602-258-6471		
Subject:	Survey Requirements		

Please call immediately if you do not receive all pages of this transmission.

Remarks:
In preparation for final submittal of the North Las Vegas Wash FIS restudy, I have prepared a list of items that must be included as part of the survey portion of the study. This list was compiled from Appendices 4 and 7 in the Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995. It is imperative that a representative of Kenny Aerial read through these chapters to ensure that the necessary items be provided to NHC for submittal to FEMA. The following list outlines the type of material required for submittal and does not represent a comprehensive list of submittal requirements.

1. Maximum flight altitude used
2. C-Factor ratio limitations
3. Aerotriangular adjustment criteria

4. Comparison with ASPRS 1990 standards
   - A. Horizontal accuracies
     - a. limiting RMSE in x & y
     - b. horizontal survey standards control and check
     - c. relative accuracy
   - B. Relative accuracies
     - a. vertical RMSE
       - i. interpolated between workmap contours
       - ii. spot heights, ERMs, ERPs
     - b. Vertical survey standards (order) control and check surveys
   - C. Photogrammetric planning with analytical plotter, 6" focal length
     - a. max C-factor
     - b. max flight height
     - c. aerotriangular accuracy
       - i. horizontal
       - ii. vertical

5. Accuracy labeling page A4-6
   - A. Tested RMSE in x, y, & z
   - B. Compiled to meet RMSE in x, y & z

6. Photo control contact prints see page A4-7

7. Survey records
   - A. Field book (complete copy), see page A4-9 section B-4a.
   - B. GPS documentation
     B-file, D-file, G-file, R-file, see page A4-10 section B-4b.
   - C. Computations and adjustments of
     horizontal and vertical control points, see page A4-10 section B-4c.
   - D. Control diagram schematic control diagram of the survey records
     on a photo index for all basic horizontal and vertical control, see page A4-10 section 4d.
   - F. Analytical Aerial Triangulation data , see page A4-12 section D, including Control Photographs with a list of photo control points.

8. Aerial triangulation report with:
   - A. flight lines
   - B. exposure stations or model layout
   - C. all control points appropriately labeled w/station designations
   - D. computer designations (?)
   - E. agency responsible for establishing stations

   Results must include items a.-f. on page A4-14

9. Metadata file for each file type (i.e. basemap files, survey files), see pages A7-8 through A7-10

10. Check to ensure the Base Map Files meet the required specifications outlined in Appendix 7 for Digitizing Specifications Option 2

In addition to items we discussed regarding the field survey data, NHC did not receive any information on Section corner 34, 35, 3, 2 to tie in the Upper Las Vegas Detention Basin Plans.

Should you have any questions please call me at 371-7400. Thank you for your assistance.

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

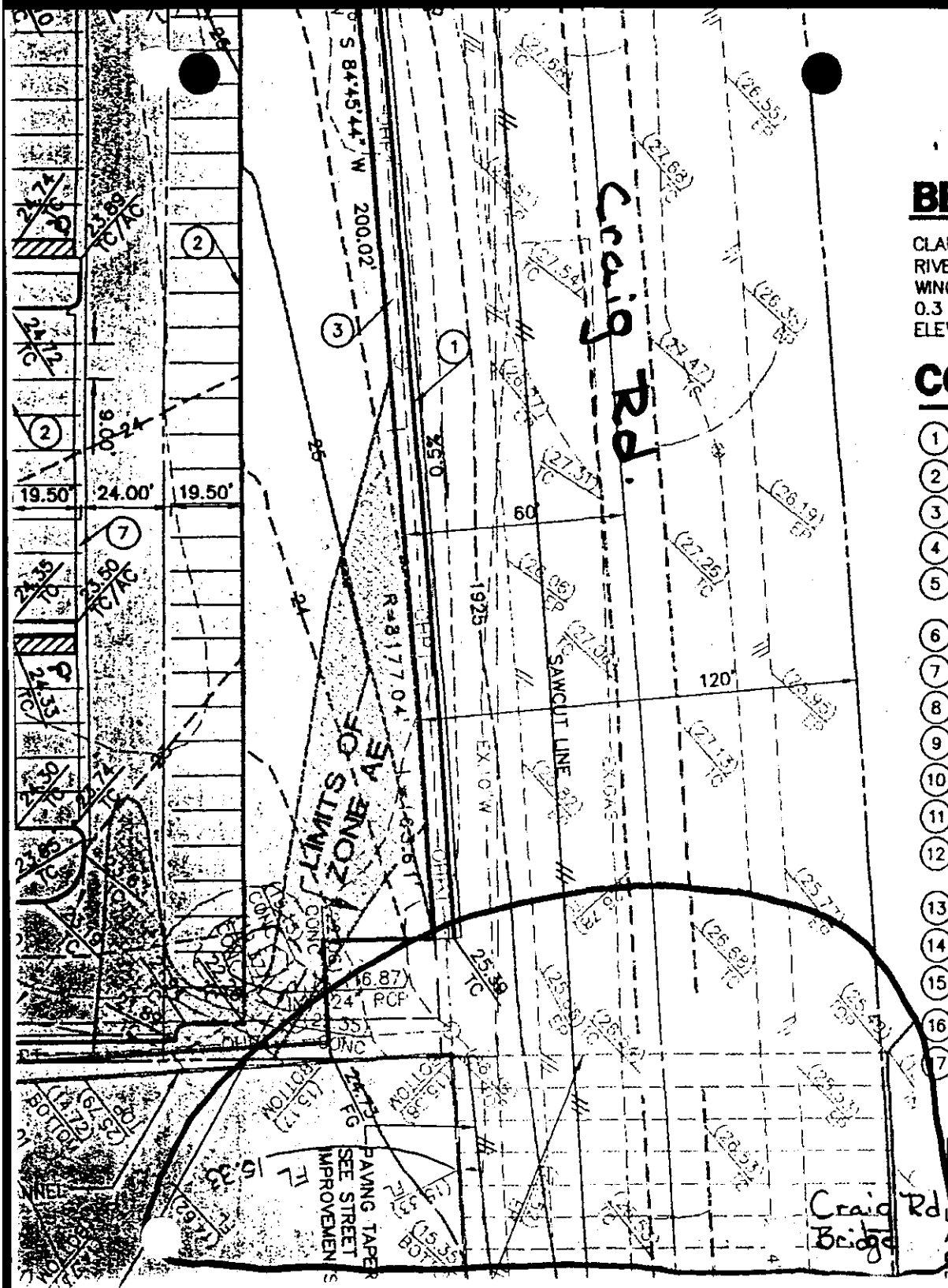
FAX MESSAGE

Date:	July 12, 1996	Job Number: 50010-10	
From:	Joey Howard	Number of Pages: 4	
To:	Gary Finney	Original via:	
Company:	Kenny Aerial		
Fax Number:	602-340-1877		
Telephone No:	602-340-1877		
Subject:	Craig Road bridge		

Please call immediately if you do not receive all pages of this transmission.

Remark:

It appears that there may be a problem with the survey data for the Craig Road Bridge. The field surveyed data appears to be approximately 4 feet higher than the aerial topography and existing plans show, see the following sheets. Please review the following pages. Thank you.



VICINITY MAP

NO SCALE

BENCHMARK

CLARK COUNTY BENCHMARK No. 7C011W6
RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CONCRETE WINGWALL OF BOX CULVERT UNDER CRAIG RD.
0.3 MILE WEST OF DONOVAN WAY.
ELEVATION = 1925.73 U.S. FEET – PER NAVD88 (586.964 METERS)

CONSTRUCTION NOTES

1. CONSTRUCT "L" TYPE CURB AND GUTTER PER STD. DWG #216.
2. CONSTRUCT 6"–"A" TYPE CURB PER DETAIL — B/6
3. CONSTRUCT 5' SIDEWALK
4. CONSTRUCT 4' SIDEWALK
5. CONSTRUCT SIDEWALK RAMP PER STD. DWG. #235, CASE I A=8' & B=8'
6. CONSTRUCT 8' CROSS GUTTER PER STD. DWG. #228.
7. CONSTRUCT 3' VALLEY GUTTER PER DETAIL — C/6
8. CONSTRUCT 2' U-GUTTER PER DETAIL — D/6
9. CONSTRUCT 6' SCREEN WALL
10. CONSTRUCT WALL OPENING PER DETAIL — E/6
11. CONSTRUCT DEEPENED FOOTING PER DETAIL — F/6
12. CONSTRUCT WROUGHT IRON WALL OPENING PER DETAIL — G/6
13. INSTALL 12" PVC DRAIN PIPE
14. INSTALL DROP INLET TYPE "D" PER STD. DWG. NO. 414.
15. CONSTRUCT HEADWALL PER DETAIL — H/6
16. CONSTRUCT DRIVEWAY PER STD. DWG. NO. 225 & 228
17. CONSTRUCT DRIVEWAY PER STD. DWG. NO. 226

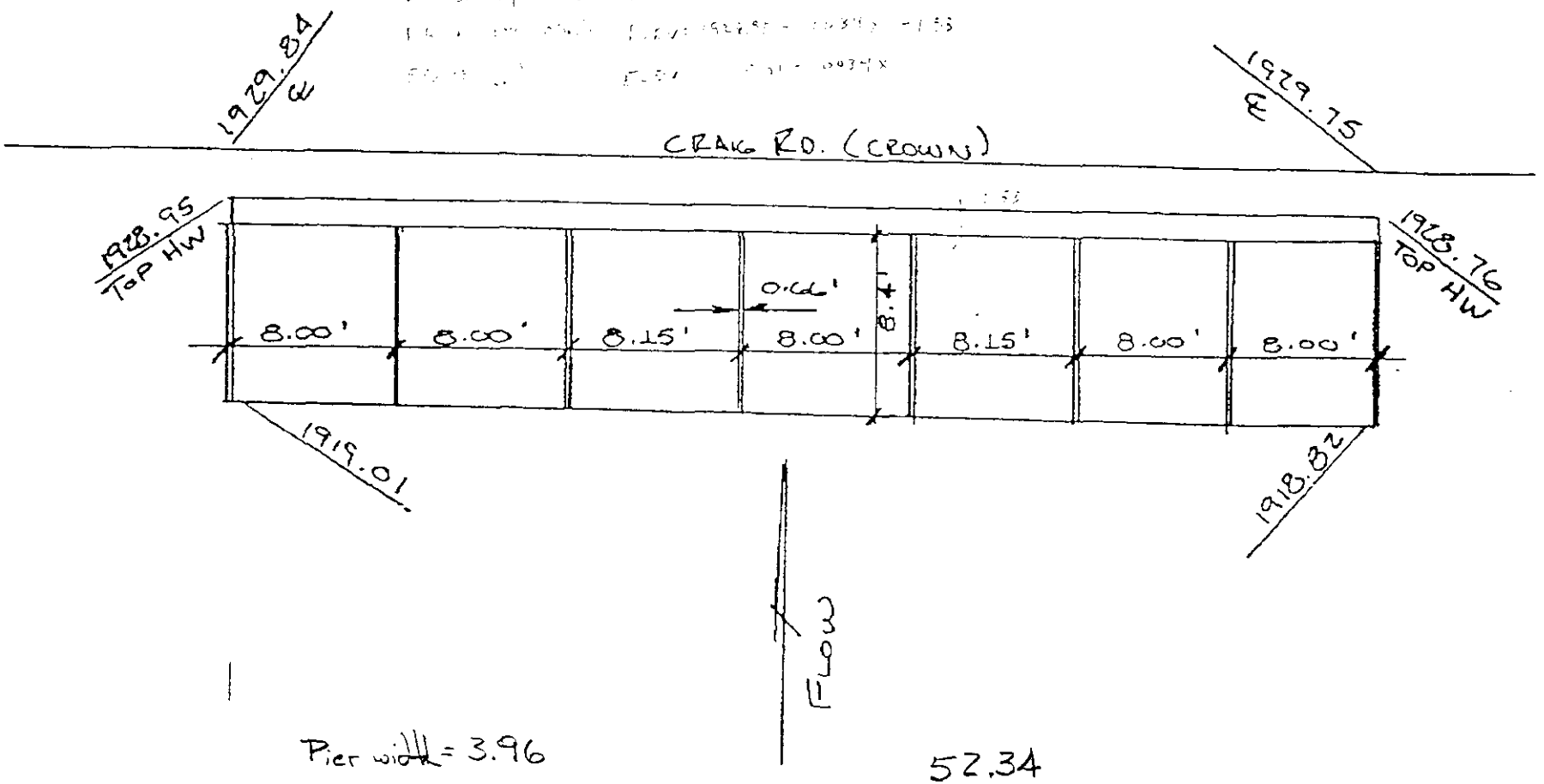
DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND

Ariz... ...ting underground ...ities. It's easy. Call

PAGE 03
ASSOCIATED CONSLTG.
07/01/1996 19:07 7026479265

CRAIG RD BRIDGE
NVD 88 DATUM
7/1/96

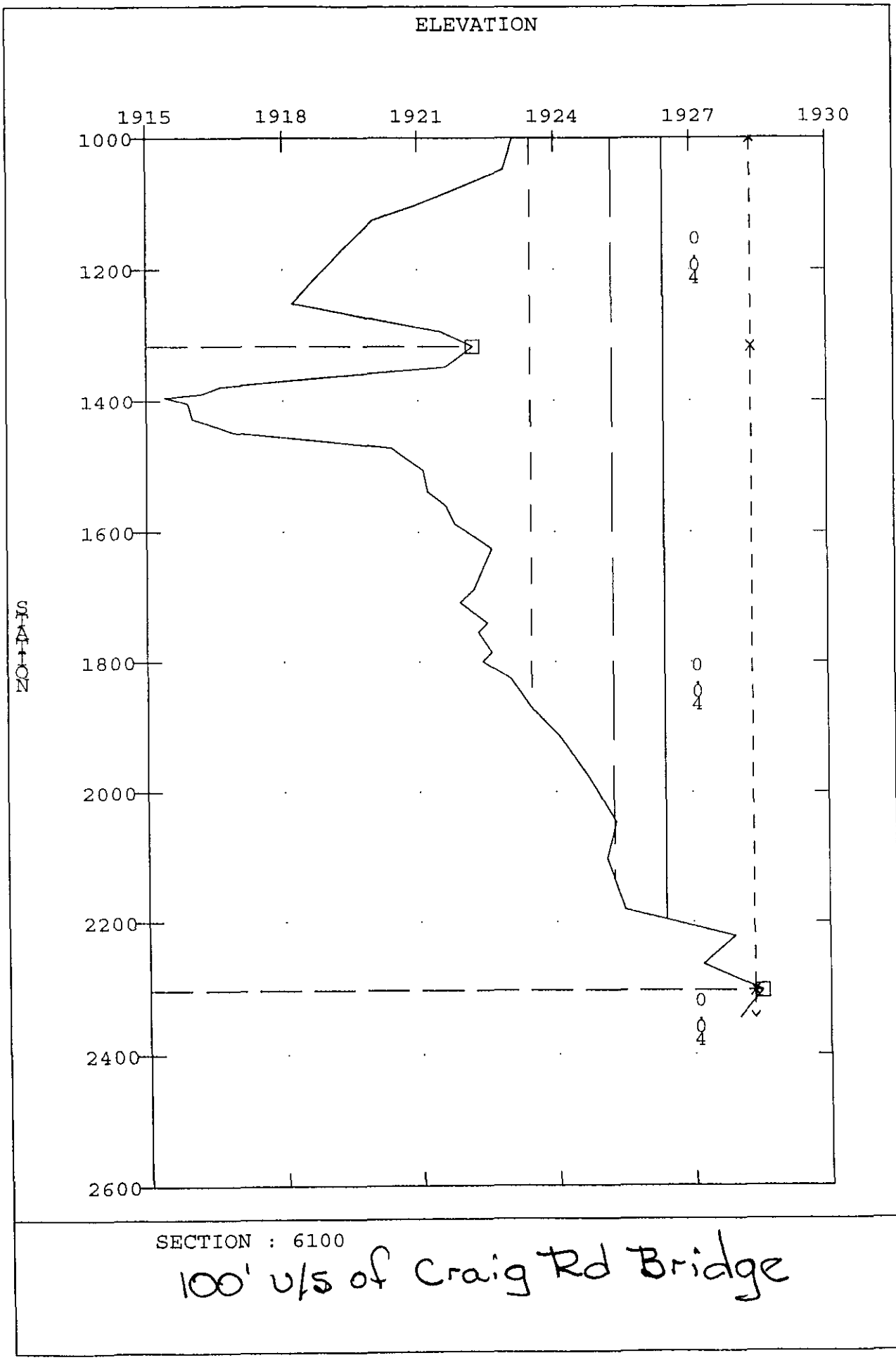


Pier width = 3.96

52.34
8.41
440.2#

56.3 + ~~3.96 / 2 = 58.26~~

A = 8.41(56.3) = 473.5#



SECTION : 6100

100' u/s of Craig Rd Bridge

Memo - Clark County FEMA study - Peter Blodgett - No. 1 - Date:7/11/96

Re: Craig Road Bridge Survey

The HEC-2 model shows a break-out upstream of the Craig road bridge at the section 6100. However, I believe this problem may be caused by a datum difference in the bridge survey information.

The following are my observations.

- According to Associated Engineers Fax dated 7-1-96 the lowest culvert invert is at elevation 1918.82 ft. However, the lowest point in the cross-section immediately upstream (Station 6100) is nearly 4 feet lower (around +/- 1915 ft).

- According to the topo maps supplied by Kenney Aerial the elevation of the crown of Craig road above the culverts should be between 1924 feet and 1928 feet. The bridge data supplied by Associated Engineers indicates that the crown of Craig Road is at 1929.84 feet.

- Elevation data from the Craig Road Commercial Site plans show the elevation of the invert at the downstream end of the culverts to be at 1915.35 ft and the road crown to be at 1926.53 ft.

Most likely the problem is due to a bad starting elevation.

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185



PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: NORTHWEST HYDRAULIC CONSTRUCTION
3950 INDUSTRIAL BLVD #100
WEST SACRAMENTO, CA. 95691

Phone: _____

Date: 7/9/96
Attention: JOEY HOWARD
Re: UPPER L.V. WASH
Job # _____

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____

- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size _____
  Scale _____
  Sepia Size _____
  Scale _____
- ☒ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

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Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
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☐ UPS ☐ Air Express ☒ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

5 PAGES SHOWING LOCATIONS OF EXTRA ELEVATIONS

From: GARY FINNIE Received by _____ Date _____

PLEASE SIGN AND RETURN REMAINDER COPY

Mayor
James K. Seastrand

Councilmen
Theron H. Goynes
Mary J. Kincaid
William E. Robinson
John K. Rhodes

City Manager
Linda Hinson

Deputy City Manager
Patrick Importuna

City of North Las Vegas
Public Works Department - Development & Flood Control Division
2266 Civic Center Drive • North Las Vegas, Nevada 89030-6307
Telephone: (702) 657-2265 • Fax: (702) 649-4696

June 21, 1996

Post-it Fax Note | Date 7/3 | # of pages 2
To Les Sakamoto
Fax# 415-923-7147
From Joey Howard
Phone#

Edward E. Wallace, P.E.
Northwest Hydraulic Consultants, Inc.
3950 Industrial Boulevard, Suite 100-C
West Sacramento CA 95691-3430

Re: ***Hydraulic Analysis - FEMA FIS for Upper Las Vegas Wash***

Dear Mr. Wallace:

Thank you for your letter indicating two potential conveyance problems within the Upper Las Vegas Wash study area.

The Sunrise Memorial Park project, which had begun substantial grading activities within the Las Vegas Wash near Tropical Parkway and Losee Road, has been idle since December, 1995. However, the developer has obtained additional financing and notified the City this week of its intention to resume construction. Earlier this week Sunrise Park, Inc. was informed that it must either construct the 200-ft wide earthen channel as shown in the approved plans for Sunrise Memorial Park or return the wash to its original configuration. Failure to do so will result in legal action against the developer, and the City will restore conveyance capability to the wash. We expect that the required grading will be complete within the next two weeks. Since FEMA guidelines allow the inclusion of new construction which will be complete within 12 months of the draft study, you should model the earthen channel as designed and approved.

The section of the wash between Lone Mountain Road and the North Las Vegas Detention Basin is scheduled for cleaning and debris removal on a yearly basis. Our maintenance schedule indicates that these activities should occur within the next 60 days. For your reference in preparing your hydraulic model, I will provide you with a photograph of the wash after maintenance activities are complete. Dumping of debris in this section of the wash is a recurring problem and yearly maintenance is sometimes not sufficient to keep it clean. Because staff is not able to schedule maintenance more frequently than once per year, the City has entered into an agreement with an outside contractor to provide the required maintenance on an as-needed basis. Therefore, your hydraulic model should reflect full conveyance through the wash.

I hope that I have adequately answered your questions. If you require additional information, please contact me at 657-2264.

Yours truly,

Kelly R. Chuma

Kelly R. Chuma, P.E.
Administrator, Development & Flood Control

c:\KELLY\NHC620.LET

xc: Jim Bell, City Engineer
Kevin Eubanks, CCRFCD
Les Sakumoto, FEMA Region IX

A2010 - Clark
Correspondence

Mayor
James K. Seastrand

Councilmen
Theron H. Goynes
Mary J. Kincaid
William E. Robinson
John K. Rhodes

City Manager
Linda Hinson

Deputy City Manager
Patrick Importuna

City of North Las Vegas
Public Works Department - Development & Flood Control Division
2266 Civic Center Drive • North Las Vegas, Nevada 89030-6307
Telephone: (702) 657-2265 • Fax: (702) 649-4696

June 21, 1996

Edward E. Wallace, P.E.
Northwest Hydraulic Consultants, Inc.
3950 Industrial Boulevard, Suite 100-C
West Sacramento CA 95691-3430

Re: **Hydraulic Analysis - FEMA FIS for Upper Las Vegas Wash**

Dear Mr. Wallace:

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I hope that I have adequately answered your questions. If you require additional information, please contact me at 657-2264.

Yours truly,

Kelly R. Chuma

Kelly R. Chuma, P.E.
Administrator, Development & Flood Control

c:\KELLY\NHC620.LET

xc: Jim Bell, City Engineer
Kevin Eubanks, CCRFCD
Les Sakumoto, FEMA Region IX

northwest hydraulic consultants inc.

sacramento
vancouver
edmonton
seattle

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

June 12, 1996

Kelly R. Chuma, P.E.
Development and Flood Control Administrator
City of North Las Vegas
Public Works Department
2266 Civic Center Drive
North Las Vegas, Nevada 89030

Subject: Hydraulic Analysis - FEMA Flood Insurance Study for Upper Las Vegas Wash

Dear Ms. Chuma:

NHC has reviewed available plans of existing and proposed improvements, compiled 1995 aerial topography, and conducted site reconnaissnce of the Upper Las Vegas Wash study area. We have completed a preliminary hydrologic analysis and are beginning the hydraulic analysis phase. There are two existing conditions in the study area that will significantly affect the outcome of flood hazard zone delineations that we feel should be resolved prior to detailed hydraulic analysis. These two conditions involve grading work currently in progress at the Sunrise Memorial Park site, and the large amount of urban debris in the channel and floodplain between Lone Mountain Road Bridge and the North Las Vegas Wash Detention Basin.

The Sunrise Memorial Park project, located at the corner of Tropical Parkway and Losee Way, involves significant grading in the main channel. Plans for channel construction and rough grading by LB Engineering are included in the Hydrology Study, Sunrise Memorial Park (A.K. Nielsen, January 1995). Two alternate plans are included that show 1) a 30 foot wide concrete rectangular channel and 2) a 200-foot wide trapezoidal interim channel with 3:1 side slopes. The interim channel plans are stamped by the design engineer and approved by the City. During our field visit in April, grading work appeared to be suspended, and existing grades did not appear to conform to the plans. The natural channel of the wash has been obliterated, and a continuous new channel was not constructed. FEMA guidelines allow us to include in our hydraulic analysis new construction that will be complete within 12 months of the draft FIS Study. We need to confirm the approved channel design and the date that completion can be assured, so that we may incorporate appropriate assumptions into the study.

Las Vegas Wash between Lone Mountain Road and the North Las Vegas Detention Basin has significant amounts of debris in the main channel and floodplain that can be easily mobilized and washed downstream. These materials include tires, furniture, yard trimmings, refuse, and other materials ranging in size from less than a foot to over ten feet in length. It is likely that a large amount of debris will reach the Lone Mountain Road and Craig Road bridges during a flood. The individual openings in these bridges are 7 to 8 feet wide, and could potentially be partially or completely blocked by debris. Debris blockage would result in backwater upstream of the bridge, overtopping at the bridge section, and unconfined sheet flow downstream of the bridges. An analysis that assumes the bridge openings are blocked may result in significantly larger areas within flood hazard zones than an analysis based on clear bridge openings. We would like to discuss with you any anticipated controls for debris that could assure that the probability of blockage at these bridges is very low.

Our intent in raising these concerns is to allow the hydraulic analysis to accurately reflect conditions that can be anticipated near the time of study completion, including any changes that might reduce the area of flood hazard zones. Study budget and schedule limitations will preclude modification of the hydraulic analyses once complete. Therefore, we would like to resolve these questions by July 1, 1996. We appreciate your assistance in defining appropriate assumptions for the hydraulic analysis, and will contact you next week to discuss these questions. Please contact us at your convenience with any questions.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

cc:
Kevin Eubanks, CCRFCD
Les Sakumoto, FEMA Region IX.

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: NORTHWEST HYDRAULIC CONSULTANTS
3950 INDUSTRIAL BLVD. STE# 100
WEST SACRAMENTO, CA 95691

Phone: _____

Date: 6/10

Attention: _____

Re: UPPER L.V. FEMA PROJECT

Job # 960104

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____

- ☐ Computer Tape(s)
- ☑ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size _____
  Scale _____
  Sepia Size _____
  Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☐ Extra Order Item

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T1									
T2									
T3									
J1	-10	2					1000	1894	
J2	-1		-1				-6		
NC	0.04	0.04	0.03						
X1	1520	33	1000	2008.13					
GR1896.9		1000	1896.9	1012.82	1896.3	1018.94	1895.9	1068.72	1900.2	1095.14
GR1901.2	1131.13		1900.6	1147.14	1899.6	1156.9	1902	1180.46	1903	1200.38
GR1903.7	1222.38		1901.7	1249.16	1901.4	1283.65	1900.9	1336.1	1890.9	1354.23
GR1890.4	1372.25		1900	1389.43	1899.6	1418.46	1907.3	1433.03	1908.3	1456.78
GR1907.6	1463.49		1907.6	1472.34	1901.2	1490.3	1900.2	1507.41	1900.7	1562.56
GR1901.6	1616.31		1901.8	1671.56	1902	1736.4	1902.2	1802.23	1903	1873.54
GR1903.3	1956.26		1903.8	1960.16	1904	2008.13				
X1	2210	39	1000	2196.32			690			
GR1901.8		1000	1899.7	1019.07	1899.6	1040.87	1901	1056.88	1902.7	1077.31
GR1904.3	1116.29		1902.2	1143.04	1902.6	1157.29	1902.5	1196.86	1902.3	1228.68
GR1902.5	1295.58		1892.6	1311.78	1892.6	1331.5	1896.6	1345.99	1896.8	1364.67
GR	1897	1402.01	1897.1	1429.41	1905.9	1435.27	1906	1445.55	1906.6	1461.43
GR	1908.2	1472.1	1908.5	1479.65	1907.3	1486.22	1907.6	1501.46	1897.6	1506.14
G	1897.6	1540.96	1904.3	1554.89	1905	1670.01	1905.9	1791.37	1906.6	1849.48
G	1907.1	1930.63	1907.5	1963.76	1906.7	1979.12	1906.8	2014.52	1905.5	2065.9
GR1906.1	2069.21		1907.1	2082.42	1907.9	2136.16	1908.6	2196.32		
X1	3975	26	1000	1820.73			1765			
GR1894.7		1000	1894.9	1065.34	1895.8	1150.46	1896.1	1283.67	1896.6	1415.33
GR1897.2	1517.9		1907.2	1528.6	1907.5	1550.5	1907.5	1570.6	1907	1595.27
GR1909.2	1603.14		1898.5	1607.89	1898.3	1632.95	1908.4	1657.51	1909	1686.54
GR1912.3	1705.34		1913	1719.59	1913	1740.66	1911.7	1747.43	1911.7	1757.13
GR1907.1	1771.7		1907	1781.99	1910.6	1793.57	1910.7	1799.62	1910.3	1803.01
GR1910.1	1820.73									
X1	6100	38	805	2149.37			2125			
GR1923.1		805	1922.9	852.96	1920.9	909.32	1920	930.53	1919.3	977.13
GR1918.2	1056.78		1921.5	1099.02	1922.2	1122.25	1921.6	1153.81	1916.6	1183.61
GR1916.2	1194.16		1915.4	1200.14	1915.9	1209.19	1916	1233.27	1916.9	1254.48
GR1920.4	1277.45		1921.1	1310.9	1921.2	1344.22	1921.6	1365.31	1921.8	1392.9
GR1922.6	1429.54		1922.2	1493.12	1921.9	1513.88	1922.5	1545.44	1922.3	1559.88
GR1922.6	1590.15		1922.4	1604.65	1923	1630.68	1923.5	1678.97	1924.1	1721.86
GR1924.7	1779.56		1925.3	1850.82	1925.1	1906.85	1925.5	1985.66	1927.9	2026.66
GR1927.2	2068.41		1928.5	2108.16	1928	2149.37				
X1	6830	34	1000	2253.05			730			
GR	1929	1000	1928.3	1051.15	1926.9	1121.77	1925.3	1167.62	1922	1187.67
GR1921.5	1208.49		1919.9	1220.52	1921.3	1271.54	1921.1	1289.9	1920.4	1300.12
GR1920.2	1321.07		1923.8	1328.9	1922.2	1350.82	1921.5	1371.84	1923.5	1398.48
GR1923.9	1429.97		1918.4	1442	1918.3	1487.98	1922.5	1530.02	1920.8	1556.08
GR1919.1	1585.1		1918.7	1645.95	1919.2	1656.17	1919.4	1679.19	1927.3	1736.42
G	1928.3	1769.6	1928.7	1849.72	1929.1	1906.24	1928.9	1939.71	1928.9	1995.66
G	1929.1	2076.49	1929.8	2136.7	1930	2182.74	1930	2253.05		
λ	7820	39	1182.5	1915.92			990			
GR1929.8		1182.5	1929.1	1198.28	1929	1232.88	1930.6	1241.16	1930.5	1252.79
GR	1935	1272.58	1935	1288.88	1936	1293.41	1930.7	1304.21	1926.3	1324.25
GR1926.3	1355.62		1926	1383.62	1936.7	1425.99	1939.8	1443.45	1940.2	1475.33
GR1931.7	1498.68		1933.2	1511.61	1933.2	1541.36	1934.7	1559.92	1934.5	1571.56
GR1930.5	1591.02		1927.8	1598.52	1927.7	1606.54	1932.3	1613.2	1932.5	1631.05
GR1930.8	1637.32		1932.6	1644.11	1933.3	1662.41	1933.5	1682.98	1927.5	1689.77

X1 8545	30	847.5	1709.99			725			
GR1940.4	847.5	1940.3	871.36	1944.5	885.01	1943.7	893.93	1943.7	901.17
GR1942.9	953.3	1942.2	969.14	1926.9	1019.71	1926.6	1074.61	1940.1	1117.68
GR1945.8	1141.15	1946.8	1191.27	1940.4	1211.19	1942	1249.73	1941.4	1271.33
GR1939.6	1299.98	1939.6	1334.64	1939.3	1361.48	1940.5	1398.73	1943	1455.31
GR1942.6	1486.86	1941.9	1514.67	1942.3	1529.48	1942.4	1554.78	1941.4	1575.6
GR1941.9	1580.39	1941.6	1592.85	1943.9	1631.91	1945.9	1666.96	1945.9	1709.99
X1 9105	44	592.5	2375.53			560			
GR1938.9	592.5	1938.4	614.94	1939.4	643.33	1939.8	702.11	1940.4	777.81
GR1941.1	848.23	1941.4	922.34	1941.9	998.59	1942.3	1069.33	1942.7	1119.58
GR1943.1	1185.67	1944.1	1215.48	1945.2	1252.86	1944.3	1261.27	1944.1	1287.97
GR1943.4	1343.59	1943.4	1397.26	1942.6	1434.05	1941.1	1441.81	1941.2	1463.61
GR1931.6	1480.81	1930.9	1494.84	1941	1515.21	1940.5	1526.77	1942.7	1546.76
GR1943.1	1578.38	1944	1608.57	1944.6	1651.39	1945.1	1684.24	1945.5	1729.38
GR1945.7	1782.34	1945.5	1832	1945.5	1905.85	1948.7	1921.05	1948.9	1947.88
GR1946.9	1970.26	1948.5	2006.41	1947.4	2068.99	1948.2	2101	1948.8	2126.16
GR1949.2	2156.94	1949	2215.6	1949.6	2296.74	1949.3	2375.53		
X1 9450	37	1365	2586.61			345			
GR1952.7	1365	1953.1	1375.28	1951.1	1386.85	1949.5	1440.27	1947.7	1528.09
GR1946.6	1560.36	1946.5	1595.08	1944.1	1606.98	1944.3	1626.51	1942.9	1661.05
GR1943.8	1690.79	1942.9	1697	1942.7	1735.54	1942.6	1779.64	1942.7	1826.53
GR1942.5	1887.83	1942.3	1941.64	1943.6	1946.81	1942	1962.65	1942.6	1974.94
GR1943.2	2030.1	1943.8	2087.53	1945.1	2099.36	1945.6	2112.53	1948.1	2123.14
GR1949.2	2135.55	1949.4	2157.8	1946.4	2175.52	1946.2	2193.37	1947.6	2206.62
GR1948.1	2257.71	1949.4	2283.38	1949.9	2334.82	1950.7	2386.58	1950.6	2439.49
GR1950.7	2490.99	1951	2586.61						
X1 10140	40	1560	3319.99			690			
GR1949.9	1560	1950.2	1634.69	1950.5	1724.19	1951.3	1808.32	1952	1899.38
GR1952.6	1975.75	1953	2053.33	1953	2117.48	1953.7	2144	1954.2	2168.12
GR1954.2	2201.94	1953.7	2280.12	1953.4	2362.9	1951.4	2377.32	1950.6	2409.65
GR1951.3	2433.71	1953.2	2456.02	1953.3	2527.99	1952.9	2592.34	1952.3	2657.65
GR1952.3	2685.14	1953.3	2697.21	1953	2716.86	1952.7	2740.2	1953.7	2752.3
GR 1953	2797.47	1953.1	2819.52	1952.6	2843.9	1951.7	2908.77	1948.7	2921.37
GR1952.9	2936.83	1950.9	2957.33	1953.3	2969.36	1953.5	3031.35	1951.7	3042.21
GR1953.8	3054.69	1955.1	3089.86	1955.7	3142.91	1955.8	3198.15	1956.7	3319.99
X1 10945	52	2532.5	4007.1			805			
GR1963.2	2532.5	1963.6	2559.98	1963.2	2586.43	1961.4	2621.68	1958.3	2680.52
GR1958.3	2702.64	1959.8	2730.44	1961.9	2753.66	1962	2784.12	1960.1	2795.82
GR1959.8	2816.5	1957.3	2834.15	1956.1	2882.33	1955.8	2925.4	1959.1	2935.49
GR1959.1	2946.42	1957.3	2952.17	1959.6	2974.42	1959.9	3000.91	1957.6	3016.58
GR 1958	3048.56	1956.9	3083.02	1958.3	3095.31	1956.7	3110.44	1958.6	3120.2
GR1957.9	3129.97	1959	3143.93	1959.2	3164.02	1957.9	3190.21	1959	3203.14
GR1958.7	3242.14	1959.3	3255.91	1958.8	3303.63	1958.2	3355.75	1957.4	3373.39
GR1955.9	3384.27	1955.3	3402.82	1957.2	3411.62	1958.8	3451.65	1955.5	3462.13
GR1959.2	3471.83	1959.3	3502.29	1954.9	3515.12	1958.7	3522.49	1959.2	3574.21
GR1959.5	3641.36	1960	3709.39	1960.7	3783.51	1961.5	3829.11	1961.8	3869.6
GR1962.4	3907.95	1963.2	4007.1						
X1 11615	30	3132.5	4015.85			670			
GR1968.5	3132.5	1968.5	3149.27	1965.9	3164	1965.5	3169.76	1966.9	3193.24
GR1966.5	3214.77	1964.7	3240.87	1964.2	3276.92	1963.6	3297.79	1964.2	3336.72
GR 1964	3389.93	1960.3	3410.09	1961.9	3431.15	1963.6	3459.61	1963.6	3477.22
GR1964.6	3487.4	1964.5	3520.75	1964.7	3559.04	1965.2	3597.3	1965	3648.66
GR1965.3	3685.31	1965	3734.09	1965.5	3753.75	1964.9	3770.39	1964.6	3791.57
GR 1965	3814.5	1965	3842.83	1966.1	3899.5	1966.5	3964.42	1966.5	4015.85
X1 12190	46	2895	3686.98		575	575			
GR1973.5	2895	1973.9	2936.1	1972.6	2944.1	1972.3	2950.57	1973.5	2973.41
GR1973.2	2997.18	1971.8	3012.54	1973.5	2895	1973.9	2936.1	1972.6	2944.1
GR1972.3	2950.57	1973.5	2973.41	1973.2	2997.18	1971.8	3012.54	1971	3031.36
GR1972.7	3046.28	1972.1	3054.6	1972.4	3075.73	1973.1	3089.37	1972.7	3104.54
GR1972.8	3134.18	1972.2	3175.99	1971.6	3210.18	1971.4	3254.1	1971.4	3311.33
GR1962.7	3332.46	1963.5	3341.89	1964.3	3386.07	1967.2	3402.08	1974.3	3426.53
GR1971.7	3445.54	1972.2	3457.12	1969.8	3471.39	1969.9	3495.21	1969.6	3557.22
GR1969.7	3624.13	1968.1	3630.53	1969.8	3645.2	1968.1	3686.98	1969.1	3694.86
GR1967.7	3703.69	1969.9	3717.11	1969.8	3780.59	1974	3804.53	1974.1	3825.2

GR1980.1	2845	1980.2	2873.38	1979.8	2876.96	1981	2897.72	1980.7	2921.61		
GR1979.6	2944.46	1978.5	2968.34	1980	2973.65	1980	2981.28	1977.8	2990.37		
GR1980.6	2998.56	1979.4	3006.62	1978.9	3043.7	1978.6	3116.71	1978.1	3163.1		
GR1978.4	3213.29	1978.3	3279.68	1978	3352.22	1964.9	3375.8	1964.7	3399.39		
GR1965.3	3447.79	1968	3455.61	1974.3	3503.31	1975.2	3523.04	1976.4	3556.3		
G[illegible]977.6	3599.18	1976.8	3635.55	1977.8	3671.85	1978.5	3729.66	1978.4	3782.24		
G [illegible]978.7	3858.58	1978.2	3908.28	1978	3975.51						
X1 14130	46	3010	4466.46			1055					
GR1989.9	3010	1990.2	3033.58	1990.5	3050.67	1990.3	3070.84	1989.9	3079.03		
GR1990.6	3101.31	1990.4	3128.27	1988.9	3150.74	1988.5	3173.72	1988.7	3197.86		
GR1988.4	3246.13	1988.8	3279.36	1987.5	3285.64	1990.8	3293.64	1989.5	3301.56		
GR1988.8	3331.74	1988.4	3400.82	1988.6	3475.28	1988.4	3541.6	1987.8	3600.63		
GR1987.5	3666	1987.8	3682.71	1970.3	3718.36	1970.6	3775.73	1973	3791.86		
GR1979.9	3812.41	1979.9	3830.98	1983.2	3844.21	1983.4	3879.28	1983.8	3921.87		
GR1983.5	3963.67	1984.2	4013.74	1984	4076.64	1983.5	4091.1	1984	4132.85		
GR1985.2	4176.7	1985.7	4216.72	1986.2	4276.33	1985.9	4325.3	1985.9	4382.26		
GR1984.4	4401.21	1989	4417.95	1989	4423.66	1990.6	4429.39	1989	4434.37		
GR1989.4	4466.46										
X1 15100	41	3407.5	4877.47			970					
GR1995.8	3407.5	1995.7	3423.57	1994.6	3431.83	1998.4	3439.32	1997.1	3446.12		
GR1997.5	3453.11	1997.1	3474.38	1997.7	3507.67	1997.1	3512.56	1995.7	3551.38		
GR1999.3	3562.07	1997.8	3568.64	1997.2	3620.37	1995.8	3686.55	1994.5	3750.3		
GR1993.5	3810.68	1992.7	3879.37	1992.4	3919.77	1991.9	3982.07	1990.6	4035.65		
GR1989.7	4056.59	1980.6	4090.9	1981.4	4118.49	1980.9	4154.86	1988.4	4171.67		
GR1989.7	4233.03	1989.9	4318.37	1990.3	4396.42	1990.3	4422.01	1989.6	4520.87		
GR1991.8	4542.23	1991.8	4583.01	1991.5	4621.17	1992	4680.26	1993.1	4694.51		
GR1993.1	4710.35	1991.5	4726.93	1991.7	4770.47	1991.1	4814.14	1993.4	4828.3		
GR1993.5	4877.47										
X1 16510	51	3747.5	5156.89			1410					
GR2006.9	3747.5	2006.8	3758.28	2006.1	3763.8	2006.7	3771.98	2006.8	3781.35		
G[illegible]005.8	3786.77	2006.4	3793.24	2005.4	3852.56	2005.9	3871.71	2004.8	3912.8		
G[illegible]004.5	3954.91	2003.2	3996.2	2002.7	4050.62	2003.2	4070.73	2003.7	4110.78		
GR 2003	4132.45	2002.4	4170.06	2002.9	4196.76	2002.1	4226.44	2001.6	4271.27		
GR1999.6	4289.9	1994.6	4307.78	1994.9	4343.41	1993	4358.88	1993.5	4414.44		
GR1994.8	4432.26	2001.8	4443.93	2002.6	4479.95	2002.1	4514.28	2003.9	4532.35		
GR2006.1	4565.39	2007	4590.15	2007.4	4614.91	2006.7	4640.35	2009.1	4666.13		
GR2008.6	4705.07	2008.3	4754.22	2008.7	4799.94	2009.6	4822.43	2009.6	4870.16		
GR2013.1	4904.03	2013.9	4941.19	2010.8	4993.71	2011.1	5014	2009.9	5033.16		
GR2011.5	5043.74	2014.4	5077.01	2009.4	5108.51	2013.7	5120.62	2009.6	5131.11		
GR2008.7	5156.89										
X1 17020	44	4072.5	5626.75			510					
GR2012.5	4072.5	2013	4122.15	2013	4195.31	2013.6	4266.14	2013.8	4319.22		
GR2013.8	4373.7	2013.8	4430.58	2013.8	4481.63	2013.3	4525.45	2012.6	4565.31		
GR2010.6	4597.3	2011.5	4622.03	2007.2	4631.01	2006.6	4646.53	2011.1	4665.06		
GR2004.9	4684.13	2006.2	4710.36	2004.6	4745.9	2006.7	4755.88	2005.4	4793.85		
GR2005.6	4834.64	2010.9	4858.14	2013	4882.85	2014.1	4922.06	2016.4	4961.64		
GR 2018	5016.09	2019	5060.31	2018.8	5101.8	2017.8	5145.27	2016.8	5174.51		
GR2016.9	5199.11	2019.5	5219.6	2019.4	5239.32	2016.7	5266.9	2015.5	5293.85		
GR2016.4	5318.67	2018.6	5341.19	2017.6	5357.8	2015.1	5400.29	2016.4	5436.18		
GR 2014	5478.73	2012.9	5539.24	2009.4	5575.76	2008.7	5626.75				
X1 17580	47	4547.5	5856.5			560					
GR2017.5	4547.5	2017.9	4561.64	2019.1	4608.96	2018.6	4655.32	2018.6	4694.25		
GR2019.4	4697.23	2018	4704.38	2018.9	4716.72	2019.4	4765.6	2019.3	4829.27		
GR2019.5	4884.52	2019.2	4920.99	2020.2	4950.78	2019.5	4994.91	2020.7	5021.48		
GR2020.2	5078.05	2018.8	5094.8	2018.2	5115.54	2019.6	5126.08	2020.2	5146.67		
GR2019.8	5168.77	2015.4	5185.64	2013.6	5204.85	2014.7	5255.83	2011.3	5261.93		
G[illegible]014.2	5274.24	2014.4	5289.91	2013.8	5309.25	2014.8	5327.2	2011	5352.07		
G[illegible]009.2	5390.95	2009.5	5410.35	2013.9	5421.05	2016.8	5441.79	2017.7	5459.8		
GR2017.3	5497.79	2019.1	5533.12	2019.6	5575.69	2020.6	5589.18	2022	5632.48		
GR2023.6	5654.59	2022.4	5668.39	2022.4	5705.83	2024	5735.11	2025	5761.12		
GR2025.4	5806.98	2025.1	5856.5								
X1 18400	42	4767.5	6256.23			820					
GR2024.8	4767.5	2025.8	4809.04	2025.9	4869.06	2025.5	4910.58	2025.5	4970.08		
GR2025.7	5022.95	2026.5	5070.89	2026.7	5100.75	2027.2	5142.86	2028.2	5183.89		

GR2021.8	5551.07	2022.1	5583.35	2022.2	5609.22	2024	5640.29	2025.3	5659.95
GR2025.3	5691.8	2025.1	5723.58	2026.7	5751.87	2027.8	5780.15	2028.2	5821.88
GR2027.5	5856.76	2028	5899.77	2028.8	5930.6	2029	5970.22	2028.7	6023.63
GR2029.6	6066.84	2031.1	6103.61	2033	6129.64	2034.6	6155.21	2034.6	6169.45
GR2033.6	6194.37	2030.5	6256.23						
X[redacted]9790	46	1000	2440.08			1390			
[redacted]041.6	1000	2041.5	1046.48	2039.3	1081.39	2038.7	1110.52	2039.7	1154.42
GR2040.5	1184.19	2038.7	1210.92	2034.8	1249.33	2032.9	1287.07	2031.9	1300.56
GR 2032	1315.86	2034.6	1346.74	2036.8	1373.6	2039.7	1416.99	2042.4	1448.51
GR2044.4	1482.22	2044.4	1510.5	2043.7	1540.75	2043.7	1569.59	2040.9	1599.88
GR2039.5	1643.73	2038.4	1703.43	2038.9	1715.29	2037.5	1725.92	2034.5	1762.3
GR2034.3	1780.5	2032.5	1794.35	2032	1814.83	2032.2	1837.85	2032.7	1857.1
GR2033.5	1881.06	2034.3	1914.07	2036.2	1954.17	2036.5	1979.88	2038.2	2000.14
GR2039.5	2048.44	2040.8	2101.47	2041.2	2137.26	2041.3	2179.13	2040.3	2206.98
GR2040.1	2282.34	2040.5	2296.63	2041	2352.88	2041.4	2379.33	2041.7	2393.79
GR2046.5	2440.08								
X1 20510	30	1395	2175.94			720			
GR2053.4	1395	2050.3	1448.9	2049.5	1467.42	2048.6	1542.63	2048.5	1570.03
GR2047.3	1608.4	2042.3	1628.31	2041.5	1647.21	2041.7	1673.91	2040.3	1687.04
GR2040.8	1702.82	2040.3	1710.35	2041.5	1724.05	2041.5	1762.1	2039.4	1769.77
GR2039.3	1786.01	2042.2	1797.49	2042.1	1807.56	2043.6	1823.19	2043.8	1836.31
GR2045.9	1858.28	2045.7	1904.8	2046	1944.61	2046.9	1966.99	2046.6	2001.16
GR2046.3	2015.17	2046.5	2061.78	2047.3	2096.91	2047	2125.5	2048.2	2175.94
X1 21275	40	1000	1875.28			765			
GR2057.5	1000	2055.7	1041.47	2054.1	1052.27	2054.9	1065.72	2056.1	1082.37
GR2055.6	1096.57	2049.8	1121.39	2050.1	1157.01	2050.9	1186.54	2050.7	1226.18
GR2049.7	1271.29	2048.6	1312.57	2046.2	1326.33	2045.8	1342.04	2048.1	1357.87
GR2048.9	1388.15	2049	1432.26	2045.4	1440.93	2045.4	1453.12	2046.2	1460.09
GR2047.4	1479.88	2046.7	1508.66	2048.6	1525.56	2047.4	1541.05	2049.2	1557.32
GR2054.2	1580.56	2055.5	1603.93	2055.3	1614.05	2050.1	1634.03	2051.5	1646.85
GR[redacted]050.2	1662.75	2053.2	1691.04	2054.7	1703.17	2054.1	1717.68	2054.8	1740.29
[redacted]054.2	1755.38	2055.3	1779.76	2056.9	1804.58	2059.6	1840.52	2058.5	1875.26
X1 22120	45	1000	2091.44			845			
GR 2065	1000	2064.2	1028.21	2064.2	1044.93	2064.8	1062.86	2065	1122.17
GR2065.1	1153.02	2063.6	1171.24	2057	1198.51	2056.9	1209.25	2055.3	1220.44
GR2055.9	1233	2055	1254.99	2055.5	1267.43	2054.9	1288.54	2052.6	1299.22
GR 2054	1331.64	2053.4	1343.77	2054.8	1353.31	2053.5	1364.18	2055.4	1376.62
GR2055.7	1393.52	2056.7	1440.89	2057.5	1492.61	2057.6	1551.85	2057.4	1558.95
GR2057.5	1574.03	2059.6	1587.92	2057.9	1602.87	2058.3	1624.73	2058.9	1664
GR 2059	1681.88	2061.6	1696.4	2061	1715.37	2064.1	1752	2066	1780.06
GR2066.5	1808.11	2066.7	1845.3	2065.3	1884.82	2064.3	1915.48	2063.9	1951.16
GR2062.8	1987.23	2061.8	2019.52	2060.2	2043.65	2059.3	2078.64	2058.5	2091.44
X1 23250	27	1000	1531.88			1130			
GR2076.7	1000	2076.1	1016.84	2074.9	1061.89	2068.1	1081.86	2075.4	1111.27
GR2075.5	1139.83	2074.2	1166.71	2066.5	1193.41	2065.6	1213.71	2066.8	1235.89
GR2064.9	1255.54	2065.5	1264.15	2064.8	1280.17	2065.2	1292.98	2065.1	1311.7
GR2063.6	1322.89	2063.2	1333.84	2064.3	1352.07	2063.1	1361.54	2064.2	1397.04
GR2065.5	1403.83	2065.5	1425.63	2066.5	1435.79	2066.6	1449.87	2072.1	1482.47
GR 2082	1514.37	2082.3	1531.88						
X1 24535	24	1000	1528.79			1285			
GR2089.3	1000	2089.1	1057.36	2088.1	1097	2087.5	1131.87	2079.2	1157.95
GR2079.2	1170.13	2077.3	1177.86	2078.6	1189.17	2079	1212.67	2077.7	1231.33
GR2076.5	1287.94	2077.2	1303.9	2078.3	1319.85	2078.3	1331.35	2077.1	1340.46
GR2076.8	1364.53	2077.8	1380.92	2077.8	1409.89	2075.6	1424.15	2075.4	1434.07
GR2085.4	1460.45	2105.9	1487.26	2106.5	1506.91	2104.8	1528.79		
X1 25650	35	1000	1884.62			1115			
[redacted]101.4	1000	2101	1045.55	2099.9	1064.96	2098.8	1097.76	2100.6	1140.3
[redacted]100.5	1184.78	2100.1	1232.97	2098.8	1266.02	2095.4	1298.04	2093.6	1320.41
GR2090.3	1337.94	2088.6	1351.7	2085.1	1366.4	2085.5	1380.16	2088	1389.21
GR 2088	1401.52	2086.9	1411.19	2086.2	1423.94	2087.8	1440.11	2088.3	1475.16
GR2089.9	1536.61	2090.5	1565.47	2089.9	1577.62	2091.1	1606.85	2095.5	1630.6
GR2096.8	1656.2	2092.3	1681.9	2092	1698.26	2094.5	1711.86	2095.2	1722.18
GR 2098	1749.32	2098	1767.19	2099.3	1795	2100.6	1836.38	2099.8	1884.62
X1 26400	35	1000	1856.7			750			

GR2096.8	1269.86	2095.3	1278.59	2094.3	1298.05	2092.4	1307.9	2091.9	1327.03
GR2090.2	1338.57	2090	1360.32	2092.4	1367.29	2093.1	1381.56	2092.1	1414.58
GR2091.1	1427.75	2096.3	1445.95	2101.5	1471.22	2102.6	1501.08	2101.3	1515
GR2100.7	1570.49	2102.6	1604.17	2103.1	1638.74	2103.7	1673.36	2105.6	1701.35
GR 2106	1729.64	2104.9	1761.13	2107.4	1791.33	2107.1	1828.72	2106.3	1856.7
X[illegible]26840		20	1000	1548.24			440		
G 112.6		1000	2113.7	1043.87	2098.3	1105.81	2097.6	1132.08	2096.7	1171.4
GR2097.4	1206.41	2097.5	1234.01	2099	1254.7	2099.4	1282.95	2098.8	1307.72
GR2101.5	1353.27	2100.7	1407.61	2097.4	1421.74	2097.1	1438.85	2093.6	1451.45
GR2097.1	1460.19	2097.3	1466.66	2103.6	1500.25	2106.8	1516.18	2103.9	1548.24
X1200000		45	1000	2226.66			173160		
GR2138.4		1000	2138.2	1029.86	2137.8	1041.72	2137.5	1079.24	2136.6	1085.22
GR2136.9	1106.65	2136.1	1121.97	2135.9	1143.76	2137.6	1185.29	2138.4	1224.73
GR2138.2	1259.68	2116.7	1305.35	2117.2	1323.24	2116.7	1338.21	2133.5	1373.16
GR2131.8	1393.74	2142.8	1433.5	2143.2	1458.81	2142.5	1466.24	2143.4	1488.98
GR2143.2	1504.74	2143.6	1560.99	2142.6	1592.11	2130.9	1652.86	2124	1688.71
GR2124.1	1717.38	2125.2	1766.27	2115.1	1801.58	2115.6	1822.89	2114.6	1874.78
GR 2114	1926.49	2113	1974.97	2110.5	1990.52	2110.5	2002.38	2112	2017.28
GR2111.7	2045.77	2110.5	2056.12	2112.1	2071.74	2110.8	2089.09	2110.3	2102.8
GR2110.4	2113.93	2110.5	2130.99	2132.1	2178.79	2134	2194.29	2134	2226.66
X1201285		36	1225	2039.13			1285		
GR2141.9		1225	2141.2	1263.06	2138.8	1276.71	2126.8	1305.2	2126.3	1318.3
GR2126.5	1334.82	2140.3	1369.77	2140	1384.82	2143.3	1412.41	2142.3	1454.96
GR2127.5	1530.13	2126.4	1547.24	2125.6	1598.77	2125.1	1651.86	2131.3	1679.75
GR2131.7	1701.36	2133.7	1722.39	2133.1	1758.21	2132.3	1769.82	2133.1	1774.13
GR2133.1	1790.76	2131.5	1804.53	2130.7	1838.22	2131	1856.42	2123.7	1880.79
GR2123.6	1899.82	2122	1909.19	2119	1918.95	2119	1925.59	2122.6	1936.72
GR2122.7	1944.51	2119.8	1959.23	2122.4	1972.27	2122.4	1979.62	2133.5	2007.94
GR 2134	2039.13								
X1202750		18	1000	1415.34			1465		
G[illegible]158.1		1000	2157.3	1049.5	2141.3	1082.69	2142.3	1093.37	2141.5	1115.96
[illegible]139.8	1137.18	2138.9	1182.3	2138.1	1189.12	2137.5	1206.04	2138.6	1223.55
Gr2138.7	1240.23	2144	1279.77	2145	1302.32	2144.8	1321.6	2152.9	1344.81
GR2155.4	1376.98	2157.3	1400.79	2157.3	1415.34				
X1204370		21	1000	1475.62			1620		
GR2180.2		1000	2179	1024.4	2180.2	1043.16	2179.7	1093.26	2178.7	1142.94
GR2176.6	1173.86	2176.2	1204.79	2175.1	1224.56	2171.8	1250.5	2154.2	1263.09
GR 2153	1291.82	2154.8	1301.91	2156.8	1321.79	2157.2	1339.36	2156.3	1354.2
GR2159.7	1372.19	2160.1	1394.16	2162.6	1412.97	2171.1	1450.07	2173.5	1465.27
GR2173.8	1475.62								
X1206310		30	1000	1639.04			1940		
GR2191.9		1000	2190.5	1035.15	2189.2	1056.16	2183.9	1086.97	2169.5	1114.69
GR 2172	1127.15	2170.3	1142.71	2172.5	1155.59	2173.2	1199.87	2172.3	1206.34
GR2174.5	1221.77	2176.2	1273.66	2176	1288.49	2179	1306.24	2186.4	1337.03
GR2179.5	1363.03	2177.1	1386.96	2177.2	1394.97	2180.2	1415.21	2177.5	1430.47
GR2178.1	1448.81	2177.3	1455.93	2180	1473.27	2185.4	1493.31	2194.3	1507.23
GR2194.3	1534.84	2195.1	1550.86	2195	1587.25	2194.3	1607.37	2195.2	1639.04
X1207465		29	1000	1643.71			1155		
GR2209.7		1000	2208.6	1063.99	2207.9	1072.65	2209.2	1088.92	2208.6	1121.69
GR2207.9	1158.79	2187.8	1186.45	2182.8	1209.18	2183.6	1216.84	2184.8	1235.06
GR2183.6	1258.34	2181.4	1283.44	2182.5	1304.28	2181.4	1317.16	2181.9	1350.52
GR2179.6	1359.84	2179.3	1366.43	2183.9	1386.2	2184.5	1397.54	2191.8	1419.91
GR2207.6	1435.7	2210.1	1479.38	2210.2	1507.51	2208.1	1538.62	2207.6	1574.12
GR2209.1	1593.29	2208.8	1608.66	2209.3	1620.15	2210.6	1643.71		
X1209030		20	1000	1502.25			1565		
GR2224.3		1000	2224.1	1029.6	2222.8	1054.58	2201.7	1075.23	2198.5	1104.94
[illegible]196.6	1119.69	2196.9	1148.79	2196.1	1170.51	2196.7	1204.61	2196.2	1229.06
L 197.3	1243.68	2196.9	1295.89	2197.7	1303.88	2198.8	1342.31	2211.8	1381.14
GR2212.9	1388.48	2223.9	1422.47	2218.8	1442.88	2212.5	1475.26	2223.9	1502.25
X1210140		26	1000	1474.39			1110		
GR2236.6		1000	2235.1	1019.12	2234.3	1062.93	2234.4	1104.13	2233.6	1146.69
GR2212.3	1170.36	2208.1	1182.19	2206.4	1231.27	2205.6	1241.98	2205.3	1257.55
GR 2206	1268.98	2203	1285.67	2204.1	1294.37	2203.7	1303.55	2204.9	1311.89
GR2205.7	1328.63	2204.7	1334.67	2206.4	1357.76	2203.7	1365.15	2205.9	1376.22

X1211250	33	1000	1657.06			1110			
GR2244.3	1000	2244.1	1066.3	2243.2	1106.79	2244.1	1123.66	2244.1	1149.12
GR2242.5	1158.12	2233.3	1162.5	2219.6	1192.34	2217.1	1227.15	2213.7	1238.63
GR2215.5	1245.44	2214.1	1253.06	2215.8	1261.34	2216.5	1282.07	2215.9	1325.99
GR2215.1	1342.1	2213.8	1349.77	2216.3	1364.81	2217.5	1400.24	2217.8	1426.25
GR2217.6	1443.84	2225.9	1466.22	2233.5	1479.71	2235.5	1515.47	2222.8	1540.82
G 227.2	1552.45	2224.5	1559.89	2226.1	1568	2225.2	1571.41	2229.2	1583.55
GR2229.3	1598.8	2241.9	1627.55	2242.7	1657.06				
X1212835	44	1000	1848.51			1585			
GR2251.5	1000	2253.4	1017.64	2254.1	1049.84	2253.5	1063.28	2247.1	1083
GR2249.4	1098.09	2242.2	1116.44	2242.5	1129.95	2244.6	1143.43	2239.3	1160.74
GR2233.8	1177.19	2233.4	1189.21	2238.8	1213.96	2233.9	1253.33	2228.5	1277.66
GR2229.7	1288.2	2228.4	1304.47	2229.9	1326.9	2230.9	1360.58	2231.4	1393.79
GR2231.4	1426.33	2230.4	1464.21	2228.5	1524.29	2227.4	1536.47	2228.3	1547.24
GR2228.5	1558.96	2227.4	1569.97	2226.6	1577.62	2227.3	1583.2	2226.8	1592.21
GR2224.8	1605.36	2226.7	1617.66	2225.8	1630.67	2230.2	1640.3	2231.2	1648.47
GR2240.6	1681.86	2254	1709.4	2254.3	1728.02	2251.8	1744.52	2254.1	1760.1
GR2254.7	1782.16	2255.1	1804.57	2254.3	1822.71	2249.5	1848.51		
X1213910	49	1000	1863.39			1075			
GR2263.8	1000	2264.4	1023.3	2261.1	1046.23	2257.2	1058.41	2262	1077.29
GR2252.7	1095.53	2261	1106.47	2249.8	1124.35	2245	1147.12	2241.8	1163.12
GR2239.5	1200.3	2238.7	1240.18	2238	1269.24	2238.5	1280.3	2237.1	1291.77
GR 2238	1299.95	2238.2	1312.83	2235.9	1331.36	2236.5	1339.42	2233.7	1356.07
GR2235.6	1366.3	2235.4	1375.55	2236.1	1385.03	2234.7	1401.09	2235.4	1415.06
GR2235.6	1431.52	2246.2	1438.62	2243.6	1447.5	2254.3	1469.25	2253.9	1480.38
GR2244.5	1496.61	2239.2	1512.44	2238.8	1526.2	2239.8	1539.18	2245.1	1563.54
GR2258.7	1578.39	2247.5	1593.16	2241.1	1617.51	2240	1647.34	2241.4	1668.04
GR2244.7	1686.2	2259.1	1702.55	2254.9	1713.55	2260.8	1729.56	2261.4	1744.02
GR2261.6	1760.79	2261.9	1787.85	2261.3	1824.97	2256.8	1863.39		
X1215055	39	1000	1564.23			1145			
GR2269.7	1000	2269.6	1006.12	2257.3	1026.82	2257	1040.24	2268.9	1059.94
G 2269.9	1069.59	2269.6	1081.36	2265.6	1098.06	2260.9	1115.59	2260.3	1136.88
GR2258.2	1146.77	2261	1166.42	2260.6	1182.18	2257.5	1202.07	2254.8	1221.18
GR2247.6	1239.77	2252.2	1259.07	2251	1271.59	2251.1	1292.54	2245.2	1310.07
GR2245.2	1335.3	2242.8	1349.07	2244.1	1356.77	2245.1	1368.71	2245.7	1381.66
GR2245.2	1393.07	2244.5	1407.83	2245.5	1417.19	2245	1424.77	2245	1441.66
GR2246.5	1448.07	2246.1	1455.41	2259.2	1471.74	2257.6	1485.68	2263.4	1504.65
GR2265.4	1515.88	2267.6	1539.42	2269.9	1555.59	2269.6	1564.23		
X1216460	45	1000	1846.59			1405			
GR2279.8	1000	2259.5	1040.16	2258.4	1052.51	2258.7	1061.16	2258.5	1087.96
GR2257.4	1117.06	2257.9	1137.71	2258.3	1161.47	2257.3	1196.3	2256.1	1238.36
GR2255.6	1253.42	2255.6	1266.47	2254.9	1274.24	2255.4	1301.59	2255.6	1320.54
GR 2253	1329.48	2255.1	1337.89	2253.7	1344.71	2253.9	1361.71	2254.9	1393.66
GR2256.3	1400.95	2256.3	1407.3	2264	1433.95	2276.3	1450.19	2265.6	1472.6
GR2262.3	1485.48	2261.9	1501.65	2260.1	1508.19	2259	1522.48	2257.9	1547.95
GR2257.5	1576.17	2264	1596.88	2277.9	1611.57	2279.5	1629.04	2280.1	1651.98
GR2279.5	1677.75	2278.8	1695.15	2273.6	1727.34	2277.7	1757.11	2279.8	1782.27
GR2278.9	1796.15	2276.6	1818.5	2277.8	1824.57	2277.9	1836.27	2277.4	1846.59
X1217545	35	1000	1558.44			1085			
GR2285.1	1000	2284	1016.17	2273.9	1045.65	2274.9	1050.59	2270.8	1071.77
GR 2266	1101.47	2264.9	1124.86	2263.9	1155.74	2264.5	1163.51	2264.2	1200.51
GR2263.1	1256.82	2262.2	1267.06	2262.4	1275.41	2261.3	1291	2260.7	1308.7
GR2260.5	1323.53	2262.4	1338.06	2261.7	1352.1	2261.2	1364.34	2260.3	1372.42
GR2262.4	1380.73	2262.5	1392.85	2261.1	1400.96	2260.6	1426.44	2258.8	1437.68
GR2261.7	1448.32	2261	1458.68	2261.5	1465.62	2261.5	1482.78	2260	1494.31
GR2262.1	1503.25	2262.7	1513.17	2269.6	1524.52	2268.7	1537.22	2273.2	1558.44
X 8825	43	1000	1721.96			1280			
L 273.4	1000	2280.9	1017.83	2276.8	1029.39	2285.7	1045.35	2288.7	1058.02
GR2280.2	1081.02	2272.5	1100.91	2270.3	1120.39	2270.5	1129.2	2271.1	1138.24
GR2270.5	1147.55	2271	1156.18	2270.9	1180.13	2271	1210.57	2270.2	1239.18
GR2270.7	1246.95	2270.2	1261.99	2270	1281.1	2270.3	1295.75	2270.5	1351.34
GR 2268	1360.9	2269.7	1371.93	2269.7	1388.14	2266.9	1400.75	2269.7	1418.64
GR2270.9	1431.31	2277.3	1440.75	2279.9	1454.12	2278.1	1463.22	2275.8	1487.56
GR 2277	1499.89	2274.4	1519.24	2273.7	1548.76	2276.1	1556.62	2276.6	1574.81

X1220435	47	1000	1785.34			1610			
GR2309.3	1000	2308.1	1032.79	2305.5	1043.94	2284.5	1072.73	2283.9	1094.91
GR2281.3	1102.48	2283.5	1109.46	2283.2	1134.02	2281.5	1140.58	2281.6	1151.62
GR2284.1	1160.54	2283.5	1169.44	2281.1	1177.45	2283.6	1186.66	2284.5	1193.04
GR2285.8	1217.3	2286.6	1254.87	2287.1	1271.42	2286	1279.86	2287	1293.39
GR[illegible]87.5	1307.27	2286.5	1321.92	2284.8	1345.47	2285.1	1362.99	2284.6	1385.8
G 285.3	1399.15	2303.2	1414.61	2307.2	1431.43	2306.5	1451.9	2303.3	1468.55
GR2293.1	1489.38	2289.1	1499.53	2289	1518.72	2290.6	1529.28	2292	1549.81
GR2301.7	1572.7	2300.2	1585.5	2297.4	1595.23	2297.2	1605.85	2298.8	1611.19
GR2293.6	1621.87	2291.3	1634.25	2293.1	1671.79	2289.3	1685.05	2287.7	1706.34
GR2287.4	1739.52	2287.7	1785.34						
X1221730	45	1000	1882.06			1295			
GR2318.1	1000	2311.1	1013.78	2308.4	1031.27	2312.3	1049.63	2311.9	1069.23
GR2297.2	1091.23	2295.3	1108.11	2296.1	1131.27	2293.6	1144.23	2293.1	1162.01
GR2292.4	1169.11	2292.2	1186.62	2292.7	1193.19	2292.2	1217.33	2293	1227.27
GR2292.9	1243.43	2291.4	1252.76	2292.4	1267.59	2292.6	1276.62	2296.2	1289.29
GR2297.2	1306.89	2295.1	1321.97	2293.9	1339.43	2294.6	1349.87	2292.4	1365.53
GR2293.5	1371.75	2293.9	1393.37	2292.4	1407.91	2292	1430.97	2292.4	1456.81
GR2313.4	1464.67	2312.3	1487.14	2305.1	1521.69	2305.2	1535.42	2308.6	1542.11
GR 2314	1575.52	2314.7	1599.55	2320.7	1634.21	2320.2	1664.36	2319.3	1708.3
GR2319.7	1730.48	2319.9	1763.82	2319.5	1801.4	2319.2	1833.03	2316.9	1882.06
X1222785	23	1000	1513.64			1055			
GR2326.2	1000	2320.6	1024.49	2310.9	1049.68	2302.6	1077.44	2300.5	1097.02
GR2299.8	1114.55	2297	1124.84	2297.3	1134.36	2299	1144.48	2299	1184.46
GR 2298	1202.4	2297.3	1235.27	2299.1	1258.85	2299.4	1282.12	2298.4	1301.35
GR2299.8	1315.61	2308.7	1338.21	2325.9	1368.67	2325.3	1395.58	2325.8	1411.94
GR2325.9	1451.45	2325.9	1492.84	2326.2	1513.64				
X1223980	35	1000	1659.02			1195			
GR2335.9	1000	2321.2	1009.35	2324.6	1023.46	2317.6	1030.59	2311.5	1053.21
GR2310.6	1063.56	2311.1	1069.39	2309.9	1083.59	2310.8	1090.73	2310.4	1111.32
GR[illegible]309.2	1118.92	2311.3	1128.82	2311.3	1174.74	2311.1	1214.76	2310.9	1246.96
G[illegible]309.7	1311.05	2309.2	1343.78	2309	1377.97	2306.5	1382.06	2309.5	1387.2
G[illegible]309.7	1398.02	2305.7	1410.17	2307.3	1422.56	2308.5	1435.3	2308.8	1459.21
GR2308.7	1488.67	2310.5	1499.24	2315.8	1510.35	2325	1542.44	2329.4	1557.17
GR2332.3	1572.24	2336.2	1584.75	2337.2	1606.24	2337.4	1626.09	2336.9	1659.02
X1225305	59	1000	2107.8			1325			
GR2341.7	1000	2344.5	1017.65	2344.3	1033.32	2344.9	1047.14	2336	1065.57
GR2323.8	1098.95	2322.2	1127.07	2321.8	1162.12	2322	1197	2321.8	1204.3
GR2322.6	1222.77	2323.8	1253.57	2324.6	1278.58	2328.9	1296.06	2326.7	1326.39
GR2339.6	1338.01	2344	1360.82	2342.9	1384.17	2344	1406.09	2344.5	1422.52
GR2343.6	1436.76	2344.4	1470.2	2343.6	1484.06	2345.7	1519.4	2345.7	1543.04
GR 2346	1568.82	2344.1	1591.74	2343.3	1602.9	2343.7	1623.39	2343.3	1634.57
GR2326.1	1644.21	2319.9	1663.17	2319.4	1676.21	2319.7	1696.04	2318.8	1703.14
GR2319.7	1711.21	2319.2	1735.5	2318.7	1749.97	2319.8	1765.72	2319.9	1779.36
GR 2319	1792.44	2319	1801.18	2317.9	1805.49	2318.9	1812.55	2319.5	1828.22
GR2319.4	1856.87	2319.4	1901.62	2318.2	1911.73	2319.2	1916.64	2319.2	1935.72
GR2327.8	1956.94	2345.4	1973.64	2344.9	1989.31	2346.3	1996.61	2345.7	2017.16
GR2347.4	2040.91	2347.8	2058.42	2348	2081.27	2347.9	2107.8		
X1226400	23	1000	1551.34			1095			
GR2356.2	1000	2356	1016.93	2337.6	1046.3	2331.8	1067.36	2331	1091.77
GR2330.5	1139.87	2330.2	1187.66	2328.6	1236.66	2328.3	1283.38	2327.7	1319.99
GR2327.3	1341.77	2326.8	1347.63	2327.1	1380.3	2325.3	1389.21	2326.8	1402.91
GR2324.7	1415.77	2327.3	1426.84	2328.8	1472.84	2328	1489.71	2332.4	1511.96
GR 2338	1526.49	2349.3	1537.66	2354.2	1551.34				
X1300000	48	707.5	1945.91			73600			
GR2384.7	707.5	2383.8	730.11	2379	760.78	2381.3	780.05	2382.8	799.56
G[illegible]384.5	818.17	2384.5	847.88	2382.8	864.7	2366.7	886.95	2357.2	908.61
G[illegible]357.3	936.83	2357.5	970.54	2357.5	1018.68	2356.8	1087.41	2382.8	1111.5
GR 2376	1123.73	2370.5	1143.52	2368.8	1159.63	2358.9	1186.66	2357.4	1197.99
GR 2357	1227.82	2355.5	1236.71	2357.2	1244.29	2356.9	1268.03	2356.2	1275.67
GR2357.4	1289.57	2356.5	1329.3	2357.1	1339.38	2357.5	1385.86	2358.6	1429.53
GR2358.6	1469.86	2358.4	1495.81	2358.7	1518.72	2359	1541.15	2359.2	1591.92
GR2359.9	1608.8	2359.7	1636.54	2362.1	1659.93	2369	1692.15	2368.8	1747.69
GR2371.1	1768.09	2370.4	1816.06	2365.8	1827.99	2367.7	1841.05	2381	1857.22

GR2392.4	1000	2394	1023.02	2392.4	1038.78	2397.9	1056.49	2395.3	1075.97		
GR2391.1	1100.2	2394.9	1117.44	2393.9	1124.66	2380	1152.28	2378.5	1168.56		
GR2377.3	1180.2	2377.6	1199.71	2380.3	1212.89	2377.3	1241.94	2377.8	1252.98		
GR2376.2	1284.24	2376.5	1299.4	2375.9	1326.12	2375.4	1337.56	2374.1	1341.99		
GR2375.8	1349.75	2375	1368.66	2375.8	1377.07	2376.2	1408.51	2386.9	1423.57		
GR2376.2	1445.88	2376.7	1471.18	2376.9	1503.45	2376.1	1537.16	2375.2	1575.28		
[illegible]375.2	1594.14	2374.9	1622.95	2375.5	1634.41	2375.1	1664.71	2374.7	1682.25		
GR2372.9	1693.65	2385.7	1712.38	2382.1	1728.19	2373.8	1746.26	2374.4	1763.63		
GR2375.4	1802.46	2374.5	1814.94	2376.3	1837.01	2376.4	1860.45	2375.7	1886.94		
GR2375.3	1898.63	2373.5	1912.3	2374.3	1922.2	2371.5	1928.59	2373.6	1937		
GR2372.9	1957.4	2373.2	2000.35	2374.1	2013.36	2374.7	2038.89	2374.5	2087.87		
GR2373.9	2126.47	2373.2	2155.35	2372.6	2197.58	2372.7	2226.28	2373.4	2257.18		
GR2374.5	2274.85	2374.4	2285.1	2373.9	2291.43	2374.1	2321.86	2374.3	2364.99		
GR2374.4	2432.29	2379.2	2456.68	2389.2	2479.59	2397.8	2497.85	2394.1	2509.84		
GR2381.8	2533.33	2376.3	2552.96	2376.8	2578.91	2377	2604.09	2395.1	2630.98		
GR2396.3	2660.33										
X1303500	26	1522.5	2163.77			1720					
GR2406.4	1522.5	2405.4	1530.66	2398.7	1552.09	2387.5	1571.8	2386.2	1595.91		
GR 2388	1635.2	2387.9	1678.18	2387.6	1709.78	2388.1	1735.68	2388.2	1782.58		
GR2388.4	1796.69	2389	1858.84	2388.5	1869.01	2388.7	1876.28	2390.3	1890.74		
GR2390.9	1935.62	2390.5	1957.41	2390.2	2006.82	2389.8	2031.16	2390.4	2075.75		
GR2390.2	2083.13	2390.5	2099.74	2391.5	2109.5	2405.9	2133.07	2411	2145.21		
GR2410.9	2163.77										
X1304570	42	1162.5	2073.79			1070					
GR2419.8	1162.5	2415.8	1178.09	2415.8	1187.14	2407.5	1206.49	2409.7	1226.23		
GR2406.8	1247.48	2403.4	1262.94	2405.8	1269.73	2401.7	1282.41	2410.6	1300.64		
GR2401.9	1305.52	2399.2	1316.41	2399.1	1338.32	2398.4	1344.33	2397.7	1369.09		
GR2398.3	1377.01	2399	1400.76	2399.2	1426.83	2399.2	1458.38	2398.9	1505.94		
GR2398.3	1542.85	2398.4	1587.19	2398	1646.66	2397.7	1695.95	2397.5	1713.8		
GR2399.3	1722.14	2399.4	1767.55	2398.1	1776.84	2398.1	1812.62	2398.1	1834.28		
GR2415.9	1868.87	2413.7	1883.33	2404.1	1904.59	2405.1	1916.4	2410.6	1934.41		
[illegible]415.5	1951.56	2416.2	1968.17	2420.7	2002.27	2418.9	2021.8	2417.8	2041.8		
[illegible] 2417	2067.15	2415.7	2073.79								
X1306010	62	1000	2460.81			1440					
GR2428.1	1000	2428.3	1025.18	2426.1	1071.98	2414.4	1095.95	2414.6	1142.01		
GR2414.9	1157.14	2414.4	1193.39	2413.8	1199.22	2414.3	1204.34	2413.7	1232.19		
GR2413.8	1268.57	2414.1	1316.84	2413.3	1353.03	2412.6	1358.63	2413.3	1364.94		
GR2413.1	1381.78	2411.8	1391.13	2412.8	1404.23	2412.7	1434.47	2413.6	1453.46		
GR2413.5	1477.13	2413.7	1512.25	2413.1	1525.82	2413.1	1549.81	2413.4	1569.87		
GR 2413	1583.44	2412.7	1618.33	2415.2	1643.74	2415.5	1681.48	2414.5	1715.41		
GR2413.4	1736.6	2411.2	1749.88	2411.5	1783.99	2410.8	1840.23	2411.5	1875.53		
GR2412.6	1897.8	2413.3	1926.96	2413.3	1949.94	2412.1	1972.09	2413	1993.04		
GR2413.7	2040.95	2413.7	2058.58	2412.6	2110.01	2412	2131.08	2412.4	2167.57		
GR2411.5	2173.16	2411.6	2180.6	2416.4	2201.08	2425.3	2222.75	2424.2	2253.46		
GR2422.9	2274.24	2426.3	2288.64	2425.7	2304.23	2418.4	2339.49	2424.2	2352.57		
GR2416.3	2378.17	2418.2	2385.25	2416.7	2390.01	2423.7	2403.42	2426.4	2420.27		
GR 2424	2447.05	2425.7	2460.81								
X1307055	33	1000	1769.16			1045					
GR 2422	1000	2420.3	1010.6	2420.5	1056.55	2420.8	1097.21	2422.1	1101.26		
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GR2420.1	1451.92	2420.3	1510.43	2428.2	1538.11	2428.6	1547.04	2428.5	1556.8		
GR2427.6	1561.03	2428.1	1579.96	2430.8	1590.67	2430.4	1596.92	2429.6	1601.74		
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GR 2428	1727.46	2428.2	1745.44	2429.8	1769.16						
X1307650	29	16982.5	17845			595					
[illegible]527.5	16982.5	2527.7	17013.81	2525.7	17058.16	2525.4	17099.7	2525.3	17151.43		
[illegible]529.5	17162.58	2530.3	17180.38	2534.5	17200.08	2534.8	17238.12	2531.4	17255.5		
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X1307820	34	18122.5	18962.64			170					
GR2529.7	18122.5	2529.2	18159.35	2527.2	18200.6	2526.7	18224.35	2527.4	18242.21		
[illegible]											

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GR2531.718491.44  2531.518535.01  2531.418590.73  2531.4   18649  2531.418705.91
GR2539.618730.61  2540.418741.45  2540.318756.81  2533.718782.58    253418808.17
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X1310575       31-2864.21-2154.14                      2755
G 2592.4-2864.21 2591.81-2855.49 2589.31-2841.54 2590.91-2822.14 2590.71-2792.18
( 2589.2-2787.08 2590.91-2781.02 2591.21-2741.39 2589.71 -2735.1 2589.61-2727.15
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GR  2591-2154.14
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GR2631.6-745.0752631.412-694.08522632.512-675.35522633.312-653.26522627.012-631.465
GR2626.6-583.7352626.312-526.13522626.112-484.46522626.412-408.365  2626.6-367.595
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GR2630.1-225.5252630.012-180.595
EJ


ER
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Mayor
James K. Seastrand

Councilmen
Theron H. Goynes
Mary J. Kincaid
William E. Robinson
John K. Rhodes

City Manager
Linda Hinson

Deputy City Manager
Patrick Importuna

City of North Las Vegas
Public Works Department - Development & Flood Control Division
2266 Civic Center Drive • North Las Vegas, Nevada 89030-6307
Telephone: (702) 657-2265 • Fax: (702) 649-4696

received
MAY 31 1996

May 29, 1996

Joey Howard, P.E.
Northwest Hydraulic Consultants Inc.
3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691-3430

Dear Mr. Howard:

In accordance with your request, enclosed are bluelines for:

★King Charles Diversion Channel from N-Channel Phase I
★King Charles Diversion Channel from N-Channel Phase II
★Improvement Plans for Lone Mountain Road Bridge
★Las Vegas Wash Detention Basin

If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Irene R Contreras for

Kelly R. Chuma, P.E.
Administrator, Development and Flood Control

irc
Enclosures

Upper Las Vegas Wash

Clark County, Nevada

Copy of Draft Hydrology

Submitted to FEMA Region IX and TEC

May, 1996

CLARK COUNTY FIS

1. Hydrology

1.1 Study Approach

The North Las Vegas Wash is an ephemeral desert stream draining a basin area of approximately 720 square miles originating in the Spring and Sheep Mountains upstream of the City of Las Vegas. Peak flows from the majority of the basin are controlled by two major detention basins: the North Las Vegas Detention Basin constructed in 1984 and the Upper Las Vegas Wash Detention Basin constructed in 1993. The tributary area to the North Las Vegas Detention Basin was increased by 48 square miles with construction of the Range Wash Diversion Dike in 1994. Figure 1-1 shows basin boundaries above the major flood control structures.

Previous hydrology studies for flood control facility design and for determining regulated flood discharges include work by the U.S. Army Corps of Engineers (1988), James M. Montgomery (1991), Boyle Engineering Corporation (1991) and by Black & Veatch (1993).

The approach and objectives for the current hydrologic analysis are to assess the adequacy of the previous analyses, and to update and re-run previously-developed Flood Insurance Study HEC-1 models as necessary to reflect existing flood control facilities.

1.2 Previous Hydrology Studies

The hydrology of the North Las Vegas Wash has been studied in numerous previous reports. Recent studies leading to the development of HEC-1 models adopted for use in the present work are listed below.

- U.S. Army Corps of Engineers (COE), South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988. That study provided a regional analysis of flood frequency data, including 20 years of peak flow data for USGS Gage 09419650, Las Vegas Wash at North Las Vegas. The Las Vegas Wash at this location reflects flows from the Upper Las Vegas Wash channel. The COE developed a computed probability 100-year regional flood frequency curve, reproduced here as Figure 1-2.

- Black & Veatch (B&V), "Flood Control Facilities Plan for the Northern Las Vegas Wash," August 1989. That study included the development of HEC-1 models with various storm centerings for the Upper Las Vegas Wash basin.

- Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood Control Facility Plan," prepared for City of North Las Vegas, June 1991. That study included HEC-1 modeling and led to construction of the West Range Wash Diversion Dike which now diverts flow from 48 square miles of the Range Wash basin into the North Las Vegas Detention Basin.

- B&V, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991. That study included HEC-1 modeling of the upper portion of the Las Vegas Wash basin, and led to construction of the Upper Las Vegas Wash Detention Basin and an accompanying interception berm/channel extending to the west from that facility.

- James M. Montgomery (JMM), "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991). HEC-1 models for that study were based on the HEC-1 models developed by B&V (above). Model calibration was attained by matching previous COE and B&V discharges in an initial set of model runs which did not include proposed flood control facilities The proposed facilities were then introduced to the models to generate Flood Insurance Study (FIS) flows.

- B&V, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25 1993. That report included HEC-1 modeling of 6 storm centerings to examine impacts of the Upper Las Vegas Wash Detention Basin and West Range Wash Diversion Dike on outflows from the North Las Vegas Detention Basin. This work led to modification of the North Las Vegas Detention Basin outlet structure by closing two of the five original outlet pipes.

A review of peak flow data through 1993 for the USGS Las Vegas Wash gage (Gage 09419650, Las Vegas Wash at North Las Vegas) found that no significant flood events have occurred since the COE's 1988 analysis that would substantially change the results of that assessment. The lack of additional significant events in the Las Vegas Wash would tend to lower the COE-estimated 100-year discharge for that station, but the COE's adopted regional analysis curve (Figure 1-2) already results in a slightly lower 100-year discharge estimate for that station than frequency analysis of the individual station gage records. The COE's regional analysis for 100-year peak discharge versus drainage area therefore continues to be a reasonable method for estimating unregulated peak flows for the Upper Las Vegas Wash basin.

Existing HEC-1 models of the Upper Las Vegas Wash were "calibrated" to the COE regional analysis curve, and should provide a reasonable estimate of unregulated peak flows. However, it should be noted that there was no calibration to the shape or volume of runoff hydrographs, apparently due to a lack of data for such calibration. The accuracy of the shape and volume of simulated runoff hydrographs, which are important to the performance of detention facilities, is therefore unknown. Hydrographs simulated by the existing HEC-1 models assume a hydrograph shape defined by the SCS unitgraph approach.

The previous analyses considered numerous separate storm centerings over the basin to identify storm configurations which produced the highest peak flows at various locations in the basin. Multiple storm centerings were required because peak flows in the region result from cloudburst events having areas less than 200 square miles and that only cover a portion of the entire Upper Las Vegas Wash basin. For the present work, we have accepted the findings of the previous B&V (1993) and JMM (1991) studies as to which theoretical design storms are most critical for determining FIS discharges:

- The "Spring Mountain Storm" previously used by both JMM and B&V produces the highest uncontrolled peak inflows to the Upper Las Vegas Wash detention basin, as well as the highest peak outflows from both the Upper and North Las Vegas Wash detention basins. The Spring Mountain storm has been modeled as a 136.34 sq. mi. storm centered over the Spring Mountain Range. Spring Mountain storm HEC-1 models had previously been developed by JMM (1991) with 10-, 50-, and 100-year rainfall amounts. The Spring Mountain storm simulates a 100-year (uncontrolled) peak flow of 14,737 cfs into the Upper Las Vegas Wash detention basin. Considering the detention basin's total tributary area of approximately 516 sq. mi., the HEC-1 result, is consistent with the COE's regional analysis curve (Figure 1-2).

- The "Interbasin Storm" previously used by B&V produces the highest 100-year peak inflow to the North Las Vegas detention basin. The Interbasin storm has been modeled as a 54.37 sq. mi. storm covering the North Las Vegas Wash tributary area between the Upper and North Las Vegas Wash detention basins. A single Interbasin storm model had been developed by B&V (1993) to represent 100-year storm conditions only. The Interbasin storm simulates a 100-year (uncontrolled) peak flow of 8,537 cfs from the 54.37 sq. mi. basin and is consistent with the COE's regional analysis curve (Figure 1-2).

- An unnamed storm covering the entire 48.16 sq. mi. tributary area to the West Range Wash diversion dike produces the highest peak flows for the West Range Wash diversion dike. A HEC-1 model for this storm had previously been developed by Boyle (1991) for 100-year storm conditions only. This storm simulates a 100-year (uncontrolled) peak flow of 6,584 cfs from the 48.16 sq. mi. basin, which is about 13% lower than the 100-year peak flow indicated from the COE's regional analysis curve (Figure 1-2).

For purposes of the present work, the previously-developed Spring Mountain 10-, 50-, and 100-year HEC-1 models were updated to reflect the existing flood control facilities, and additional Interbasin storm models were developed to represent 10- and 50-year rainfall amounts. HEC-1 models representing 500-year rainfall amounts were developed for both the Spring Mountain and Interbasin storms.

No modifications were made to the HEC-1 model representing West Range Wash diversion dike flows, as FIS discharges for floodplain mapping were not required for this location. If required for other purposes, approximate 10- through 500-year values for West Range Wash diversion dike flows could be estimated by multiplying Interbasin storm values by 0.89, which is the ratio of Interbasin storm to West Range Wash diversion dike basin areas.

1.3 Modifications to Existing HEC-1 models.

HEC-1 models developed by JMM (1991) for the Spring Mountain storm and by B&V (1993) for the Interbasin storm were used as the basis for hydrologic modeling in the present study. No changes were made to any of the previously-defined runoff or channel routing parameters including basin areas, curve numbers, loss rates, channel geometry, and channel routing coefficients. Furthermore, no changes were made to subbasin rainfall amounts for 10- through 100-year return periods, precipitation multipliers, or depth-area correction factors, all of which appeared to be consistent with values recommended by the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

Spring Mountain Storm Files

Spring Mountain 10-, 50-, and 100-year storm HEC-1 files for the present study are based on HEC-1 files prepared by JMM (1991) for the previous FIS hydrology study. Modifications to the JMM files consisted of updating the detention basin characteristics for existing conditions as follows:

- Stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were updated to reflect as-built conditions. The 1991 JMM model had been based on a preliminary detention basin design which was revised prior to construction. The original (JMM, 1991) model SV, SE, and SQ data for the Upper Las Vegas Wash detention basin were replaced using the SV, SE, and SQ data from HEC-1 models prepared by B&V (1993). The B&V stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were reviewed and found to adequately reflect as-built conditions.

- The stage-discharge relationship for the North Las Vegas Wash detention basin was updated to reflect the existing three-pipe outlet structure with a four-feet high, 53-feet wide upstream barrier wall. The 1991 JMM model had assumed a four-pipe outlet structure based on preliminary design data; however, two of the structure's original five outlet pipes were subsequently blocked following construction of the Upper Las Vegas Wash detention basin. The original (JMM, 1991) model SQ data for the North Las Vegas Wash detention basin, for stages above seven feet, were replaced using the discharge data presented by

B&V (1993) for a three-pipe outlet structure. Discharges below about seven feet stage were found to be controlled by the upstream barrier wall which was not represented in any of the previously outlet rating curves. The rating curve for the barrier wall was computed for the current study by assuming orifice flow through the weep holes, plus weir flow at stages above four feet.

A Spring Mountain 500-year storm HEC-1 model was developed for the present study by modifying the 100-year model to include 500-year rather than 100-year rainfall amounts. This differs from the approach taken in the previous JMM (1991) FIS study in which 500-year flows were estimated by extrapolation of the flows simulated for 10-, 50-, and 100-year return periods. The previous method is likely to underestimate 500-year flows in the Upper Las Vegas Wash system because the detention basins are sized to be filled during a 100-year event. A substantial loss of flow control should therefore be expected at more extreme events due to spillway flow.

Spring Mountain storm 500-year rainfall amounts for each model subbasin were determined by extrapolation of the rainfall amounts from the JMM (1991) 10-, 50-, and 100-year Spring Mountain storm HEC-1 models.

Interbasin Storm Files

Interbasin storm 10- through 500-year rainfall HEC-1 files for the present study are based on the 100-year Interbasin storm HEC-1 file prepared by B&V (1993). This storm covers the Las Vegas Wash basin area beginning immediately downstream from the Upper Las Vegas Wash detention basin and extending to the outlet of the North Las Vegas detention basin. Hydraulic characteristics for the North Las Vegas detention basin were revised to be the same as for the updated Spring Mountain storm models discussed above.

Subbasin rainfall amounts for the 100-year Interbasin storm are as presented in the original B&V model. Rainfall amounts for 10- and 50- year storms are based on the 10- and 50-year subbasin rainfall amounts presented by JMM (1991) for the Lower Central Valley storm, which covers all but two of the subbasins included in the Interbasin storm. Rainfall amounts from the JMM (1991) 10- and 50-year models were divided by a factor of 0.62 to remove the depth-area correction factor which had been applied to subbasin rainfall amounts in the original development of the Lower Central Valley models. 10- and 50- year, 6-hour rainfall amounts for the two subbasins (104 and 105) not covered by the Lower Central Valley models were determined from NOAA Atlas 2 for Nevada. The 10- and 50-year atlas amounts were increased by factors of 1.24 and 1.39 respectively, as recommended by the CCRFCD (1990). A depth-area correction factor of 0.66 was applied for all Interbasin storms.

Subbasin rainfall amounts for the 500-year Interbasin storm were determined by extrapolation of rainfall amounts from the 10-, 50-, and 100-year Interbasin storm models.

Input files for all HEC-1 models modified or created for the purposes of this study are provided in digital form on a diskette which accompanies this report.

1.4 Revised FIS Discharges

Table 1 summarizes the results of the HEC-1 modeling at various points along the Upper Las Vegas Wash system. Computation nodes are shown in Figure 1-3. Table 2 compares the current model results with the previously adopted FIS flows.

The current model results for 10- through 100-year return periods are slightly lower than the previously-adopted FIS discharges. We do not consider the differences to be sufficiently large to warrant changing the previously-published 10- through 100-year flows which are currently being used by others for concurrent (downstream) floodplain mapping analyses.

The revised hydrologic analysis indicates a 500-year discharge downstream from the North Las Vegas detention basin which is about 80% larger than previously assumed. This increase in the 500-year discharge is due to a loss of detention basin flow control that was not specifically addressed in the previous FIS analysis.

REFERENCES

Black & Veatch, "Hydrologic Analysis of Proposed Transbasin Diversion from the Range Wash Watershed into the North Las Vegas Detention Basin," prepared for City of North Las Vegas, June 1990 draft.

Black & Veatch, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991.

Black & Veatch, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25, 1993.

Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood Control Facility Plan," prepared for City of North Las Vegas, June 1991.

Clark County Regional Flood Control District, "Hydrologic Criteria and Drainage Design Manual," Section 500 (Rainfall) and Section 600 (Storm Runoff), October 1990.

Montgomery, James M., "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991).

Montgomery, James M., "Clark County Regional Flood Control District, The Master Plan Update of the Las Vegas Valley (Volume II)," August 1991.

U.S. Army Corps of Engineers, South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988.

U.S. Army Corps of Engineers, Los Angeles District, "Special Flood Hazard Study, Las Vegas Wash and Tributaries, Clark County, Nevada," July 1988.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, NOAA Atlas 2: Precipitation-Frequency Atlas of the Western United States, Volume VII-Nevada, 1973.

Table 1-1
HEC-1 Results

Location	Storm ID	Model Node	Storm Return Period 10-yr	50-yr	100-yr	500-yr
Inflow to ULVWDB	Spring Mtn	WTRIBUS	3,465	10,312	14,737	24,938
Outflow from ULVWDB (Max basin stage, feet)	Spring Mtn	ULWDB	2,426 (2351.26)	3,888 (2366.98)	5,019 (2372.40)	19,217 (2375.68)
Inflow to NLVDB	Spring Mtn	NLVIN	2,400	3,878	4,796	**17,855**
	Interbasin		**2,939**	**6,751**	**8,537**	13,077
Diversion Dike Overflow at NLVDB	Spring Mtn	DIVDIKE	0	0	0	**6,838**
	Interbasin		0	0	**194**	3,226
NLVDB Pipe and Spillway Outflow (Max stage, feet above 2108 feet)	Spring Mtn	NLVDET	1,292 (9.90)	2,186 (22.5)	2,839 (27.42)	6,322 (31.44)
Total Discharge below NLVDB	Spring Mtn	2 combined	**1,292**	**2,186**	**2,839**	**8,988**
	Interbasin		1,220	2,074	2,345	5,438
Diversion along Railway	Spring Mtn	RRCHANNL	0	0	0	2,236
ULVW at Railway Bridge	Spring Mtn	RRBRIDGE	1,281	2,183	2,833	6,083
Diversion at King Charles Channel	Spring Mtn	KCHAR	1,024	1,746	2,266	4,866
ULVW at Hwy 15	Spring Mtn	I15 below KCHAR	256	437	567	1,217

Definitions:

ULVWDB = Upper Las Vegas Wash Detention Basin
NLVDB = North Las Vegas Detention Basin
ULVW = North Las Vegas Wash

Assumptions for Railway and King Charles Diversions:

HEC-1 model output for diversions from the main ULVW into the Railway and King Charles Channels are based on the following approximate relationships:

ULVW Flow cfs	Diversion to Railway Channel	NLVW Flow cfs	Diversion to King Charles
0	0	0	0
6,000	0	1,000	800
20,000	13,500	10,000	8,000

Storms:

Spring Mountain: a 136 square mile storm over the Spring Mountains upstream from the ULVWDB.
Interbasin: a 54 square mile storm between the ULVWDB and NLVDB

West Range Wash Diversion flows to NLVDB

West Range Wash Diversion flows were not modeled as part of the present study. Three estimates of the 100-year peak inflow from this 48.2 square mile basin are readily available as follows:

From HEC-1 model by Boyle (1991): 6,584 cfs
From COE Regional Curve: 48.2 times 155 cfs/sq mi: 7,471 cfs
Adjust Interbasin storm flows above DIVDIKE for basin area, 8,537 times (48/54):7,588 cfs

Table 1-2
Comparison of HEC-1 model results with previous (1991) FIS Discharges

Node (JMM, 1991)	10-year Peak Flow, cfs			50-year Peak Flow, cfs			100-year Peak Flow, cfs			500-year Peak Flow, cfs		
	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change
RRBRIDGE	1,440	1,281	(159)	2,600	2,183	(417)	3,050	2,833	(217)	4,630	8,319	3,689
NC5	288	256	(32)	520	437	(83)	618	567	(51)	940	1,217	277

Node	Description Given by JMM, 1991
RRBRIDGE	Total flow at RR bridge (before diversion along RR to A Channel)
NC5	Outflow from NLV det. basin below King Charles Diversion

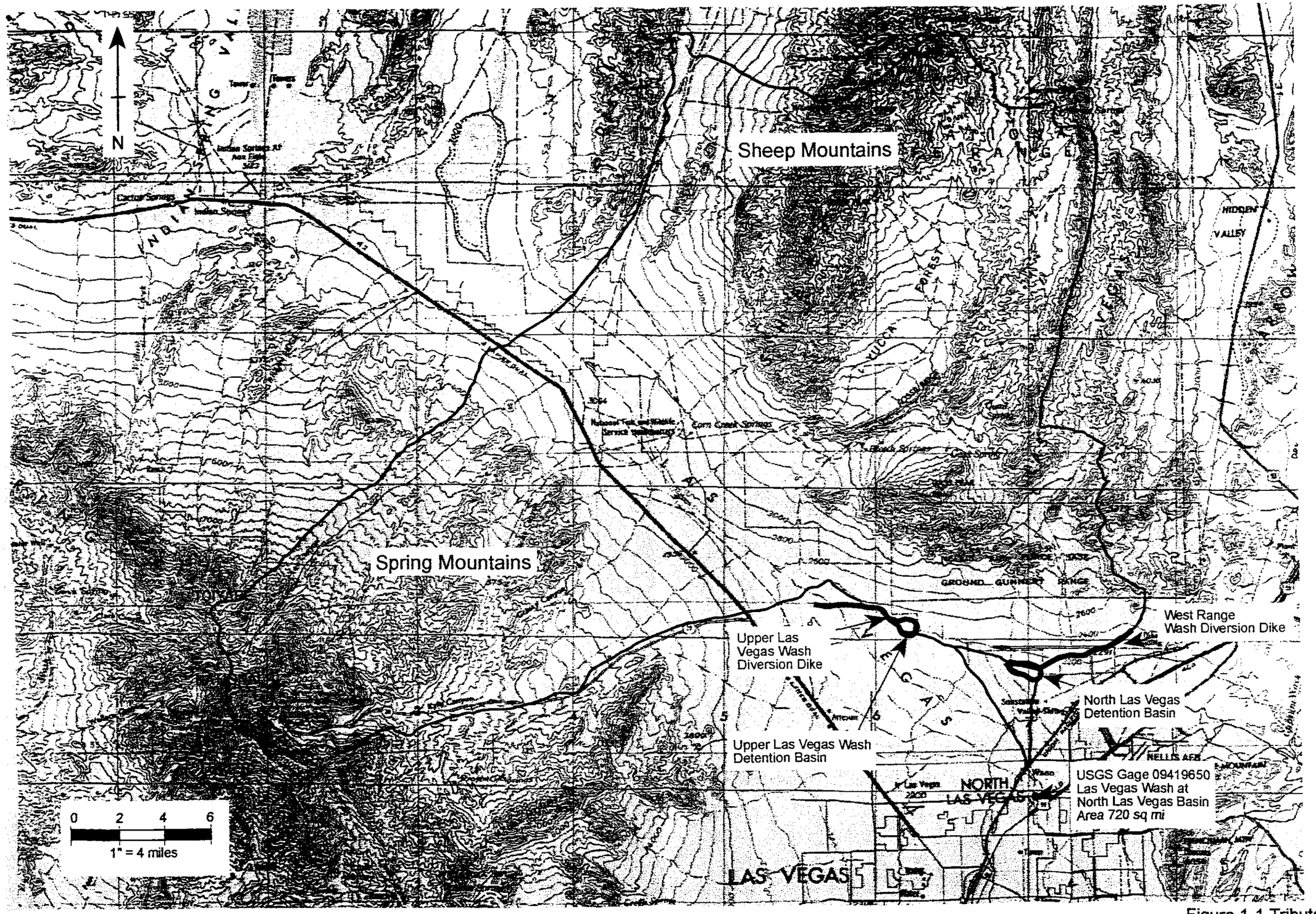
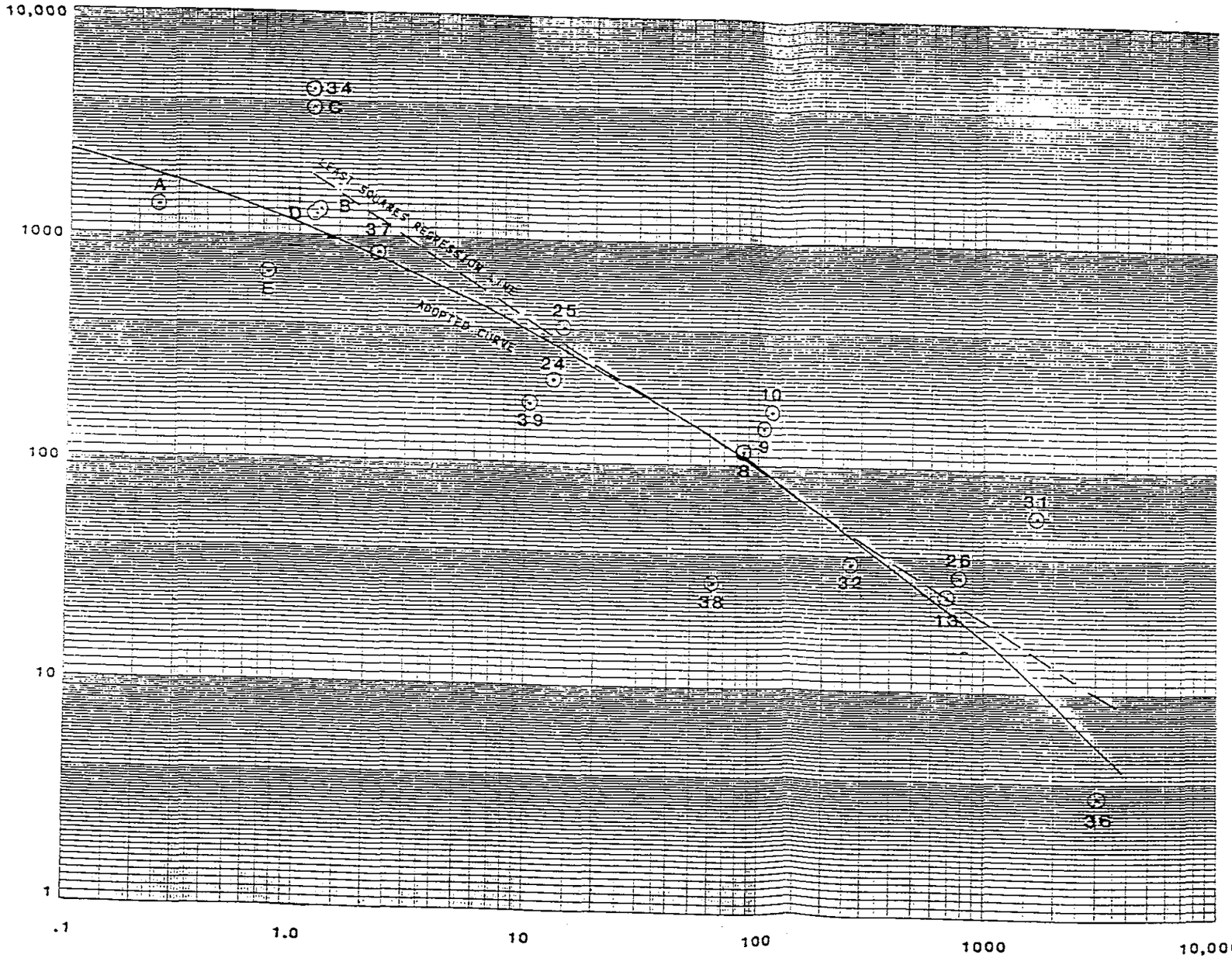


Figure 1-1 Tributary Area Map



STREAMGAUGES USED IN REGIONAL ANALYSIS (ANALYTICAL ANALYSIS)

8. FLAMINGO WASH @ LAS VEGAS
9. FLAMINGO WASH @ MARYLAND PKWY
10. FLAMINGO WASH NEAR MOUTH
13. LAS VEGAS WASH @ N. LAS VEGAS
24. TYSON WASH TR. NEAR QUARZITE
25. SACTO WASH TR. NEAR TOPOC
26. SACTO WASH NR. YUCCA, ARIZONA
31. SAN FELIPE CRK NR. WSTMRELND
32. SALT CREEK NEAR MECCA, CALIF.
34. CARUTHERS CRK NR. IVANPAH, CA
36. AMARGOSA RIVER @ TECOPA
37. AMARGOSA R TR. #1 NR. JOHNNIE
38. SALT WELLS CRK NR. WESTEND, CA
39. NINEMILE CREEK NEAR BROWN, CA

STREAMGAUGES USED TO HELP SHAPE CURVE (GRAPHICAL ANALYSIS)

A. BOOM CREEK NEAR BARSTOW, CA
B. DETRITAL WASH NR. CHLORIDE, AZ
C. LAS VEGAS WASH TR. NR. HENDERSON
D. LAS VEGAS WASH TR. S. OF NELLIS
E. BEACON CREEK AT HELENDALE, CA

LAS VEGAS FEASIBILITY STUDY

COMPUTED 100-YEAR PEAK DISCHARGE VERSUS DRAINAGE AREA

US ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

Source: Corps of Engineers, 1988

Figure 1-2. Corps of Engineers Adapted Regiona
100-Year Peak Discharge Curve

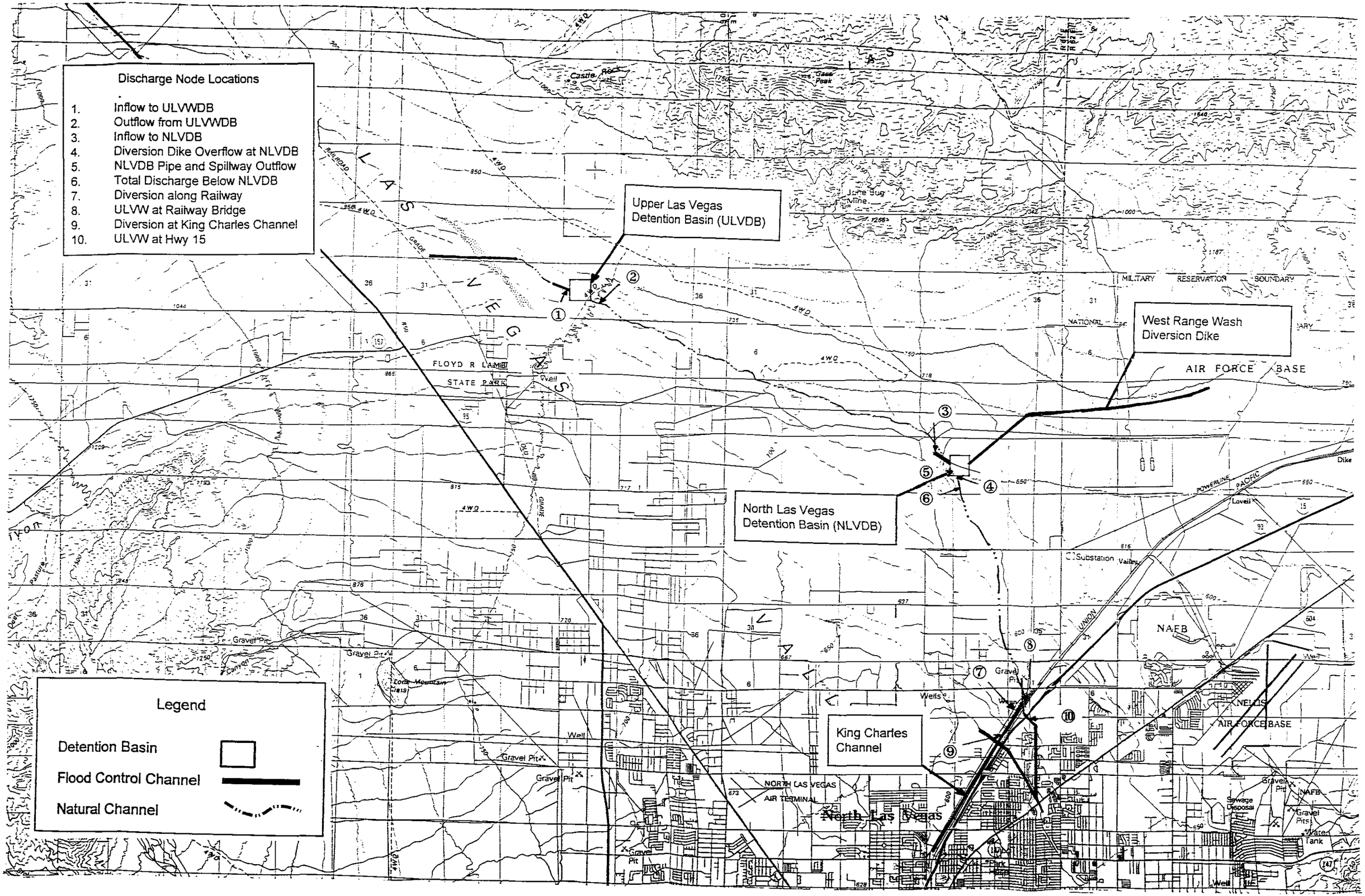


Figure 1-3. Computational Discharge Node

northwest hydraulic consultants inc.

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(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date:	May 16, 1996	Job Number: 50010
From:	Joey Howard	Number of Pages: 3
To:	Gary Finney	Original via: mail
Company:	Kenny Aerial Mapping Inc.	
Fax Number:	602-340-1877	
Telephone No:	602-258-6471	
Subject:	Cross sections	

Please call immediately if you do not receive all pages of this transmission.

Remarks:

Please review the following memo before you begin work on the cross sections. Thank you.

MEMORANDUM COPY

TO: Gary Finney

FROM: Joey Howard

DATE: May 16, 1996

SUBJECT: FEMA cross sections

During our conversation on Wednesday, you mentioned that the cross sections for the North Las Vegas Wash FIS would be cut from a DTM. FEMA specifications require cross section ground points read from a first order stereoplotter or digital stereo photogrammetric workstation, see the attached sheet. It may be necessary to review Appendix 4 to confirm that your approach meets FEMA specifications.

Please call Ed Wallace or myself, at 916-371-7400, if any questions arise. Thank you for your assistance in this matter.

white prints of alternate photographs enlarged 2x and screened on frosted, 0.004-inch-thick mylar with emulsion on back. All must provide complete single coverage of the flight area. The screen must be appropriate so that quality blue lines of a pilot sheet can be made and accepted prior to quantity production. On the 2x photographs, the SC will designate the position, approximate termini, and minimum range in elevation for each cross section to be read, and the position of approximately two photo-identifiable ground points near each cross section. The range in elevation is the vertical distance from the water surface at the time of photography to the upper limit of the cross section. If the channel is dry, the lowest point in the streambed is used to define the range.

Each cross section must cross the entire 500-year floodplain and should be carefully selected to be representative of reaches that are as long as possible, without permitting excessive conveyance change between sections.

One copy of each annotated 2x photograph should be returned to the Photogrammetric Subcontractor.

2. Plotting and Presentation of Elevation Points. The Photogrammetric Subcontractor, using a first order stereoplotter or digital stereo photogrammetric workstation, will read an elevation for the top of each identifiable ground point designated by the SC and a profile for each designated cross section. The approximate terminus of each cross section will be extended by the Photogrammetric Subcontractor until the range in elevation of that cross section exceeds the minimum range marked on the annotated photograph print by no more than 10 percent. Elevations to read to the nearest 0.5 foot will be taken at the three most significant gradient breaks on each bank and at enough intermediate points to satisfy the following criteria: (1) no adjacent points separated vertically by more than 20 percent of range; (2) no adjacent points separated horizontally by more than 5 percent of the complete channel cross-section width; and (3) no adjacent points in the main channel separated by more than 10 percent of main channel width or 2 feet, whichever is greater. Specified spacing is illustrated on Figure A4-3 (Figures 1 and 2). Elevations and stations must be read at each edge of water. The Zero Station (initial point) for each cross section will be the finally adopted terminus on the left bank (looking downstream). Stations should be the distance to the nearest foot measured along the straight, curved, or zig-zag alignment of the cross section. The Photogrammetric Subcontractor will furnish the information, in the format illustrated by Figure A4-4, where the stream is within the low water channel. Where the channel is dry, the "RIGHT BANK" subtitle will be eliminated and the tabulation will be one continuous array of stations and elevations. Where the stream is in more than one channel, separate arrays of stations and elevations, headed by the subtitle "ISLAND" should be inserted, one for each island, between the LEFT BANK and RIGHT BANK arrays. The plotting and listing should be done using a line printer, as illustrated by Figure A4-4, or a continuous automatic plotter if the plot is confined without breaks to the one sheet and the tabulation is contained on the same sheet, or by manual plotting and tabulation on an 8.5-inch x 11-inch sheet similar to Figure A4-4. By convention, the plot must be viewed looking downstream. Elevations of designated identifiable ground points should be written on the map manuscript sheet only.

3. Planimetric Map Manuscript. The Photogrammetric Subcontractor should

50010-10 Corresp

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seattle

COPY

May 15, 1996

Kelly R. Chuma, P.E.
Development and Flood Control Administrator
City of North Las Vegas
Public Works Department
2266 Civic Center Drive
North Las Vegas, Nevada 89030

Dear Kelly:

Ed and I appreciate you taking the time to meet with us and allowing us access to your micro fiche files. We were able to locate a number of plans we were looking for. Upon reviewing the plans we obtained from your office, we noticed some elevations on the micro fiche copies are illegible. Please send us bluelines or copies from the master copy of the following plans.

- King Charles Diversion Channel From N-Channel Phase I, James M. Montgomery, September 1987
- King Charles Diversion Channel From N-Channel Phase II, James M. Montgomery, June 1990
- Improvement Plans for Lone Mountain Road Bridge, Church Engineering, May 1991
- Las Vegas Wash Detention Basin, Montgomery Engineers of Nevada, 1983

In addition, we are missing plans for the Craig Bridge Structure and the Donovan Street Culvert.

Thank you for sending us additional information such as the packages with Chapter 2 Range Wash FIS Hydrology, the correspondence regarding King Charles Channel and the Upper Las Vegas Wash Detention Basin and Diversion Dike.

Respectfully,

Joey Howard

Joey Howard, P.E.

cc: Les Sakumoto, P.E.

MEMORANDUM

TO: John Cahoon

FROM: Joey Howard

DATE: May 7, 1996

SUBJECT: Clark County Cross Sections

The following pages were left out of the package I sent on Friday. They describe the HEC-2 data format and necessary survey points. Thank you.

Contraction-Expansion Coefficients. Contraction or expansion of flow due to changes in the channel cross section is a common cause of energy losses within a reach. Whenever this occurs, the loss may be computed by specifying the contraction and expansion coefficients as variables CCHV and CEHV, respectively, on the NC record. The coefficients are multiplied by the absolute difference in velocity heads between the cross sections to give the energy loss caused by the transition. Where the change in river cross section is small, coefficients CCHV and CEHV are typically on the order of 0.1 and 0.3, respectively. When the change in effective cross section area is abrupt such as at bridges, CCHV and CEHV may be as high as 0.6 and 1.0, respectively. These values may be changed at any cross section by inserting a new NC record. These new values will be used until changed again by another NC record. For additional information concerning transition losses and for information on bridge loss coefficients see Appendix III.

3.6 Cross Section Geometry

Boundary geometry for the analysis of flow in natural streams is specified in terms of ground surface profiles (cross sections) and the measured distances between them (reach lengths). Cross sections are located at intervals along a stream to characterize the flow carrying capability of the stream and its adjacent floodplains. They should extend across the entire floodplain and should be perpendicular to the anticipated flow lines (approximately perpendicular to contour lines). Occasionally it is necessary to layout cross sections in a curved or dog-leg alignment to meet this requirement. Every effort should be made to obtain cross sections that accurately represent the stream and floodplain geometry. However, ineffective flow areas of the floodplain such as stream inlets, small ponds or indents in the valley floor should generally not be included in the cross section geometry.

Cross sections are required at representative locations throughout a stream reach and at locations where changes occur in discharge, slope, shape, or roughness, at locations where levees begin or end and at bridges or control structures such as weirs. Where abrupt changes occur, several cross sections should be used to describe the change regardless of the distance. Cross section spacing is also a function of stream size, slope, and the uniformity of cross section shape. In general, large uniform rivers of flat slope normally require the fewest number of cross sections per mile. The purpose of the study also affects spacing of cross sections. For instance, navigation studies on large relatively flat streams may require closely spaced (e.g., 500 feet) cross sections to analyze the effect of local conditions on low flow depths, whereas cross sections for sedimentation studies to determine deposition in reservoirs may be spaced at intervals of up to five or ten miles.

The choice of friction loss equation may also influence the spacing of cross sections. For instance, cross section spacing may be maximized when calculating an M1 profile with the average friction slope equation or when the harmonic mean friction slope equation is used to compute M2 profiles. The J6 record provides the option to let the program select the averaging equation (see Table 2, page 23).

Each cross section in an HEC-2 data set is identified and described by X1 and GR records. Variable SECNO on the X1 record is the cross section identification number which may correspond to stationing along the channel, mile points, or any fictitious numbering system, since it is only used to identify output and is not used in the computations. Each data point in the cross section is given a station number corresponding to the horizontal distance from a zero point on the left. The elevation and a corresponding station number of each data point are input as variables EL(I) and STA(I) on GR records. Up to 100 data points may be used to describe cross section geometry for most program applications. When the encroachment options are utilized, no more than 95 data points should be used, since they generate additional data points automatically to define the encroachment limits. The channel improvement option also should be used with less than 100 data points since it will generate data points (four or more depending on the geometry).

Cross section data is traditionally oriented looking downstream since the program considers the left side of the stream to have the lowest station numbers and the right side to have the highest. The left and right stations separating the channel from the overbank areas are specified as variables STCHL and STCHR on the X1 record. End points of a cross section that are too low (below the computed water surface elevation) will automatically be extended vertically and a note indicating the extension amount will be printed.

Numerous program options are available to allow the user to easily add or modify cross section data. For example, when the user wishes to repeat a surveyed cross section, a single X1 record may be input to identify the cross section and to provide reach length information. X1 record variables, PXSECR and PXSECE, allow the user to modify the horizontal and vertical dimensions of the repeated cross section data. Other program options to modify cross section data to model improved channel sections, encroachments and ineffective flow areas are described in detail in the following chapter.

3.7 HEC-2 Cross Section Adjustment Sequence

The following list describes the sequence of changes performed by HEC-2:

1. **Read Cross Section Data, or Read Previous Data for Repeat Cross Section**

   The previous section data was stored after the modifications listed in Items 2 and 3 below. The elevations and stations for this data are considered the original coordinates in the following.

2. **Add X4 Data Points into the Cross Section Array**

   X4 data should be in original cross section coordinates, for GR data; but adjusted for repeat section coordinates of the section as saved in Item 4, below.

3. **Adjust Cross Section Coordinates Elevation and Station**

   PXSECR (X1 record, Field 8 - X1.8) ratio is multiplied times the difference between the coordinate stations to compute new coordinates. Ratio is applied to the input section (GR and X4 data), or to the repeat section, as saved in Item 4. (Does not change X4 data in repeat section.)

   PXSECE (X1.9) elevation adjustment is added to the elevations of every coordinate point. (Does not change X4 data in repeat section.)

4. **Store the Adjusted Cross Section for Repeat Section Use**

   The above adjustments are permanent, in that a repeat of the section will include the changes listed in Items 2 and 3.

5. **Perform Channel Modifications Defined by CI Input**

   CI input should be in original coordinate system, that is the center line station and invert elevation will be adjusted by the current cross section adjustments (Item 3 above).

   CI adjustment is not a permanent change to the cross section in that a repeat of the section will not include the channel improvement.

8 Cross Section Records

8.1 X1 Record - General Items for Each Cross Section (required)

This record is required for each cross section (800 cross sections can be used for each profile) and is used to specify the cross section geometry and program options applicable to that cross section.

FIELD	VARIABLE	VALUE	DESCRIPTION
0	IA	X1	Record identification characters.
1	SECNO	+	Cross section identification number.
		-	Start new tributary backwater at this cross section.
2	NUMST	0	Previous cross section is repeated for current section. GR records are not entered for this cross section.
		+	Total number of stations on the following GR records.
3	STCHL	0	NUMST(X1.2) is 0.
		+	The station of the left bank of the channel. Must be equal to one of the STA(N) on next GR records.
4	STCHR	0	NUMST(X1.2) is 0.
		+	The station of the right bank of the channel. Must be equal to one of the STA(N) on GR records and equal to or greater than STCHL.
5	XLOBL	+	Length of left overbank reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0, (J1.4).
6	XLOBR	+	Length of right overbank reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0.
7	XLCH	+	Length of channel reach between current cross section and next downstream cross section. Zero for first cross section if IDIR = 0.

8.8 GR Record - Ground Profiles Elevations and Stations

This record specifies the elevation and station of each point in a cross section used to describe the ground profile, and is required for each X1 record unless NUMST (X1.2) is zero. The points outside of the channel determine the subdivision of the cross section which influences calculation of a discharge-weighted velocity head for the cross section.

FIELD	VARIABLE	VALUE	DESCRIPTION
0	IA	GR	Record identification characters.
1	EL(1)	+ or -	Elevation of cross section point one at station STA(1). May be positive or negative.
2	STA(1)	+	Station of cross section point one.
3	EL(2)	+ or -	Elevation of cross section point two at STA(2).
4	STA(2)	+	Station of cross section point two.

5-10 etc.

Continue with additional GR records using up to 100 points to describe the cross section. Stations must be in increasing order progressing from left to right across the cross section.

Example No. 3

Input

```
T1       Example 3:  Channel Improvement (CHIMP)
T2       1ST PROFILE IS NATURAL (IBW=8 on J2.8), (BW=.01 on CI.8)
T3       RABBIT CREEK
T4       (Example 3 based on test data file HEC212.DAT)
T5       Field 12 (Second field of second QT) read for discharge.
J1             12                                                    168.1
J2     1                -1                                    8
J3   120
*    Supress detailed output, except for the last two cross sections.
J5    -10       0      2.2
NC   .120     .120     .037      0.1      0.3
QT    11      450      600      900     1200     1500     2300     5000     6700     9400
QT 15000    25000

*    No CI input for first section; therefore, this section is always natural.
X1   1.05        38    18150    18448                                    1      -.85
GR 200.0     12000    180.0    12200    170.0    13000    170.0    13200    170.0    13500
GR 170.0     14000    170.0    14400    165.0    14500    170.0    14600    170.0    15950
GR 165.0     18149    165.0    18150    165.0    18151    165.0    18168    160.0    18179
GR 149.0     18188    155.0    18201    158.0    18209    159.8    18229    159.9    18234
GR 159.9     18237    160.0    18255    157.5    18259    157.0    18260    145.0    18292
GR 144.8     18306    144.8    18309    145.0    18310    145.0    18324    150.0    18341
GR 155.0     18353    162.0    18364    163.0    18429    164.0    18447    167.0    18448
GR 172.8     18449    180.0    19250    200.0    20600
Zsp  6sp      8sp      8sp      8sp      8sp      8sp      8sp      8sp      8sp      8sp
*    CI input provides center station, elevation, channel 'n' value, and
*    side slopes of 3 on 1.
X1   1.55                                    1200     1300     3684              3.14
CI 18300    147.09    0.025        3        3       10      100                300      400

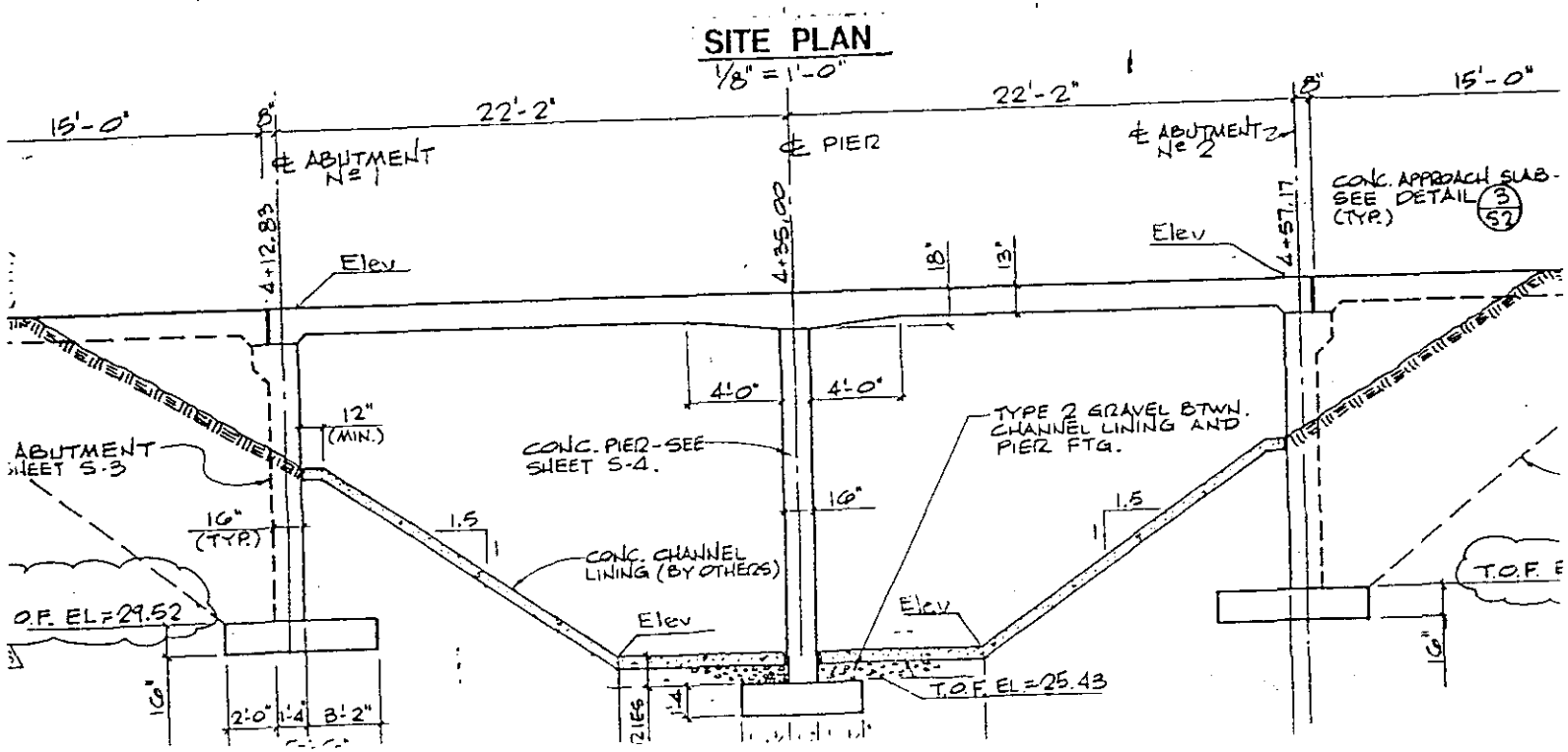
*    CI input of -1 provides center station and elevation based on existing cross
*    section.  Blank fields indicate no change from previous CI input.
X1   1.82                                    1400     1250     1450              1.7
CI     -1        -1    0.025

*    No CI incicates no change from previous input.
X1    2.1                                    1400     1250     1450              1.76

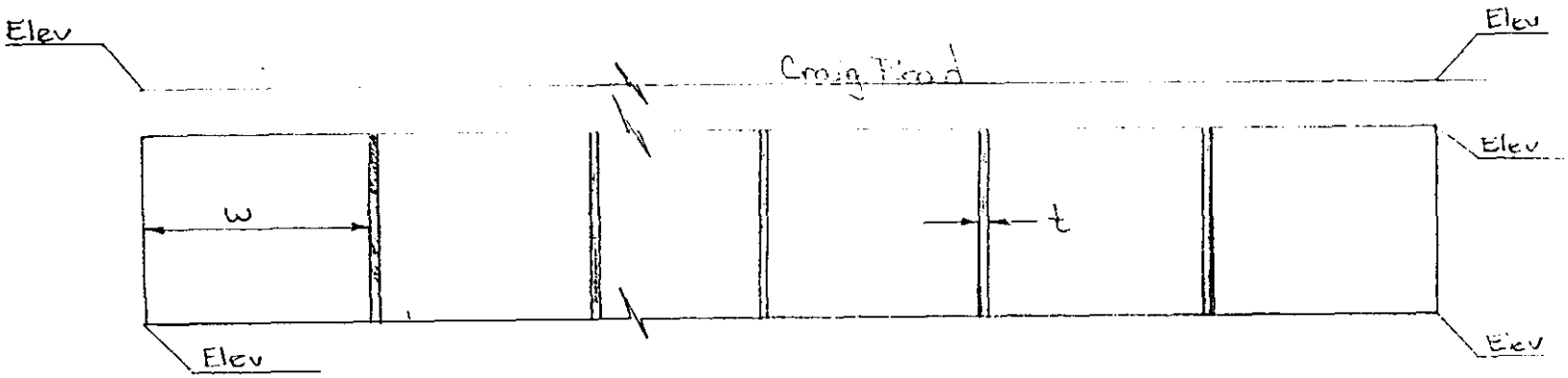
*    CI input changes center station, elevation, 'n' value and side slopes.
X1    2.2                                    528      528      528               0.5
CI 18400       150    0.015        4        2       100      100               300      400

*    The Channel improvement is stopped at this cross section.  (BW = 0.01)
X1    2.3                                    600      600      600               1
CI                                          0.01     0.01                       0.01     0.01
EJ
T1       CHANNEL IMPROVEMENT: IBW=6, BW=10 UNTIL SEC 2.2, BW=100 AT SEC 2.2
J1             12                                                    168.1
J2     2                -1                                    6       30
T1       CHANNEL IMPROVEMENT: IBW=7, BW=100 and CHNIM=30 (J2.9)
J1             12                                                    168.1
J2     3                -1                                    7       30
T1       CHANNEL IMPROVEMENT:  IBW=9, BW=300 and CHNIM=20 (J2.9)
J1             12                                                    168.1
J2     4                -1                                    9       20
ER
```

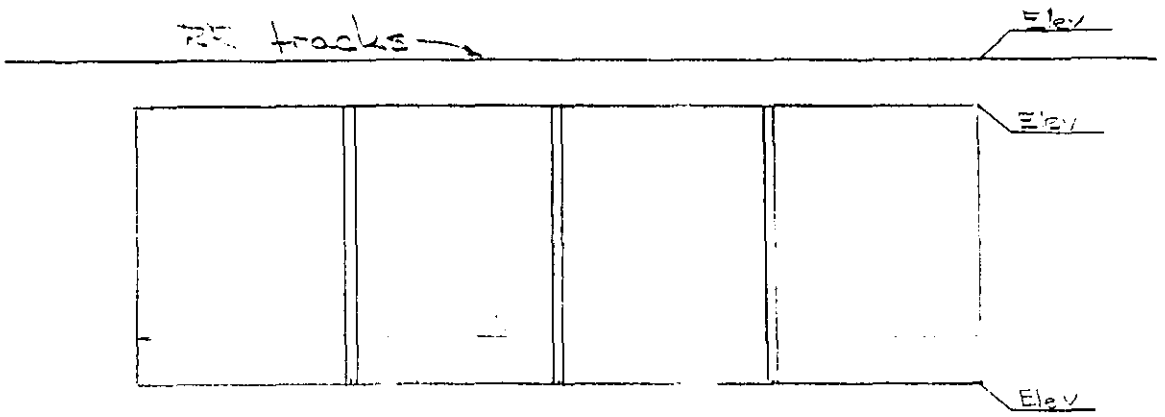
Lone Mountain Rd

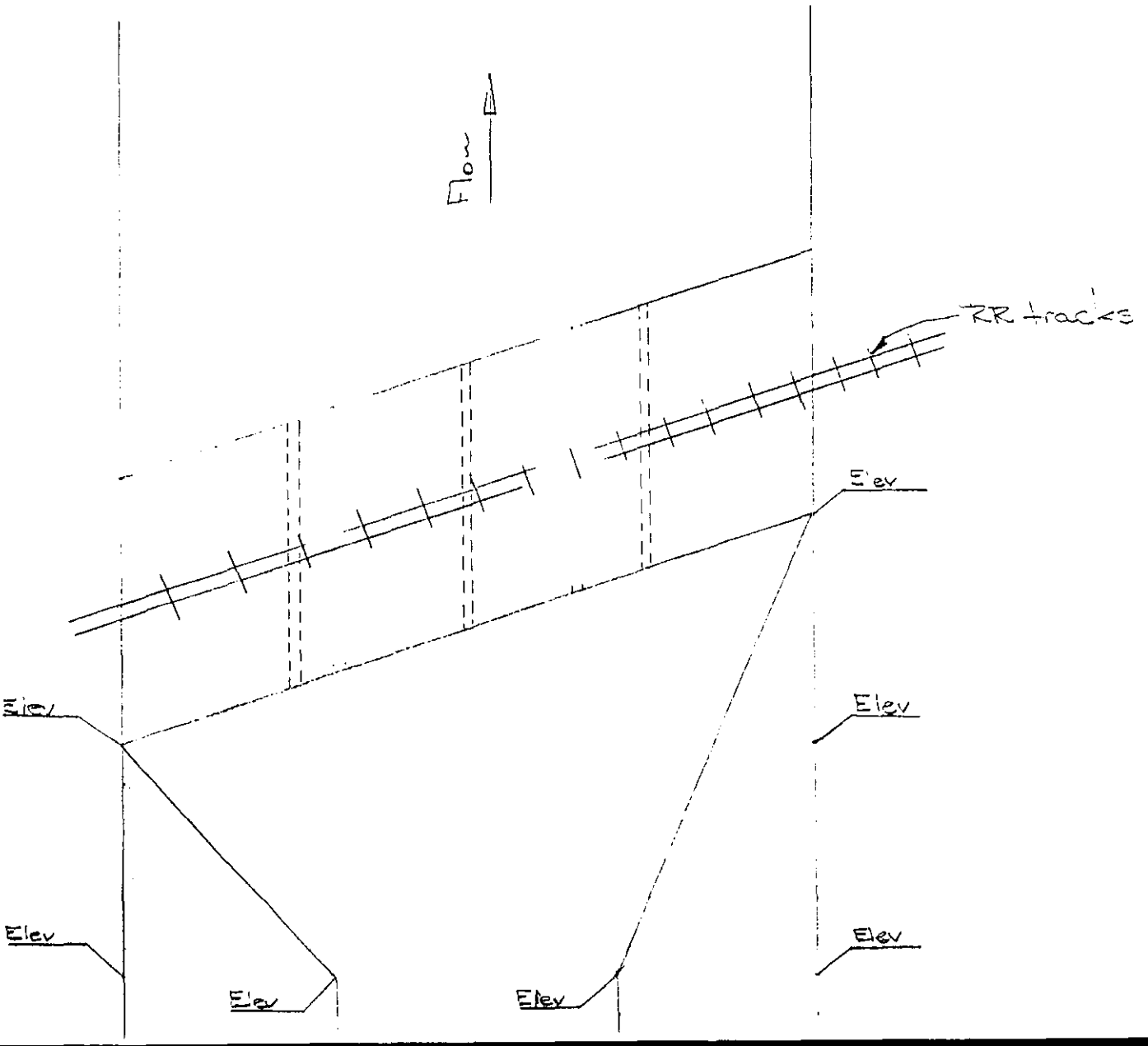


Craig Road Bridge



Railroad Bridge





COPY

50010-10
Corresp

MEMORANDUM

TO: John W. Cahoon

FROM: Joey Howard

DATE: May 3, 1996

SUBJECT: FEMA cross sections

I have identified the cross section locations and spot elevation locations necessary to begin the HEC-2 modeling portion of the study. The cross section locations and identification number are marked in red on the blueline copies of the aerial topographic maps, see Attachment 1. These sections should be coded in HEC-2 format as described in Attachment 2. Spot elevations are necessary at the Lone Mountain Road bridge, Craig Road bridge, SPRR bridge, Donovan Culvert, North Las Vegas Detention Basin, and Upper Las Vegas Detention Basin. Sketches of these locations are shown in Attachment 2. A few other areas also require spot elevations these areas are shown in green on the topographic maps; see Attachment 1.

The HEC-2 data format has some conventions that need to be followed. Orient the cross sections looking downstream with the station (or offset distance) beginning at 1000 on the left and increasing to the right. The maximum allowable number of GR records (ground points) is 100. If the ground is very irregular and the operator is not comfortable limiting the points to 100 we can reduce the number of points at our office.

While identifying cross section locations I noticed some minor inconsistencies and missing items in the map work. I have noted specific examples of these oversights on the attached cross section location maps; see Attachment 1. Listed below are items that should be checked:

Inconsistencies in line work and text

- contour lines from sheets 1 and 2 do not match sheets 3 thru 8
- roads on sheet 2 do not continue to sheet 3
- road line types change between sheets
- fences on are shown on sheets 1 and 2 but not sheets 3 thru 8
- coordinate and spot elevations of text sizes are different between sheets
- paved areas, i.e. parking, on sheet 8 are not consistently delineated

COPY

Items appearing on aerial photographs do not appear on the topographic maps

- some structures, i.e. gate house to golf course, that appear on the aerial photographs are not shown on the topographic maps
- some power poles are missing from the topographic maps
- some prominent unpaved roads are missing from the topographic maps

Features required in FEMA Guidelines not shown on basemap

- Park or military reservation boundaries
- Range and township/section lines
- Annotation (i.e. road names)

Should you have any questions please call. Thank you.

COPY

N577317.20
E600542.67

34 | 35
3 | 2

S89°32'09"E 2638.39'

Is this the Same as 80008

3
23

5
20

3
20

DOWNSTR
OF RIPR

600' EASEMENT

365'

150'

80+00

85+00

P1.*5 STA 86+65.97
N576,952.22
E600,539.67

S.89°32'09"E

END OF CHANNEL
STA 91+41.43
N576,948.37
E601,015.11

12" CLASS "A" RIPRAP

EL 31.50

EL 27.00

TORTOISE-PROOF FENCING

4
39

Structure Plan X @ Sta 1+00

NEVADA DIVISION OF STATE PARKS LAND

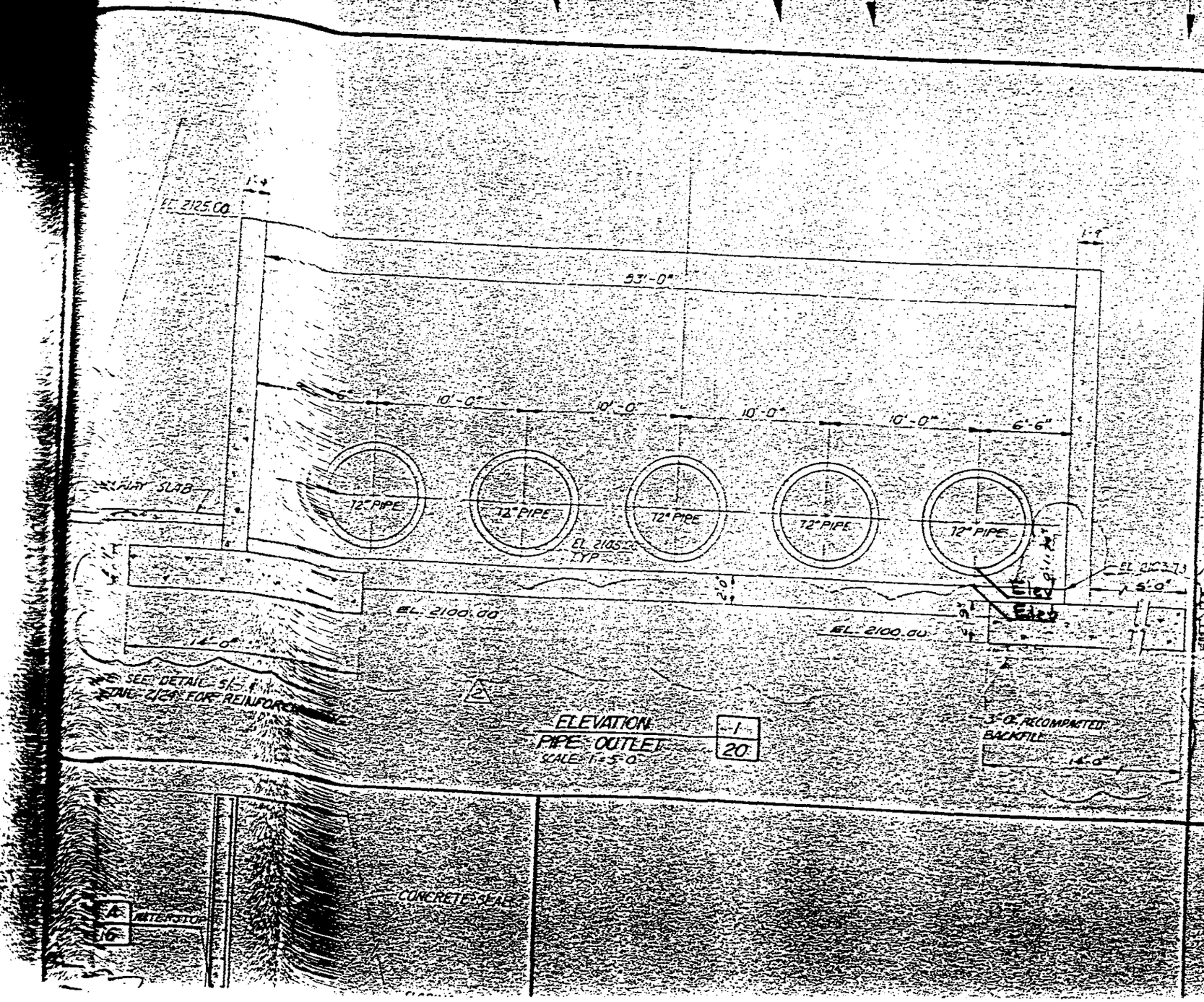
flows into North Las Ve Detention Bas.

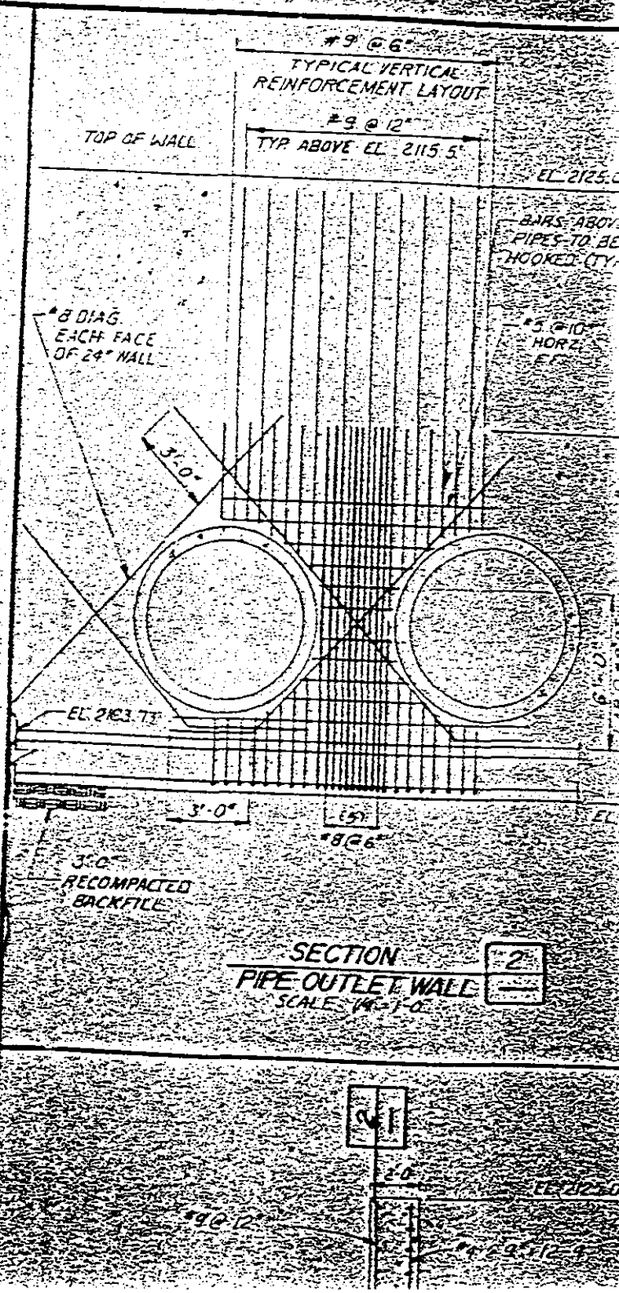
17
11
5'8
8.5
11
17
22

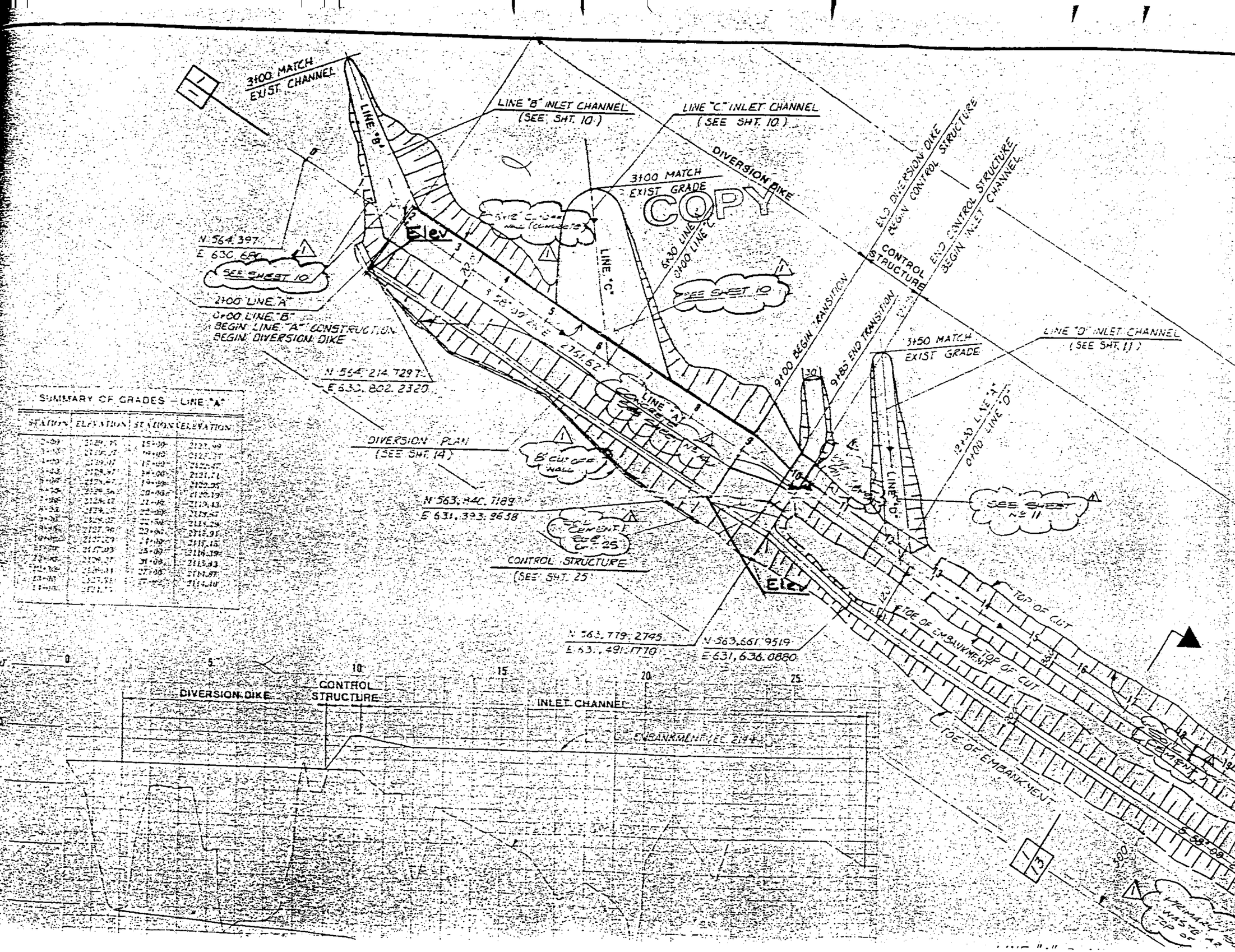
10.5'
50.0'
82.5'
70.0'
57.5'
5.96'
2
24
ELEV 2144.00
Elev. of Crest
SPILLWAY INLET
A
21
ELEV 2134.00
ELEV 2129.00
ELEV 2125.00
EXISTING GROUND
OUTLET CHANNEL
ELEV 2117.00
ELEV 2118.00
RIP-RAP CLASS 200
2' DEEP
ELEV 2108.00
ELEV 2104.59
ELEV 2105.00
ELEV 2107.00
EL 2100.00
85'
35'
72'
1
24
WING WALL
1
22
SPILLWAY OUTLET WALL
SPILLWAY SECTION
1
19
SCALE: HORIZ 1"=20'
VERT 1"=10'
2
24
3
21
ELEV 2116.00
#4 S=25 @ 12" C.C.
72" PIPE
SECTION
3
—
3
1
53.0'
SECTION
1
—
PIPE SEEPAGE WALL
1"=20'
10.0'
40.0'
10.5'
15.5'
45'
50.5'
57.0'
30'
34'
30.0'
14.0'

COPY

COPY


EL. 2125.00
1'-9"
93'-0"
10'-0"
10'-0"
10'-0"
10'-0"
6'-6"
12" PIPE
12" PIPE
12" PIPE
12" PIPE
12" PIPE
EL. 2105.00 TYP.
FLAT SLAB
EL. 2100.00
EL. 2100.00
2'-0"
1'-6"
SEE DETAIL 5/-
DWG. C/24 FOR REINFORC
2
ELEVATION
PIPE OUTLET
SCALE 1"=5'-0"
1
20
4
16
INTERSTOP
CONCRETE SLAB
Elev
Elev
EL. 2103.73
5'-0"
3'-0" RECOMPACTED BACKFILL
1'-6"


#9 @ 6"
TYPICAL VERTICAL REINFORCEMENT LAYOUT
#9 @ 12"
TOP OF WALL
TYP. ABOVE EL. 2115.5"
EL. 2125.0
BARS ABOV
PIPES TO BE
HOOKED CY
#8 DIAG. EACH FACE OF 24" WALL
#5 @ 10"
HORZ.
EL.
3'-0"
3'-0"
#8 @ 6"
EL. 2103.73
3'-0" RECOMPACTED BACKFILL
SECTION
PIPE OUTLET WALL
SCALE 1/4"=1'-0"
2
—
#9 @ 12"
2'-0"
EL. 2102.00



SUMMARY OF GRADES – LINE "A"

STATION	ELEVATION	STATION	ELEVATION
[illegible]			

COPY

CL PROFILE

HORIZ. 1"=40'
VERT. 1"=5'

16+00 15+00 14+00 13+00 12+00 11+00 10+00 58+00 57+00

CL PR

CHANNEL CL CURVE DATA

NO	Δ	R	L	T
(7)	17°11'54"	155.00'	46.80'	23.58'
(6)	61°45'17"	149.78'	161.45'	89.56'
(8)	25°39'13"	149.78'	67.06'	34.10'

PLAN

1"=40'

SEE SHT. 6 FOR CONC. DIVERSION CHANNEL

GRADE 10:1 TO TOP OF CHANNEL

DIVERSION 'N' CHANNEL

GRADE 10:1 TO TOP OF CHANNEL

Donovan Culvert

(6) (ENTIRE CURVE)
(8) (SPECIAL SECTION ONLY)

INSTALL FENCE AT TOP OF LINING RT. SIDE

FREEWAY

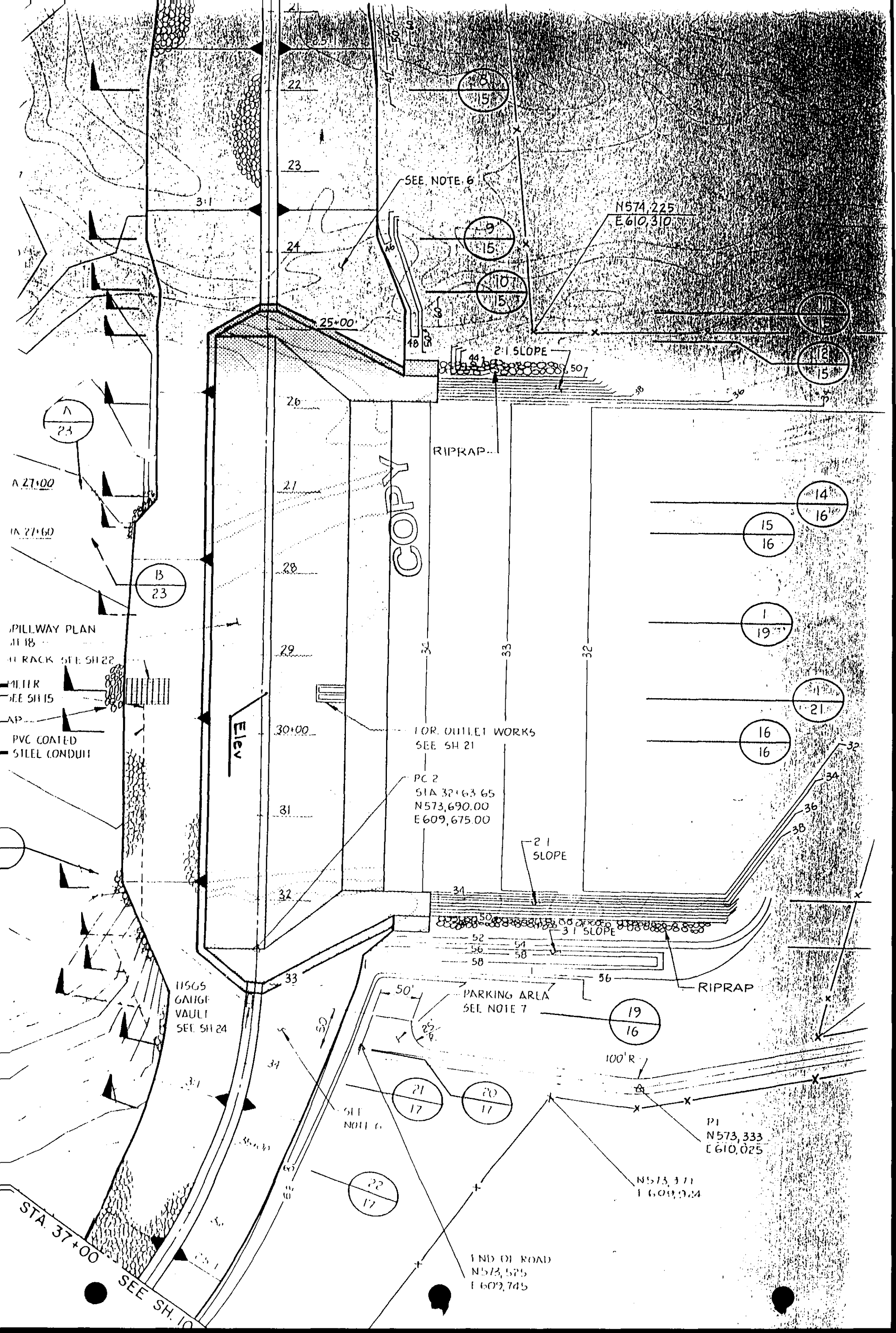
CRAIG ROAD

NOTE:
INSTALL RIPRAP D_{50}=18"

SECTION
NO SCALE

SECTION
NO SCALE

NOTE:
1. CONTRACTO
DOES NOT
2. INSTALL R
TRENCH DE


SEE NOTE 6
N574,225
E610,310
25+00
2:1 SLOPE
RIPRAP
COPY
27+00
27+60
30+00
PVC COATED
STEEL CONDUIT
FOR OUTLET WORKS
SEE SH 21
PC 2
STA 32+63.65
N573,690.00
E609,675.00
2:1
SLOPE
3:1 SLOPE
RIPRAP
USGS
GAUGE
VAULT
SEE SH 24
PARKING AREA
SEE NOTE 7
100' R
SEE
NOTE 6
P1
N573,333
E610,025
END OF ROAD
N573,525
E609,745
STA 37+00
SEE SH. 10

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: Northwest Hydraulic Consultants
3950 Industrial Blvd Suite 100
West Sacramento Ca 95691

Phone: _____

Date: 4-8-96
Attention: Edward Wallace
Re: Upper L.V. Wash
Job # 960104

WE ARE SENDING YOU THE FOLLOWING:

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- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale _____
- ☐ Final Drafted Sheet(s) Scale _____
- ☐ Photo/Topo Composite(s) Scale _____
- ☐ Plan & Profile Sheet(s) Scale _____
- ☐ Computer Tape(s)
- ☐ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☒ Photo Enlargement(s)
  - Paper Size _____ Scale _____
  - (Mylar) Size 24X36 Scale 1/2 Size
  - Sepia Size _____ Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☐ Extra Order Item

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7 Next Day Economy

From: Harry Received by Tony Howard Date 4/9/96

PLEASE SIGN AND RETURN DUPLICATE COPY

50010-01

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
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3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185
PHOTOGRAMMETRIC SERVICES SINCE 1963
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Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: NORTHWEST HYDRAULIC CONSULTS
3950 INDUSTRIAL BLVD SUITE #100C
WEST SACRAMENTO, CA 95691
Phone: _____

Date: 4/2/96
Attention: MR ED WALLACE
Re: UPPER LAS VEGAS WASH
Job # 960104

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale _____
- 6 ☑ Final Drafted Sheet(s) Scale 1"=400'
- ☐ Photo/Topo Composite(s) Scale _____
- ☐ Plan & Profile Sheet(s) Scale _____
- ☐ Computer Tape(s)
- ☐ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size _____ Scale _____
  - Mylar Size _____ Scale _____
  - Sepia Size _____ Scale _____
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- ☐ Film Positive(s)

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ADDITIONAL INFORMATION:

LASUEG3.DWG LASUEG8.DWG
LASUEG4.DWG DTMDATA.DWG
LASUEG5.DWG 6 MYLARS
LASUEG6.DWG
LASUEG7.DWG

From: _____ Received by _____ Date 4/2/96

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ENSIGN & BUCKLEY
Consulting Engineers
3327 Longview Drive
NORTH HIGHLANDS, CALIFORNIA 95660

(916) 971-3961 FAX (916) 971-0578

LETTER OF TRANSMITTAL

DATE April 1, 1996 JOB NO.

ATTENTION Joey Howard

RE: Preliminary FEMA Work Map - Las Vegas Wash No. Las Vegas, Nevada

TO Northwest Hydraulic Consultants Inc
3950 Industrial Blvd
West Sacramento, Calif
95691-3430

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☒ Prelim Work Maps

COPIES	DATE	NO.	DESCRIPTION
1		4	Prelim Work Map - FEMA LMMP STUDY Las Vegas Wash in North Las Vegas

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☐ For review and comment ☒ As directed by FEMA
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS These Preliminary maps are being provided as directed by Les Sakumoto, FEMA Region IX

COPY TO _____

SIGNED: _____

Transmittal Letter

northwest hydraulic consultants inc.

16300 Christensen Road Suite 350, Tukwila, WA 98188-3418
(206) 241-6000 (206) 439-2420 fax

Date: March 8, 1996 Job No. 50010

To: Ed Wallace
NHC - Sacramento

Regarding: Clark County - FEMA study

We are sending: ☑ attached ☐ separate by _____

Description: 1) Relevant pages from CCRFCD Master Plan Update - Vol 2 with maps
2) Enlargement of d/s end of study reach
3) Regional Frequency Curve from COE, 1988

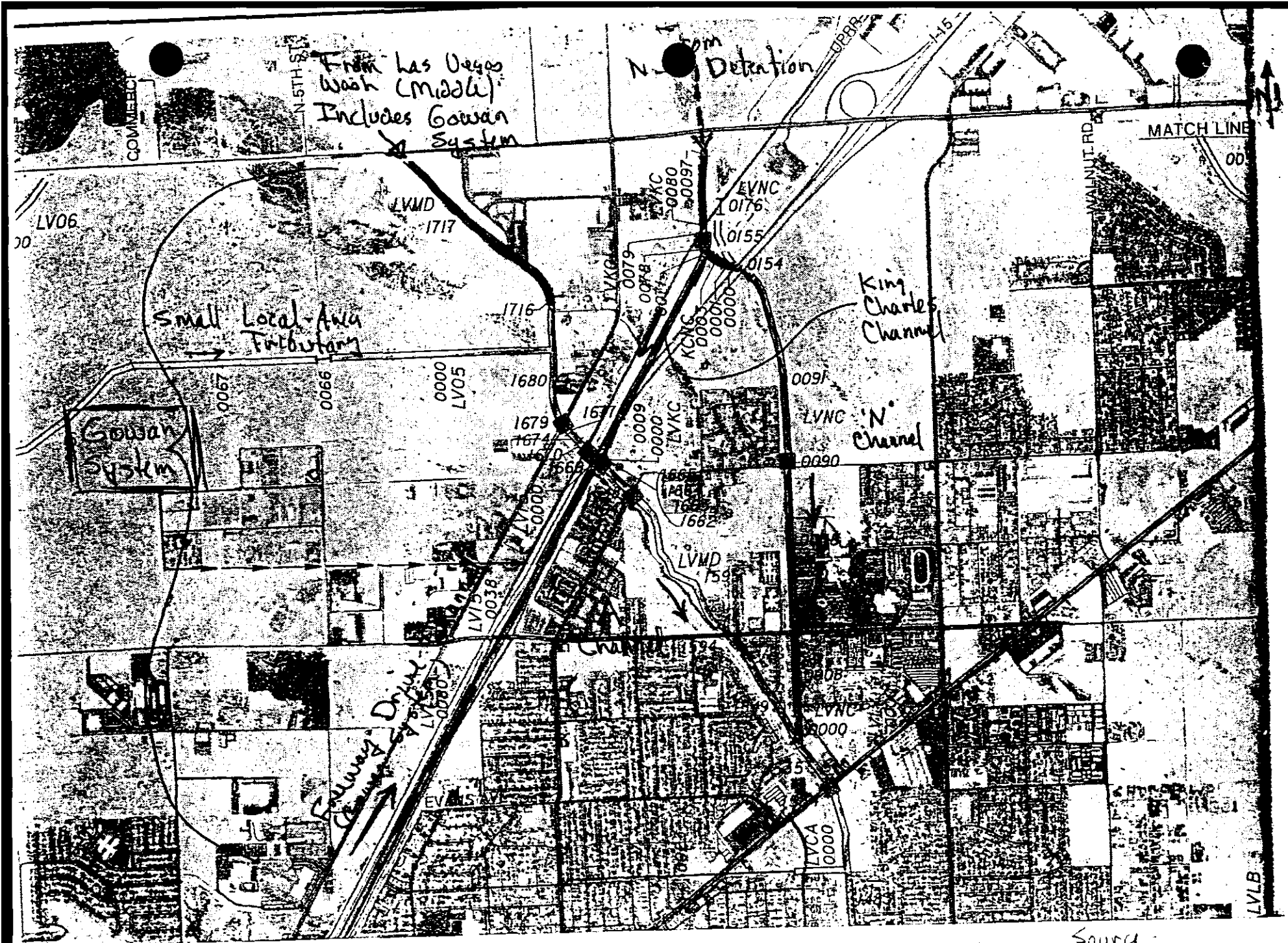
This is: ☑ as requested ☑ for your use
☐ for approval ☐ for review and comment

Remarks: As discussed, we need to confirm the d/s limit for our study. In particular, we need to determine if all the flow splits - "A"-channel, "N-Channel" and King Charles channels are included.

From: Bill Rozeboom

Copy to:

Note that the flows in the lower end are governed by the Gowan system, which appears to be quite complex and about which we know very little at this time.



Source:
Fig F-11

The following are routing statements from the JMM HEC-1 model
for the Lower Central Valley Storm, Existing Conditions
Major diversions are presented in sequence.

```
* Flows to this point are routed outflows from N Las Vegas Wash Pond.

KM DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
DT RRCHANNL

KM DIVERT FLOW INTO KING CHARLES CHANNEL
DT KCHAR

KM ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL
* remaining flow after upstream diversions
* Flows routed through several reaches, a drop structure, and end up at
* "A" channel.

** model computes flows from Gowan Basin, then:

KM ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
KM TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL

KM COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL

KM COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL

DR RRCHANNL
KK DUMMY_AREA
KM Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion

DR KCHAR
KK DUMMY_AREA
KM Add dummy subarea with near-zero area to the recalled KCHAR diversion

KK ACHANNL
KM COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
HC 5

KM ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.

KM ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL

KM COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
```

SELECTED OUTPUT FROM HEC-1 INPUT FILE ULVW100.DAT
JM MONTGOMERY FOR CCRFCD FIS, INPUT FILE DATED 01-92-91
INPUT FILE LENGTH=1,256 LINES
STORM GIVES MAXIMUM DISCHARGES IN "A" CHANNEL

```
          5          ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
          6          ID          Lower Central Valley 100-Year Storm, Existing Conditions
          7          ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
          8          ID          (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
          9          ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

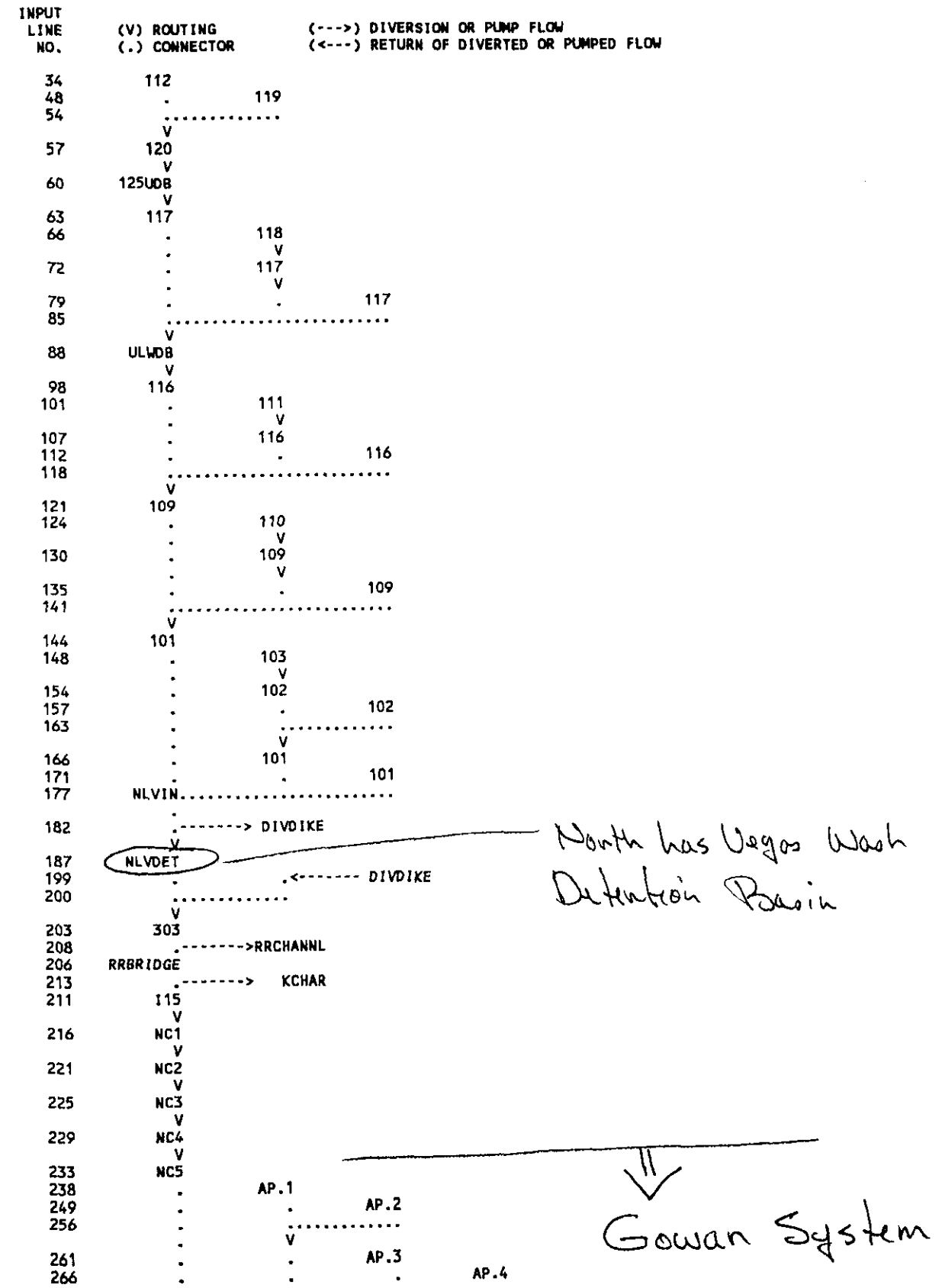
         14          ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
         15          ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
         16          ID          Channel and Hualapai Diversion included, 8/90
         17          ID
         18          ID          This data file models DARF's at certain locations where FIS flows are
         19          ID          required.  The original B&V data file used a factor of 0.62; ratios
         20          ID          of this factor are used in the JR card to model DA's at the points
         21          ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
         22          ID
         23          ID           PT OF                    AREA          DARF       DARF/0.62      RATIO
         24          ID          INTEREST                (SQ MI)
         25          ID
         26          ID     RRBRIDGE, NC5, & 304      60.7 - 64.5       0.66         1.06           1
         27          ID          ACHANNL                 111.6          0.59         0.95           2
         28          ID          NCHANNL                 172.2          0.53         0.85           3
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

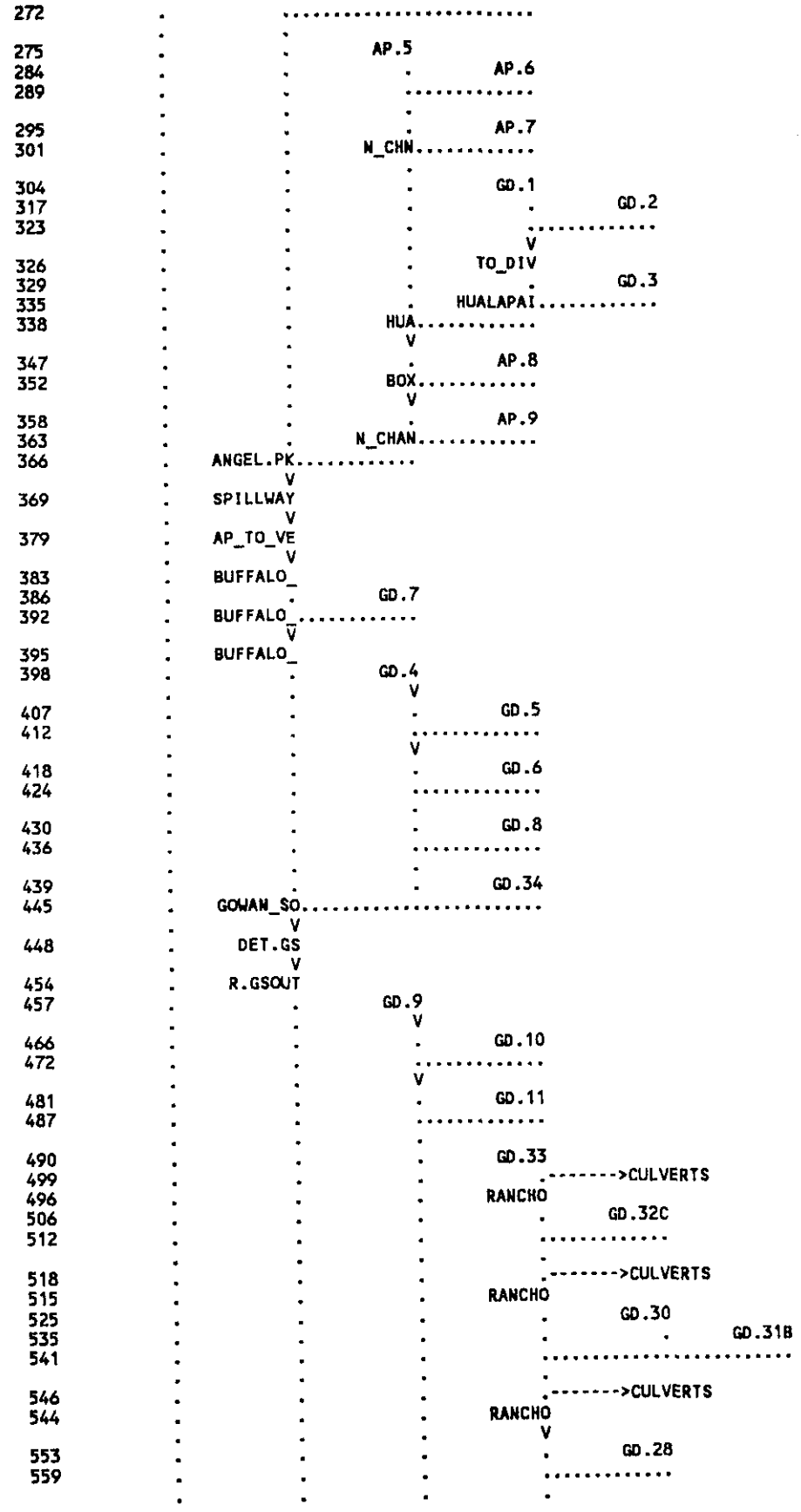
*** NOTE: SCHEMATIC EDITED TO REMOVE MANY ROUTINGS & CONNECTORS IN ORDER

SOURCE: JMM HEC-1 MODEL: ULVW100.DAT

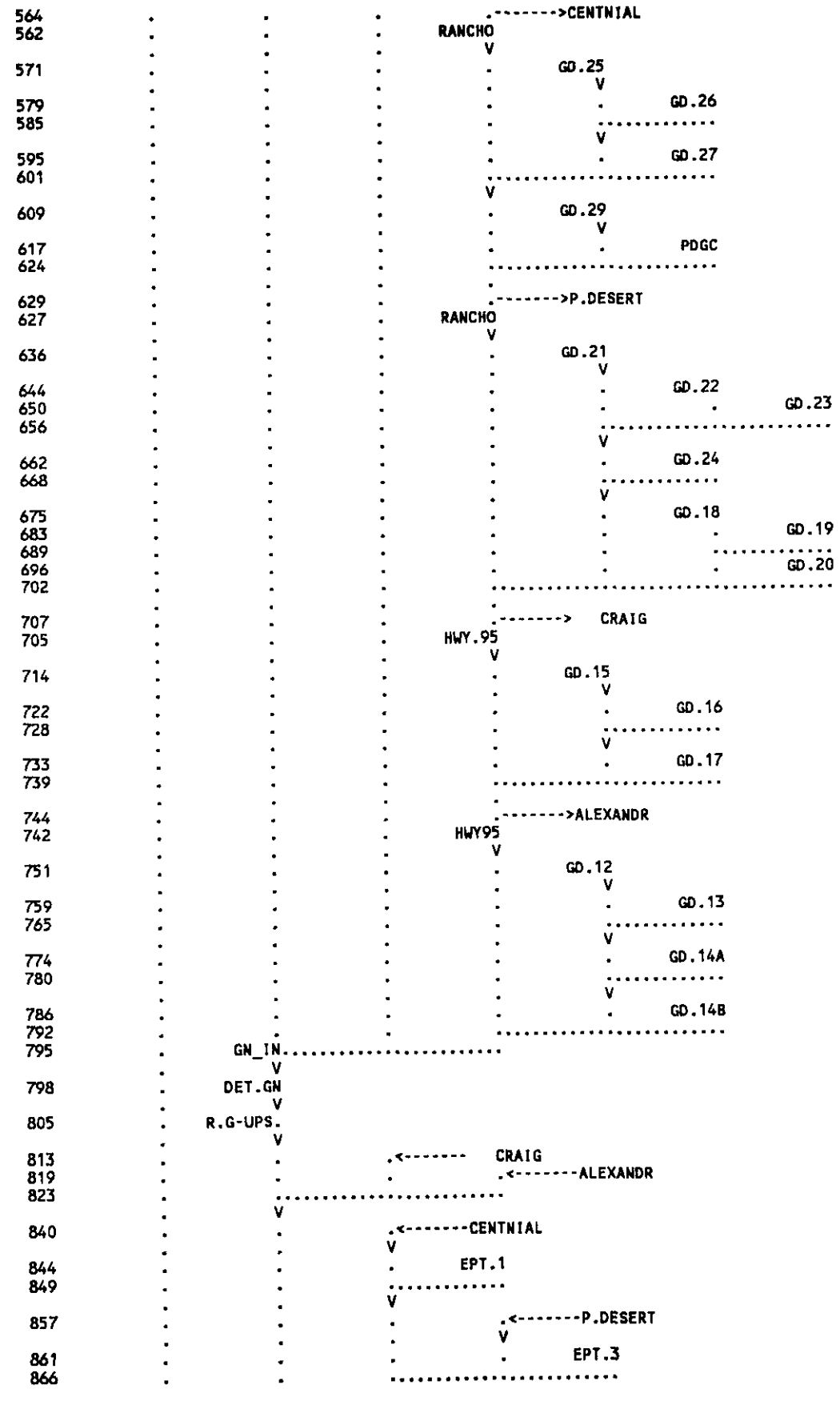
*** TO SHORTEN LENGTH OF HARD-COPY OUTPUT. ALL LINKAGES ARE INCLUDED.



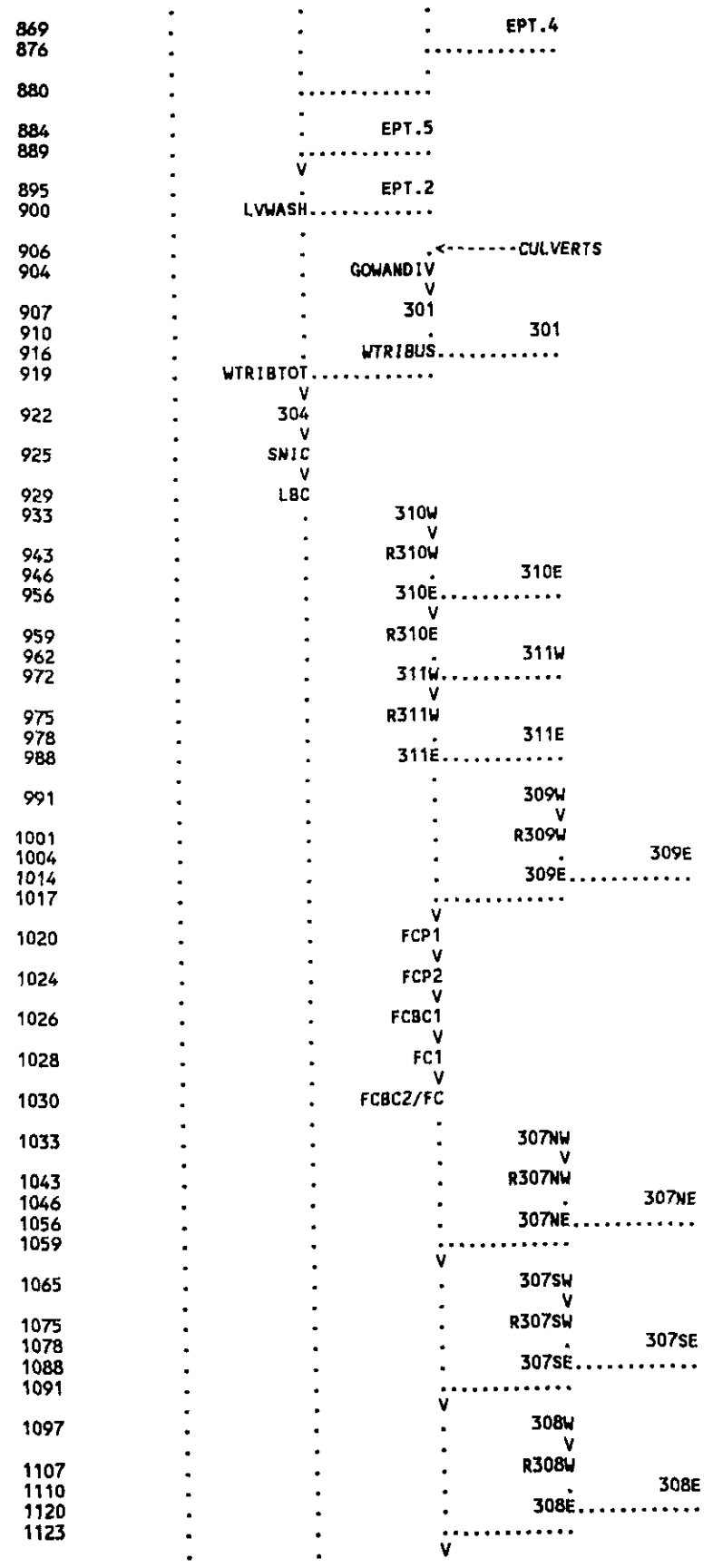
SOURCE: JMM HEC-1 MODEL: ULVW100.DAT



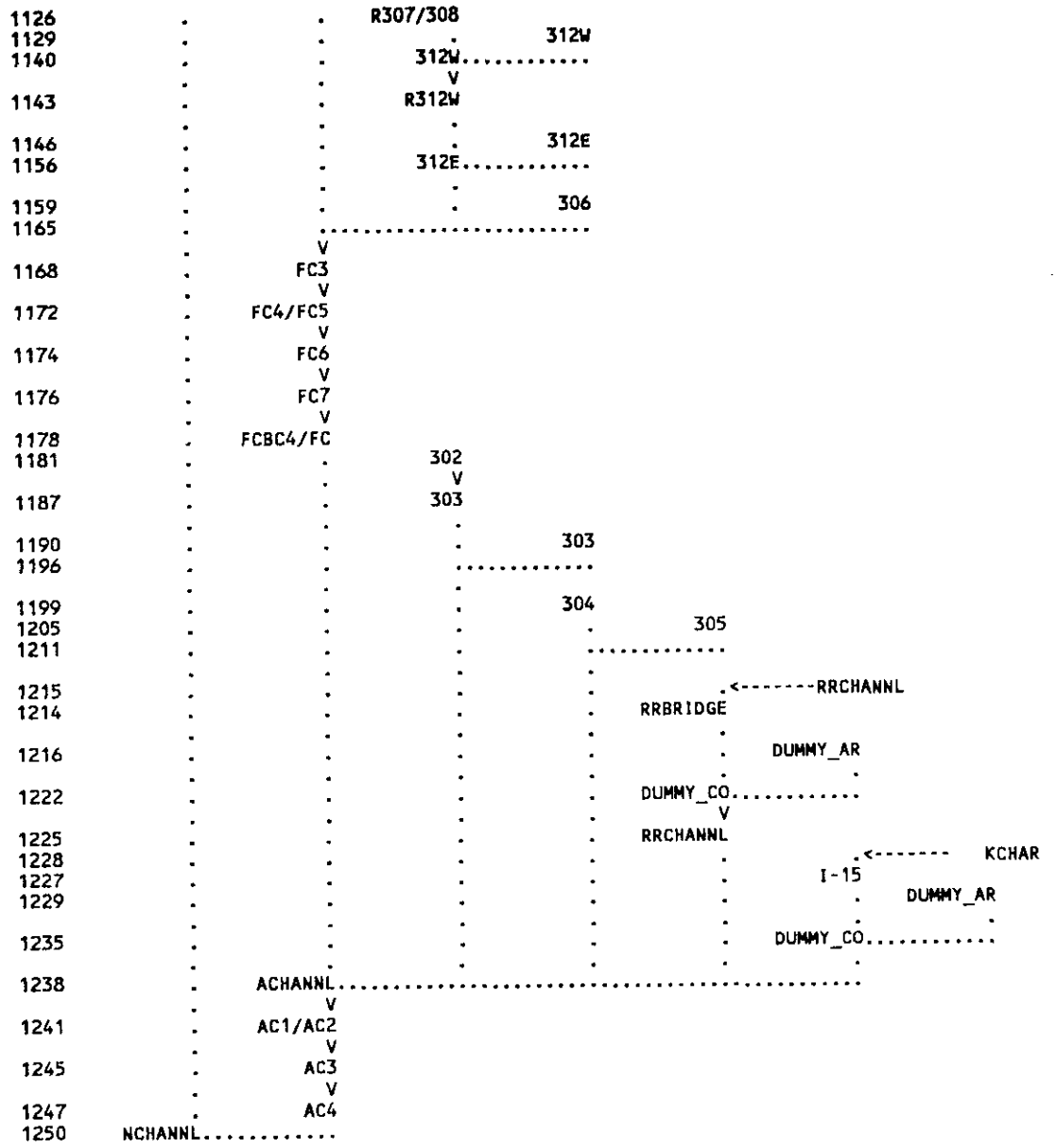
SOURCE: JMM HEC-1 MODEL: ULVW100.DAT



SOURCE: JMM HEC-1 MODEL: ULVW100.DAT



SOURCE: JMM HEC-1 MODEL: ULVW100.DAT



SOURCE: JMM HEC-1 MODEL: ULVW100.DAT

Department of Public Works

2266 Civic Center Drive
North Las Vegas, Nevada 89030
(702) 657-2200
FAX (702) 649-4696

Mayor
James K. Seastrand

City Council
Theron H. Goynes
William E. Robinson
Mary J. Kincaid
John K. Rhodes

City Manager
Linda Hinson

Public Works Director
Gary W. Holler, P.E.

received
MAR 08 1996

March 6, 1996

Joey Howard
NW Hydraulic Consultants
3950 Industrial Boulevard, Suite 100-C
West Sacramento, California 95691

Dear Joey:

Enclosed are:

Predesign Report for the Upper Las Vegas Wash Detention Basin
Hydrologic Analysis/Western and Eastern Tributaries of Range Wash
Flood Control Facilities Plan for the Northern Las Vegas Wash
Western and Eastern Tributaries of Ranch Wash/Flood Control Facility Plan

Please don't hesitate to contact me if you have any questions.

Sincerely,

Irene R. Contreras for

Kelly R. Chuma
Development and Flood Control Administrator

cc: Les Sakumoto, FEMA

Kenney Aerial Mapping Inc.

[redacted]rest Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3306 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

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FAX COVER LETTER

TO:	FROM:
Name: JOEY HOWARD	Name: GARY FINNIE
At:	Date:
	Time:

Project number: _____

Project name: _____

Number of pages, (including this one): _____

MESSAGE

If you have trouble receiving this transmission, please call:
Phoenix--(602) 258-6471 Las Vegas--(702) 368-7574

KENNEY AERIAL MAPPING
CADD STANDARD SYMBOLOGY

DATED APRIL 21, 1994

BLOCK NAME & LAYER	SYMBOLS	COLOR #	DESCRIPTIONS
BRD		7	BILLBOARD
CAC		3	CACTUS
DTICK		7	DEPRESSION TICK
FLNCTICK		3	FENCL TICK
FLAG		7	FLAG
GRID		3	GRID TICK
HVP		7	HORIZONTAL & VERTICAL PT
MB		7	MAIL BOX
MINE		7	MINE
PALM		3	SINGLE PALM
PC		7	PHOTO CENTER
PEDSIG		7	PEDESTRIAN SIGNAL
PIPE		7	CULVERT END
POST		7	POST
PROPCNR		7	PROPERTY CORNER
PUG		7	ANALYTICAL CONTROL PT.
RRTICK		7	RAILROAD TICK
SP	O SP	7	STAND PIPE
SPOTX	x 520	7	SPOT ELEVATION POINT
SPTEXT	x	7	SPOT ELEVATION TEXT
TRANS		7	TRANSMISSION TOWER
UP		7	UNIDENTIFIED PANEL
VCP		7	VERTICAL CONTROL POINT
XCANLR		7	CANTILEVER SIGN
XCBWA		7	OFF ROAD CATCH BASIN
XCC		7	CATTLE GUARD
XCGCB		7	CATCH BASIN
XGP		7	GUY POLL
XGUCKR		7	GUARDRAIL
XHYD			FIRE HYDRANT
XMETER			MISC. UTILITY
XMH		3	MAN HOLE

STRUCTURES:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
BALC	CONTINUOUS	7	BALCONY
BLDG	CONTINUOUS	6	BUILDING
OBBLDG	HIDDEN	14	OBSCURED BUILDING
UCBLDG	HIDDEN	14	UNDER CONSTRUCTION BUILDING
CANOPY	CONTINUOUS	7	CANOPY
STAIRS	CONTINUOUS	7	STAIRS
TANK	CONTINUOUS	6	TANKS
MANMADE	CONTINUOUS	7	MANMADE FEATURES
XWALL	CONTINUOUS	7	EXTERIOR WALL
RET	CONTINUOUS	7	RETAINING WALL
FENCE	CONTINUOUS	3	FENCE
HIDFENCE	DASHED	3	HIDDEN FENCE
UTIL	CONTINUOUS	7	LARGE UTILITY BOX
EXCLUDED	CONTINUOUS	7	EXCLUDED AREAS

ROADWAYS:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
ROAD	CONTINUOUS	15	PAVED ROAD
DRT	DASHED	7	DIRT ROAD
CURB	CONTINUOUS	15	CURB
GUTTER	CONTINUOUS	7	GUTTER
CURBBACK	CONTINUOUS	7	CURBBACK
PAVEMENT	CONTINUOUS	15	ASPHALT PAVEMENT
TRL	DASHED	7	TRAILS
CONC	CONTINUOUS	7	CONCRETE
BRIDGE	CONTINUOUS	7	BRIDGE
CNTR	DASHED	13	ROAD CENTER LINE
XMSTPG	CONTINUOUS	7	MISC. PAINTED STRIPES
RR	CONTINUOUS	7	RAILROAD
2' CURB	CONTINUOUS	15	CURB ZONE

VEGETATION:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
TREE	SCALLOPED	3	TREE LINE
HDG	SCALLOPED	3	HEDGE
XVEG	DASHED	11	FIELD LINE

ROADWAYS:

LAYER	LINE WEIGHT
ROAD	
DRI	
CURB	
GUTTER	
GUARDRAIL	
PAVEMENT	
INT	
CONC	
BRIDGE	
CNTR	
XMSIPC	
RR	

VEGETATION:

LAYER	LINE WEIGHT
TRELN	
HDG	
XVEGL	

MISCELLANEOUS:

LAYER	LINE WEIGHT
3DLINE	
FAIRWAY	
GRLEN	
SANDTRAP	
TEE	
ROK	
PILES	

TEXT:

LAYER	LINE WEIGHT
TEXT	2500
GRIDTXT	F 2600
CTRLTXT	1726.55

BLOCK NAME & LAYER	SYMBOLS	COLOR #	DESCRIPTIONS
XMSIGN		7	SIGN-MULTIPLE POST
XMSTLT		7	STREET LIGHT
XPLT		7	LIGHT POLE
XPOLE		7	UTILITY POLE
XSBKBK		7	BACK TO BACK SIGN POST
XSGATE		11	SINGLE GATE
XSNBRC		7	SIGN BRIDGE
XSSIGN		7	SINGLE POST SIGN
XSTNM		7	STREET NAME SIGN
XTBUTH		7	TELEPHONE BOOTH
XTREE		3	SINGLE TREE
XTS		7	TRAFFIC SIGNAL
XUGPED		7	UTILITY PEDESTAL
XUPWSL		7	UTILITY POLE WITH LIGHT
XUTIL		7	MISC. UTILITY
XVALVE		7	MULTI USE VALVE

CONTOURS:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
INDEX	CONTINUOUS	1	INDEX CONTOUR LINE
XDICL	CONTINUOUS	1	INDEX DEPRESSION
HINDEX	DASHED	1	HIDDEN INDEX CONTOUR
INTER	CONTINUOUS	2	INTERMEDIATE CONTOUR
XDMCL	CONTINUOUS	2	INTERMEDIATE DEPRESSION CONTOUR
HINTER	DASHED	2	HIDDEN INTERMEDIATE
SUPCONT	HIDDEN2	6	SUPPLEMENTAL CONTOUR

HYDROLOGY FEATURES:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
XWASH	4	4	DRAINS
XWL	CONTINUOUS	12	EXISTING WATER LINE
POOL	CONTINUOUS	12	SWIMMING POOL
XIRDC	CONTINUOUS	7	CONCRETE DITCH
XIRDE	4	4	EARTH DITCH

PLOTTED LINE WEIGHTS

CONTOURS:

LAYER	LINE WEIGHT
INDEX	
XDICI	
HINDEX	
INTER	
XDMNT	
HINTER	
SUPCONT	

HYDROLOGY FEATURES:

LAYER	LINE WEIGHT
XWASH	
XWL	
POOL	
XIRDC	
XIRDL	

STRUCTURES:

LAYER	LINE WEIGHT
BALC	
BLDG	
OBBLDG	
UCBLDG	
CANOPY	
STAIRS	
TANK	
MANMADE	
XWALL	
REI	
FENCE	
MIDFNCE	
JIII	
EXCLUDED 2D CURB	

MISCELLANEOUS:

LAYER	LINETYPE	COLOR #	DESCRIPTIONS
3DLINE	CONTINUOUS	1	3 D BREAKLINES
FAIRWAY	CONTINUOUS	2	GOLF FAIRWAY
GREEN	CONTINUOUS	3	GOLF GREEN
SANDTRAP	CONTINUOUS	4	SANDTRAP
TEE	CONTINUOUS	5	GOLF TEE
ROCK	CONTINUOUS	6	ROCK OUTCROPPINGS
DIRT	HIDDEN2	4	DIRT ON TRACK FIELD

TEXT:

LAYER	TEXT STYLE	COLOR #	DESCRIPTIONS
CTEXT	SIMPLEX	2	CONTOUR ELEVATION TEXT
GRIDTXT	SIMPLEX	7	GRID TEXT
CTRLTXT	SIMPLEX	7	CONTROL POINT TEXT

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

received
FEB 22 1996

To: Northwest Hydraulic Consultants Inc.
3950 Industrial Blvd. Ste. 100
West Sacramento, CA 95691

Phone: _____

Date: 2-19-96
Attention: Mr. Edward Wallace
Re: Upper L.V. Wash
Job # 960104

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  - Sepia Size _____ Scale _____
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Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

COPY

Mr. Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS, INC.
3950 Industrial Boulevard Suite 100C
West Sacramento, California 95691

Re: UPPER LAS VEGAS WASH

Dear Ed,

Enclosed are the survey notes for the GPS control and ERM's, provided to us by CRS and ASSOCIATED CONSULTING. I have also consolidated an ERM list combining the existing monuments within the City of North Las Vegas project and the "new area".

Compilation on the new area is complete and currently being edited. We should be delivering the final maps, CAD, 2x photos and others documents for this portion by February 19 or 20. At that time we can start looking at HECII locations and check profile locations.

We have had trouble re-flying the existing area within the City of North Las Vegas. Due to bad weather and military restrictions we have only completed one of three flight lines in this area. We expect to finish this flying by February 13, 1996 and will complete this mapping with all possible speed.

If you have any questions or if we can be of any further service please do not hesitate to call.

Sincerely,

John Cahoon

John Cahoon
KENNEY AERIAL MAPPING, INC.

Kenney Aerial Mapping Inc.

West Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

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Ellis O. Hyde, PRESIDENT

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ELEVATION REFERENCE MONUMENTS FROM THE CITY OF NORTH LAS VEGAS

NAD83 NAVD88

UPPER LAS VEGAS WASH FLOOD INSURANCE STUDY
KENNEY AERIAL MAPPING, INC. Job Number 960104

The following monument locations and descriptions were originally furnished to KENNEY AERIAL MAPPING, INC. from the CITY OF NORTH LAS VEGAS for use as photogrammetric control. By prior agreement the monument elevations have been converted to NGVD29 by subtracting 2.43 feet from the NAVD88 elevation provided by the CITY. Please see FEMA 37 Appendix 6-2, page A6-5 "Conversion Factor" paragraphs 1 and 2.

Two points with known monument elevations for both datums were used to determine the divergence in the conversion factor between NGVD29 and NAVD88.

CNLV Point Number A-1 at Moccasin and Decatur:

NAVD88 - NGVD29 = 2414.69 - 2411.88= 2.41'+/-

CNLV Point Number L-7 at Pecos and Owens:

NAVD88 - NGVD29 = 1815.08 - 1812.62= 2.46'+/-

The average difference between these points is 2.43 feet which was used to convert the photogrammetric control and the ERM elevations. The greatest divergence is less than .1' (i.e. .05'), allowing us to use the average difference throughout the City of North Las Vegas. Some differences exist between Monument Elevations and Panel Point (Ground) Elevations. These differences are noted below.

The study area not covered by existing photography and control, i.e. everything west of Decatur Boulevard, has been controlled in the field by GPS methods to NAD83 and NGVD29. These points conform to First Order (Order C) specifications (1:100,000).

Mon. Num. (CNLV)	Northing	Easting	NAVD88 Elev.	NGVD29 Elev.
A-1	26,823,895.0256	767,012.1904	Panel 2414.29 Monu. 2414.69	2411.86 2412.26

Description: MOCCASIN/DECATUR FOUND BLM BRASS CAP MONUMENT, TOWNSHIP SECTION CORNER S36IS31/S1IS6, T18SIT19S,R60EIR61E, 1990 C.S.

C-1	26,813,276.6755	767,014.1924	Panel 2332.90 Monu. 2333.10	2330.47 2330.67

Description: GRAND TETON/DECATUR FOUND 2" BRASS CAP MONUMENT IN CONCRETE CYLINDER, SECTION CORNER MONUMENT, S12IS7/S13IS18, T19S,R60EIR61E, RLS 1919 CLV 81, BLM 1990.

COPY

Mon. Num.	Northing	Easting	NAVD88 Elev.	NGVD29 Elev.
C-2	26,813,133.0675	772,339.5075	Panel 2296.26 Monu. 2296.51	2293.83 2294.08

Description: GRAND TETON/ALLEN FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S7IS8/S18IS17, T19S,R61E, 1990

C-3	26,813,322.8925	777,690.8673	Panel 2258.88 Monu. 2259.28	2256.45 2256.85

Description: GRAND TETON/CLAYTON FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S8IS9/S17IS16, T19S,R60E,1991

C-4	26,813,333.4382	783,079.6540	Panel 2214.04 Monu. 2214.34	2211.61 2211.91

Description: GRAND TETON/REVERE FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S9IS10/S16IS15, T19S,R61E, 1991

C-5	26,813,239.0908	788,446.9337	Panel 2197.28 Monu. 2198.48	2194.85 2196.05

Description: GRAND TETON/NORTH 5TH FOUND 3.5" CAPPED PIPE (CNLV), SECTION CORNER MONUMENT, S10I11/S15I14, T19S,R61E, BLM 1991

C-6	26,813,182.9116	793,610.6336	Panel 2221.64 Monu. 2221.64	2219.21 2219.21

Description: GRAND TETON/LOSEE SET HUB AND TACK FOR SECTION CORNER LOCATION FROM FOUND TIES (PLS9399) ON TOP OF NEW DIVERSION DIKE, S11IS12/S14IS13, T19S,R61E

E-5	26,802,511.9913	788,322.9267	Panel 2049.16 Monu. 2049.91	2046.73 2047.48

Description: CENTENNIAL/NORTH 5TH FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S22IS23/S27IS26, T19S,R61E, 1991

E-6	26,802,500.2282	793,588.9443	Panel 2039.67 Monu. 2040.17	2037.24 2037.74

Description: CENTENNIAL/LOSEE FOUND 3.5" CAPPED PIPE MARKED DEPT. OF THE INTERIOR, BLM, CADASTRAL SURVEY RM 66FT NE TO NE S26, T19S,R61E, 1991 (SW REF. MON.)

G-6	26,791,853.9181	793,700.0325	Panel 1948.34 Monu. 1947.89	1945.91 1945.46

Description: LONE MOUNTAIN/LOSEE FOUND 2" BRASS CAP IN WELL MONUMENT AT CENTERLINE INTERSECTION, MARKED PLS 8431, POINT USED FOR SECTION CORNER S35IS36/S2IS1, T19SIT20S,R61E

J-6	26,781,174.3348	793,796.6934	Panel 1883.42 Monu. 1883.42	1880.99 1880.99

Description: CHEYENNE/MARY DEE FOUND 4" CNLV ALUM MON AT CENTERLINE INTERSECTION, POINT USED FOR SECTION CORNER MONUMENT S11IS12/S14IS13, T20S,R61E

COPY

NEW ELEVATION REFERENCE MONUMENTS

Provided by CRS CONSULTING ENGINEERS, INC. and ASSOCIATED CONSULTING, INC.

Mon. Num.	Northing	Easting	NAVD88	NGVD29
0802	26,824,094.985	751,153.821	2473.68	2471.27
Description:	CLARK COUNTY GIS MON. IN CONCRETE MARKED "0802"AT BUFFALO/MOCCASIN			
0803	26,823,954.499	766,991,119	2415.71	2413.30
Description:	CLARK COUNTY GIS MON. IN CONCRETE MARKED "0803" AT DECATUR/MOCCASIN			
ER01	26,824,067.479	745,909.424	2534.29	2531.88
Description:	BRASS CAP IN CONCRETE MARKED " L.S.1919". CLV BM 1LV90 5NES			
ER02	26,818,722.004	745,953.589	2532.60	2530.20
Description:	BLM BC MARKED "S5/S8IS4/S9 T19S R60E 1990 CLVBM" IN A/C. CLV BM 1L90 8NES			
ER03	26,821,354.112	751,267.417	2454.57	2452.16
Description:	ALUMINUM MON. MARKED "CLV1/4 S4IS3". BM 1LV90 3W4			
ER04	26,818,793.210	756,682.406	2419.73	2417.32
Description:	CLV BM. RIVET AND PLATE IN CONCRETE MARKED "CITY OF LAS VEGAS BM NO." (NOT THE BM LISTED IN CLV BENCH BOOK.)			
ER05	26,823,937.102	761,736.590	2403.32	2400.91
Description:	BRASS CAP IN 3/4" I.P. MARKED "35/2I36/1 RLS 1919 1990 T18S R60E". CLV BM 1LV90 2NES			
ER06	26,817,040.122	761,915.926	2379.85	2377.45
Desription:	CLV BM. RIVET AND PLATE IN CONCRETE MARKED " CLV BM NO." (NOT THE BM LISTED IN CLV BENCH BOOK.)			
ER07	26,820,580.802	765,820.496	2338.32	2335.91
Description:	SET LEAD AND BRASS TAG IN SE CORNER OF OUTFLOW MARKED "LS5876".			

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

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Phone: (702) 368-7574 Fax: (702) 873-4185



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Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: NORTHWEST HYDRAULIC Consultants
3950 INDUSTRIAL BLVD Suite 100C
WEST SACRAMENTO, CA 95691

Phone: _____

Date: 2-16-96
Attention: Mr. Edward Wallace
Re: Upper Las Vegas WASH
Job # 960104

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  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____
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- ☐ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☒ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size 24 x 36
  Scale 1" = 40'
  Sepia Size _____
  Scale _____
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Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: NORTHWEST HYDRAULIC CONSULTANTS
3950 INDUSTRIAL BLVD STE 100
WEST SACRAMENTO, CA 95691

Phone: _____

Date: 2/15/96

Attention: MR. WALLACE

Re: UPPER LAS VEGAS FEMA [redacted]

Job # 960104

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- ☐ Pencil Manuscript(s)
  - Scale _____
- 2 ☑ Final Drafted Sheet(s)
  - Scale 1" = 400'
- ☐ Photo/Topo Composite(s)
  - Scale _____
- ☐ Plan & Profile Sheet(s)
  - Scale _____

- ☐ Computer Tape(s)
- ☑ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size _____
    - Scale _____
  - Mylar Size _____
    - Scale _____
  - Sepia Size _____
    - Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:

Flight(s) _____
Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) 8 Tapes _____ Rolls _____

SHIPPING INFORMATION:

☐ Pick up by Client Delivered by _____
☐ UPS ☐ Air Express ☑ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

LASVEGA1.DWG
LASVEGA2.DWG
LASGRID.DWG
DTMDATAA.DWG

From: _____ Received by _____ Date 2/15/96

PLEASE SIGN AND RETURN DUPLICATE COPY

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877
3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: Northwest Hydraulic Consult.
3950 Industrial Blvd., #100C
West Sacramento, CA 95691
Phone: (916) - 371 - 7400

Date: 2-13-96
Attention: Mr. Wallace
Re: Upper L. Vegas Wash
Job # 960104

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☑ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____
- ☐ Computer Tape(s)
- ☐ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size _____
  Scale _____
  Sepia Size _____
  Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☑ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:

Flight(s) _____
Contacts 9 Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) _____ Tapes _____ Rolls _____

SHIPPING INFORMATION:

☐ Pick up by Client Delivered by _____
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

FEB 20 1996

ADDITIONAL INFORMATION:

From: _____ Received by _____ Date _____

PLEASE SIGN AND RETURN DUPLICATE COPY

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date January 8, 1996 Job No. 50010

From Joey Howard

To Bill Rozeboom

Company Northwest Hydraulic Consultants

Regarding -

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [X] for your use
[ ] for approval [ ] for review and comment

Remarks

Enclosed is a copy of **Hydraulic Documentation For Feasibility Study,** Las Vegas Wash and Tributaries Clark County, Nevada. April. 1988.

Call if you have any questions.

Joey Howard

Kenney Aerial Mapping Inc.

11[illegible]st Fillmore, Phoenix, Arizona 85007
[illegible](602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

5-10-12

To: Northwest Hydraulic Consultants
3950 Industrial Blvd., Ste. 100
West Sacramento, CA 95691
Phone: (916) 371-7400

Date: 1-5-96
Attention: Mr. Edward Wallace
Re: Upper Las Vegas Wash
Job # 960104

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☑ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale_____
- ☐ Final Drafted Sheet(s) Scale_____
- ☐ Photo/Topo Composite(s) Scale_____
- ☐ Plan & Profile Sheet(s) Scale_____
- ☐ Computer Tape(s)
- ☐ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size_____ Scale_____
  - Mylar Size_____ Scale_____
  - Sepia Size_____ Scale_____
- ☐ Control Diagram
- ☐ Film Positive(s)

☑ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:

Flight(s)_____
Contacts 7 Sheets_____
Box(es)_____ Copies_____ Originals_____
Disc(s)_____ Tapes_____ Rolls_____

SHIPPING INFORMATION:

☐ Pick up by Client Delivered by_____
☐ UPS ☐ Air Express ☐ Fed Ex ☑ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

From: DD Received by_____ Date_____

PLEASE SIGN AND RETURN DUPLICATE COPY

Transmittal Letter

COPY

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date December 27, 1995 Job No. 50010

From Lisa Day for Joey Howard

To Steve Roberts

Company Clark County Regional Flood Control District

Regarding -

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [ ] for your use
[ ] for approval [ ] for review and comment

Remarks

Thank you for letting us borrow Las Vegas Wash and Tributaries Clark County, Nevada.

Thank You,
Northwest Hydraulic Consultants

Lisa Day for Joey Howard

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007 Phone: (602) 258-6471 Fax: (602) 340-1877

3905 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102 Phone: (702) 368-7674 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1960

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

December 26, 1995

Mr. Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.
3950 Industrial Boulevard Suite 100C
West Sacramento, California 95691

Re: UPPER LAS VEGAS WASH FEMA PROJECT
Supersedes letter dated June 16, 1995

Dear Ed,

This is to confirm our final scope of work, fees and schedule for providing photogrammetric services for the above listed project.

SERVICES TO BE RENDERED:

It is understood that CRS CONSULTING ENGINEERS, INC. will establish the horizontal and vertical control necessary for us to perform photogrammetrics. In addition they will perform other services as outlined below. Any services beyond those specified will require further negotiations.

Existing ground control will be used for areas that fall within the CITY OF NORTH LAS VEGAS mapping project currently being completed by KENNEY AERIAL MAPPING, INC. The vertical datum for this control will be converted to NGVD 1929 from the current datum NAVD 1988. By agreement of all parties this will be accomplished by subtracting 2.43 feet from the existing CITY OF NORTH LAS VEGAS control.

TASK I - SET NEW HORIZONTAL AND VERTICAL CONTROL POINTS AND ERM'S

Target and control sixteen (16) panel points using a static positioning technique with GPS equipment conforming to First Order (Order C) specifications (1:100,000). The horizontal datum will be NAD 1983. The vertical datum will be NGVD 1929.

Locate and control fourteen (14) Elevation Reference Marks (ERM's) with GPS techniques to a third order accuracy on the Z coordinate. ERM's in existing mapping area will be monumented section corners also used as control. ERM's in the new area will be existing monuments where possible. New monuments will be placed as needed in convenient, recoverable locations. ERM data and locations will be documented to NORTHWEST HYDRAULIC CONSULTANTS, INC.

Fee:	**$ 10,350.00**
Fee For Additional Points	**$ 285.00 Each**

TASK II - CHECK PROFILES

Provide quality control check profiles parallel to the direction of flow at approximately eleven (11) stations at locations agreeable to all parties. Conventional surveying techniques using trigonometric leveling methods i.e. total station, will be used. Kenney Aerial Mapping, CRS Consulting and Northwest Hydraulic Consultants will determine the appropriate locations upon completion of the mapping.

Mr. Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.

December 26, 1995
Page 2

Re: UPPER LAS VEGAS WASH FEMA PROJECT
Supersedes letter dated June 16, 1995

Each check profile will include:

1. Ties to a recoverable location (by bearing and distance, coordinates etc) for future reference.
2. Continue profile a minimum of 2000' at approximately 100'+/- intervals,
3. All check profile points will be to third order accuracy.

Approximate Fee For Urban Check Profiles: $ 850.00 Each

Approximate Fee For Rural Check Profiles: $ 635.00 Each

TASK III - HECII CROSS SECTIONS FOR STRUCTURES

Additional cross section locations will be completed in the field in places obscured on the photos i.e. upstream and downstream faces of bridges and road crossings, including abutment and pier locations, soffit elevation, top of road elevation and orientation, and culvert sizes and elevations.

Fee For Four Bridge Structures: $ 1,960.00

Fee For Additional Bridge Structures: $ 525.00 Each

TASK IV - DIGITAL PHOTOGRAMMETRY WITH FOUR FOOT CONTOURS

Aerial photography in stereo with one set of LogEtronic contact prints. This includes existing and new photography to cover the complete area.

Analytical aerotriangulation for existing and new photography
98% of analytic x, y (horizontal) control points will meet or exceed generally accepted standard mapping accuracies. 80% of analytic z (vertical) points are expected to be within .0001 of flight height. Analytic results are based on initial field control surveys.

Photogrammetric stereo compilation to develop DTMIF
(Digital Terrain Model Information Files)
Mass points will be digitized at
high, low and intermediate positions
in order to best depict the ground.
Supplemental mass points will be added in order
to densify the point network.
Additionally, 3-D breaklines will be used to supplement DTM.
4' contours will be computer generated and interpolated
using Intergraph Site Works software, then run through
our contour smoothing software as a final step.
Text scale will be 1"=400'.
The above data will be provided in AutoCAD Release 12 drawing file
on IBM 3-1/2" HD micro disk.
Mass points and breakline data will be on separate layers.

Planimetric data to be digitized includes all asphalt surfaces, major dirt roads, structures and hydraulic features.

Provide 2X paper photo enlargements for your use in delineating the thalweg and HECII cross section locations. These are to be used in conjunction with the finished map files. The thalweg and cross section locations will be returned to us as ACAD drawing files.

Mr. Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.

December 26, 1995
Page 3

Re: UPPER LAS VEGAS WASH FEMA PROJECT
Supersedes letter dated June 16, 1995

Provide photogrammetric HECII cross sections on approximately 1000' stations and photo visible breaks.

Final ink-jet drawings on stable base mylar
Map scale at 1"=400'
Sheet size 24"x36" -- Approximately 8 sheets

Photo transparencies semi-rectified to 1"=400'
to overlay each final drafted sheet

Fee: **$24,391.00** _____
(Initial)

NOTE:

It is our policy to map to the given control panel locations. If this does not meet your map limit requirements, please submit a drawing or diagram that shows exactly what area you want mapped. It is understood that mapping outside control boundaries may not meet standard mapping accuracies.

Areas that may be obscured due to dense trees, brush or dark shadows may not be identified (i.e. dashed contours or labeled) on DTM products. These areas may contain weak x,y,z data and require field survey check or verifications.

All products containing digitized information must be reviewed for correctness and completeness within 30 days of receipt and we need to be notified immediately if there are any discrepancies. This policy enables us to better satisfy our customers and eliminates possible costs to regenerate the data.

PAYMENT AGREEMENT:

As per this agreement, payment for the above services will not exceed 10 days after you receive payment.

Project fees may need to be adjusted if this project is not initiated within 270 calendar days.

In the event our photogrammetric services are not paid within the agreed time frame as outlined in this letter, there will be a 1-1/2% per month late fee added to the unpaid balance.

JOB SCHEDULE:

If we receive notice to proceed by December 27, 1995 then we anticipate a flight date of January 2, 1996 and receipt of control by January 8, 1996. The existing and new photographic contact prints and the 2x enlargements will be delivered by January 12, 1996.

The digital mapping and photo transparencies will be delivered by February 16, 1995. Allowing one week for your firm to delineate the HECII locations, we can complete the cross sections by March 4, 1995.

December 29. 1995

Mr. Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS

Re: Upper Las Vegas Wash NAVD 88 To NGVD 29 Conversions

Dear Ed,

After reviewing the conversion with Bart Dalton of City of North Las Vegas and Dave Hough of Associated Consulting we determined that a constant conversion factor was acceptable for this project.

Bart Dalton has a fairly complete set of conversions for most section corners within the City limits. His point A-1 in the northwest corner of the City (NW Corner section 6) has an NAVD 88 elevation of 2415.8.. and an NGVD elevation of 2413.4.. for a difference of 2.41 feet. Another point near the Freeway at Pecos and Owens has a difference of 2.45 feet. The average difference across this 12 mile length is 2.43'.

Since FEMA allows constant conversions if the difference is under .1 feet across the project we decided that it was unnecessary to reoccupy those points which fall within the City of North Las Vegas limits.

In any case, with four foot contours, we as photogrammetrists could never detect such small differences from the photo scales we intend to fly.

Our flight schedule is still for January 2, 1996 unless we hear from you immediately.

Please let us know if you have any additional questions.

Sincerely,

John Cahoon

John Cahoon
KENNEY AERIAL MAPPING, INC.

Mr. Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.

December 26, 1995
Page 4

Re: UPPER LAS VEGAS WASH FEMA PROJECT
Supersedes letter dated June 16, 1995

It is important to both your firm and our company that work schedule estimates are on time. Our current number of working days to complete this project may need to be adjusted if:

A. This project is not initiated within 45 calendar days,
B. Weather causes photography delays.

Your assistance in helping us serve you is appreciated.

Please contact Ellis Hyde of John Cahoon should you have any questions concerning this proposal, survey control requirements or to arrange a flight schedule.

Further communication on this project should be with our Production Manager, Gary Finnie who will supervise the project.

All services and finished materials will be prepared in strict accordance with generally accepted photogrammetric standards.

If this meets with your approval, please sign and return the enclosed copy.

Sincerely,

Ellis O. Hyde
KENNEY AERIAL MAPPING INC.

Accepted by

Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.

EOH/jc

0010.11

Kenney Aerial Mapping Inc.

[illegible] West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 69, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4186

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

FAX COVER LETTER

TO:	FROM:
Name: Ed Wallace	Name: John Cahoon
At: Northwest Hydraulic	Date: 12-29-95
	Time:

Project number: _____
Project name: Upper Las Vegas Wash
Number of pages, (including this one): 2

MESSAGE

Ed

Here is the reasoning behind our decision to use a constant value of 2.43' for the NAVD 88 to NGVD29 conversion on your project. Please call if you have any questions.

Thanks a lot

John Cahoon

If you have trouble receiving this transmission, please call:
Phoenix--(602) 258-6471 Las Vegas--(702) 368-7574

December 29, 1995

Mr. Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS

Re: Upper Las Vegas Wash NAVD 88 To NGVD 29 Conversions

Dear Ed,

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Please let us know if you have any additional questions.

Sincerely,

John Cahoon

John Cahoon
KENNEY AERIAL MAPPING, INC.

AFFIDAVIT OF PUBLICATION

PASTE CLIPPING HERE

ANNOUNCEMENT OF INTENT
TO PERFORM FLOOD
ELEVATION STUDY

The Federal Emergency Management Agency announced that under authority of the National Flood Insurance Agency of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), it will fund a detailed study of the flood hazard areas in Clark County. The study will be performed for the Federal Emergency Management Agency by Northwest Hydraulic Consultants. The purpose of this study is to examine and evaluate the flood hazard areas in the community that are developed or are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by the community to carry out the floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining the appropriate flood insurance premium rates for buildings for their contents.
This announcement is intended to notify all interested persons of the commencement of this study so that they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Federal Emergency Management Agency for consideration in the course of this study. Such information should be furnished to Mr. Kevin Eubanks, Clark County Regional Flood Control District, (702) 455-3139, the Chief Executive Officer of the community, for forwarding to Northwest Hydraulic Consultants.
PUB: December 28, 1995

STATE OF NEVADA)
COUNTY OF CLARK) SS:

BARBARA CARR, being first duly sworn, deposes and says:

That she/he is a legal clerk for the LAS VEGAS REVIEW-JOURNAL and THE LAS VEGAS SUN, daily newspapers regularly issued, published and circulated in the City of Las Vegas, County of Clark, State of Nevada, and that the advertisement, a true copy of which is attached, was continuously published in the LAS VEGAS REVIEW-JOURNAL or THE LAS VEGAS SUN for a period of ONE insertions from the period of DECEMBER 28, 1995 to DECEMBER 28, 1995, on the following days:

DECEMBER 28, 1995

Signed: Barbara Carr

Subscribed and sworn to before me this 29th day of December, 1995

Linda M. Gough
Notary Public

LINDA M. GOUGH
Notary Public - Nevada
Clark County
My appt. exp. May 14, 1996

RJ-132A

Rev. 5/94

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: December 26, 1995 Job Number: 50010-01

From: Teresa Webster

To: Maggie - 702) 383-0226
Las Vegas Sun

Pages to Follow: 1 Original in Mail: no

Please call immediately if you do not receive all pages of this transmission.

Remarks:

Maggie,

We need to publish the following announcement of intent. We would like it to run for the minimum time required. Please call me at (916)371-7400 with a price, billing details, run time, etc. Thanks in advance.

Dec. 28th 1995
$ 40.42 - Edis visa

ANNOUNCEMENT OF INTENT TO PERFORM FLOOD ELEVATION STUDY

The Federal Emergency Management Agency announced that under authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), it will fund a detailed study of the flood hazard areas in Clark County. The study will be performed for the Federal Emergency Management Agency by Northwest Hydraulic Consultants. The purpose of this study is to examine and evaluate the flood hazard areas in the community that are developed or are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by the community to carry out the floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining the appropriate flood insurance premium rates for buildings for their contents.

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Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date December 20, 1995 Job No.50010

From Joey Howard

To John W. Cahoon

Company Kenny Aerial Mapping

Regarding Clark County Aerial Mapping

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [X] for your use
[ ] for approval [ ] for review and comment

Remarks

The following documents are "Appendix 4-Aerial Mapping and Surveying Specifications", "Appendix 6-Conversion to the North American Vertical Datum of 1988", and "Appendix 7-Digital Product Delivery Specifications", published in the January 1995 Flood Insurance Study Guidelines and Specifications for Study Contractors. These guidelines replace the March 1993 FEMA guidelines provided in the Preliminary Scope of Work Surveying and Mapping Services FEMA Flood Insurance Restudies in Clark County.

If you should have any questions concerning the documents please contact Ed Walllace or me at (916) 371-7400.

Thank You,

Joey Howard, P.E.

Corresp 5001.2-I

Transmittal Letter

northwest hydraulic consultants inc.

16300 Christensen Road Suite 350, Tukwila, WA 98188-3418
(206) 241-6000 (206) 439-2420 fax

Date: Dec 17 '95 Job No. 50010

To: Ed Wallace
NHC - Sacramento

Regarding: Clark County - Data

We are sending: ☑ attached ☐ separate by

Description: list of materials i cover sheets received from CCRFCD for FEMA study

This is: ☐ as requested ☑ for your use
☐ for approval ☐ for review and comment

Remarks: let me know if you would like full copies of any of these.

From: Bill Rozeboom

Copy to:

LETTER OF TRANSMITTAL

Regional Flood Control District

301 East Clark Avenue, Suite 300
Las Vegas, Nevada 89101
(702) 455-3139
FAX (702) 455-3870

TO: BILL ROZEBOOM, P.E., MBA. Date: 12/14/95 Job #:
NORTHWEST HYDRAULIC CONSULTANTS INC. Attention: W.A. ROZEBOOM P.E.
16300 CHRISTENSEN ROAD, SUITE 350 Subject:
TUKWILA, WASHINGTON 98188-3418

We Are Sending You:

☐ Attached or ☐ Under Separate Cover Via:

The Following Items: ☐ Plans ☐ Prints ☐ Specifications ☐ Samples ☐ Shop Drawings ☐ Copy Of Letter ☐ Change Order ☐

COPIES	DATE	NO.	DESCRIPTION
1		1	WESTERN & EASTERN TRIBUTARIES OF RANGE WASH FLOOD CONTROL FACILITY PLAN.
1		1	HYDROLOGIC ANALYSIS OF PROPOSED TRANSBASIN DIVERSION FROM THE RANGE WASH WATERSHED INTO THE NORTH LAS VEGAS DETENTION BASIN.
1		1	RANGE WASH PROJECT, COORDINATION WITH MASTER PLAN UPD
1		1	HEC-1 INPUT FILES, EAST & WEST TRIBUTARIES OF RANGE WASH (ALT II
1		1	HEC-1 OUTPUT FILES FROM BLACK & VEATCHES REPORT ON "NORTH LAS VEGAS DETENTION BASIN OUTLET MODIFICA REPORT"

These Are Transmitted As Checked Below:

☐ For Information & Coordination ☐ For Review & Comment ☐ Resubmit _____ Copies For Review
☐ For Approval ☐ Returned After Loan To Us ☐ Submit _____ Copies For Distribution
☐ As Requested ☐ _____ ☐ Return _____ Corrected Prints

REMARKS: PLEASE FIND ENCLOSED WITH THIS TRANSMITTAL THE REPORTS AND INFORMATION LISTED ABOVE.

THE DISKETTS WITH THE GREEN LABELS CONTAIN THE HEC-1 FILES FROM THE REVISED OCTOBER 1, 1993 BLACK & VEATCH REPORT TITLED "NORTH LAS VEGAS DETENTION BASIN OUTLET MODIFICATION REPORT", WHICH YOU ALREADY HAVE. THE DISKETTE WITH THE MAGENTA LABEL HAS THE HEC-1 FILES FROM THE DEC 12, 1990 TRANSMITTAL FROM BOIL ENGINEERING REGARDING THE RANGE WASH PROJECT.

IF YOU HAVE ANY QUESTIONS PLEASE CALL STEPHEN C. ROBERTS P AT (702) 455-3139.

COPIES TO: STEPHEN C. ROBERTS P.E.

REGIONAL FLOOD CONTROL DISTRICT

If enclosures are not as noted, kindly notify us at once.

By: Chad Vellmire

Western and Eastern Tributaries of Range Wash

Flood Control Facility Plan



Prepared for

City of North Las Vegas

Prepared by

Black Engineering Corporation

June 1991

Boyle Engineering Corporation

35 East Sahara Avenue, Suite 300
Las Vegas, Nevada 89104

consulting engineers

702 / 731-5511

December 11, 1990

Mr. Jim Bell
City Engineer
City of North Las Vegas
2200 Civic Center Drive
P.O. Box 4086
North Las Vegas, NV 89030

Coordination of Range Wash Facility Plan with Master Plan Update

Dear Jim:

As requested at the November 29, 1990 Master Plan Update Progress meeting, we submit the following:

1. Letter to Flood Control District regarding recommendation of Alternative IV for City of North Las Vegas letterhead. Please note, some City input is required regarding funding and timing of the diversion facility (see page 3 of District letter).

2. Diskette containing hydrologic models for future conditions with Alternative IV facilities.

3. Summary of critical discharges at select locations within the watershed for the various storm scenarios. Schematic diagrams are included as illustration of the different storm scenarios.

4. Exhibit of Alternative IV with revised subbasin delineation corresponding to facility locations (2 blueline prints).

5. Estimate of probable project cost for Alternative IV facilities.

If you have any questions, or require additional information, please contact our office.

BOYLE ENGINEERING CORPORATION

Gerald W. Simpson, PE
Senior Civil Engineer

enclosures

cc: Mark W. Glidden, BEC/DN

LV-N07-300-00

HYDROLOGIC MEMORANDUM

HYDROLOGIC ANALYSIS OF PROPOSED TRANSBASIN DIVERSION FROM THE RANGE WASH WATERSHED INTO THE NORTH LAS VEGAS DETENTION BASIN

Prepared for City of North Las Vegas

DRAFT

Black & Veatch
Engineers-Architects
Las Vegas, Nevada
B&V Project 17148
June 1990

50010-12

Kenney Aerial Mapping Inc.

11[illegible]t Fillmore, Phoenix, Arizona 85007
Pho[illegible]602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: Northwest Hydraulic Consultants
3950 Industrial Blvd Suite 100
West Sacramento, Ca 95691
Phone: 916-371-7400

Date: 11-21-95
Attention: Edward Wallace
Re: North L.V.
Job # 5693

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale_____
- ☐ Final Drafted Sheet(s)
  Scale_____
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- ☐ Computer Hard Copy(s)
- ☒ Photo Enlargement(s)
  Paper Size_____
  Scale_____
  Mylar Size Various
  Scale 1"=400'
  Sepia Size_____
  Scale_____
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☒ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s)_____
Contacts_____ Sheets 7-Mylars
Box(es)_____ Copies_____ Originals_____
Disc(s)_____ Tapes_____ Rolls_____

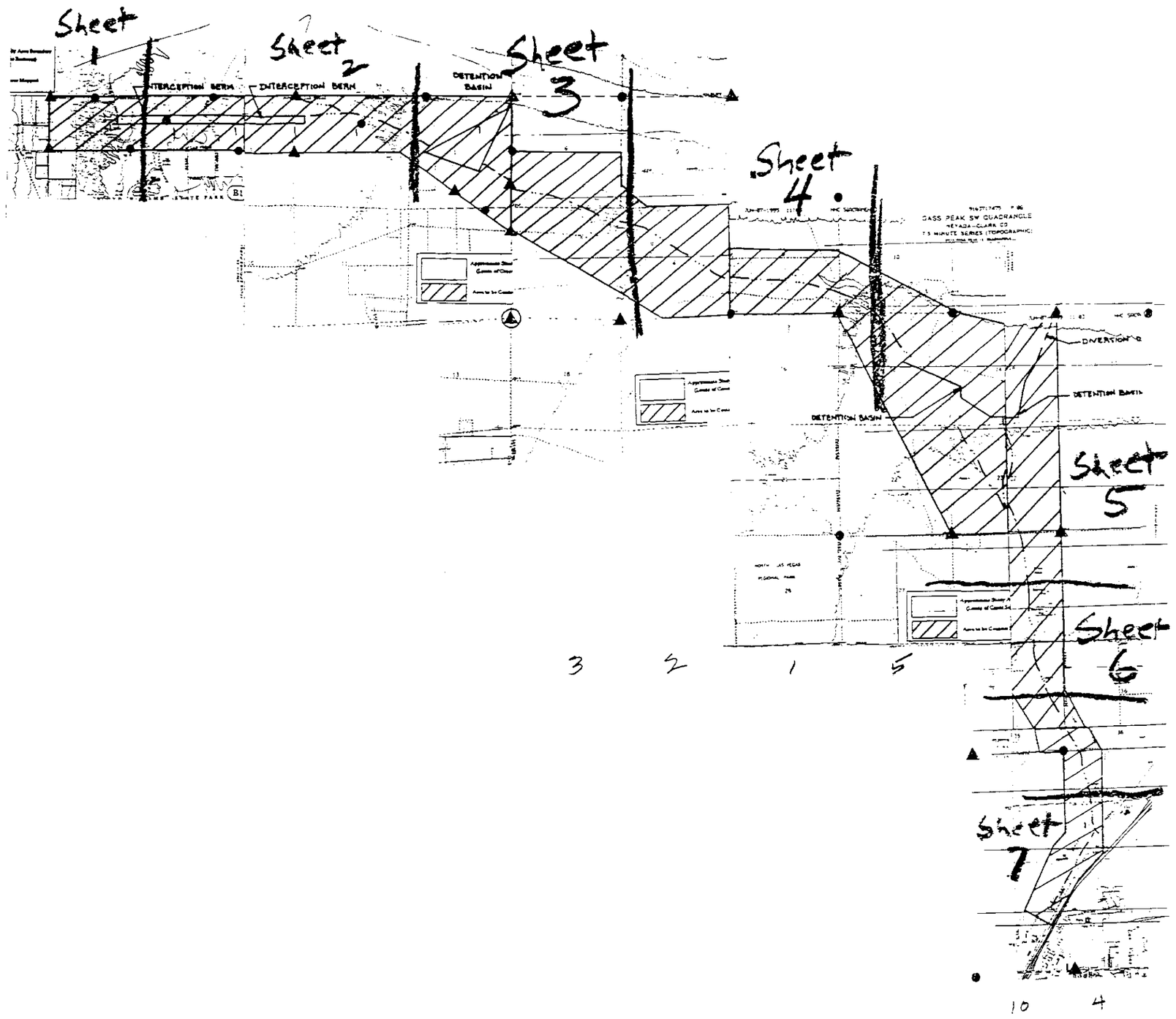
SHIPPING INFORMATION:
☐ Pick up by Client Delivered by_____
☐ UPS ☐ Air Express ☒ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

Next Day
Economy

From: Hanel Received by_____ Date_____

PLEASE SIGN AND RETURN DUPLICATE COPY


Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
Sheet 6
Sheet 7
INTERCEPTION BERM
INTERCEPTION BERM
DETENTION BASIN
DETENTION BASIN
DIVERSION
DETENTION BASIN
DESERT VIEW
DESERT VIEW
DESERT VIEW

5010.11

Kenney Aerial Mapping Inc.

West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT
Peter A. Dyroff, VICE-PRESIDENT

June 16, 1995

Mr. Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.
3950 Industrial Boulevard Suite 100C
West Sacramento, California 95691

Re: *UPPER LAS VEGAS WASH FEMA PROJECT*

Dear Ed,

This is to confirm our quotes for providing photogrammetric services for the above listed project.

SERVICES TO BE RENDERED:

It is understood that CRS CONSULTING ENGINEERS, INC. will establish the horizontal and vertical control necessary for us to perform photogrammetrics. In addition they will perform other services as specified below.

Existing ground control will be used for areas that fall within the City of North Las Vegas mapping project currently being completed by Kenny Aerial Mapping. The vertical datum for this control will be converted to NGVD 1929 from the current datum NAVD 1988.

TASK I - SET NEW HORIZONTAL AND VERTICAL CONTROL POINTS AND ERM'S

Target and control sixteen (16) panel points using a static positioning technique with GPS equipment conforming to First Order (Order C) specifications (1:100,000). The horizontal datum will be NAD 1983. The vertical datum will be NGVD 1929.

Locate and control fourteen (14) Elevation Reference Marks (ERM's) with GPS techniques to a third order accuracy on the Z coordinate.

Fee: **$ 10,350.00**

TASK II - CHECK PROFILES

Provide quality control check profiles (cross sections) at approximately eleven (11) stations at locations agreeable to all parties. Conventional surveying techniques using trigonometric leveling methods i.e. total station, will be used. Kenney Aerial Mapping, CRS Consulting and Northwest Hydraulic Consultants will determine the appropriate locations upon completion of the mapping.

Each cross section will include:

1. Both top banks, both toes and significant grade breaks in between,
2. Continue cross section 1000'+/- each direction at 100'+/- intervals,
3. All cross section points to third order accuracy.

Approximate Fee For Urban Cross Sections: **$ 425.00 Each**

Approximate Fee For Rural Cross Sections: **$ 345.00 Each**

Re: UPPER LAS VEGAS WASH FEMA PROJECT

DIGITAL PHOTOGRAMMETRY OPTIONS:

TASK III - DIGITAL PHOTOGRAMMETRY WITH TWO FOOT CONTOURS

Aerial photography in stereo with one set of LogEtronic contact prints. This includes existing photography and new photography to cover the complete area.

Analytical aerotriangulation
98% of analytic x, y (horizontal) control points will meet or exceed generally accepted standard mapping accuracies. 80% of analytic z (vertical) points are expected to be within .0001 of flight height. Analytic results are based on initial field control surveys.

Photogrammetric stereo compilation to develop DTMIF
(Digital Terrain Model Information Files)
Mass points will be digitized at
high, low and intermediate positions
in order to best depict the ground.
Supplemental mass points will be added in order
to densify the point network.
Additionally, 3-D breaklines will be used to supplement DTM.
2' contours based on .65' vertical accuracy will be computer generated and interpolated using Intergraph Site Works software, then run through our contour smoothing software as a final step.
Text scale will be 1"= 400'.
The above data will be provided in AutoCAD Release 12 drawing file on IBM 3-1/2" HD micro disk.
Mass points and breakline data will be on separate layers.

Provide 2X paper photo enlargements for your use in delineating HECII cross section locations. These are to be returned prior to the start of mapping to improve our efficiency.

Provide HECII cross sections on approximately 1000' stations and breaks (bridges, road crossings, etc.) across the channel or flood plain.

Final ink-jet drawings on stable base mylar
Map scale at 1"=400'
Sheet size 24"x36" -- Approximately 8 sheets

Photo transparencies semi-rectified to 1"=400'
to overlay each final drafted sheet

Fee: $36,477.00 _____
(Initial)

TASK III - DIGITAL PHOTOGRAMMETRY WITH FOUR FOOT CONTOURS

Aerial photography in stereo with one set of LogEtronic contact prints. This includes new photography to cover the complete area.

Analytical aerotriangulation
98% of analytic x, y (horizontal) control points will meet or exceed generally accepted standard mapping accuracies. 80% of analytic z (vertical) points are expected to be within .0001 of flight height. Analytic results are based on initial field control surveys.

Re: UPPER LAS VEGAS WASH FEMA PROJECT

Photogrammetric stereo compilation to develop DTMIF
(Digital Terrain Model Information Files)
Mass points will be digitized at
high, low and intermediate positions
in order to best depict the ground.
Supplemental mass points will be added in order
to densify the point network.
Additionally, 3-D breaklines will be used to supplement DTM.
4' contours will be computer generated and interpolated
using Intergraph Site Works software, then run through
our contour smoothing software as a final step.
Text scale will be 1"=400'.
The above data will be provided in AutoCAD Release 12 drawing file
on IBM 3-1/2" HD micro disk.
Mass points and breakline data will be on separate layers.

Provide 2X paper photo enlargements for your use in delineating HECII cross section locations. These are to be returned prior to the start of mapping to improve our efficiency.

Provide HECII cross sections on approximately 1000' stations and breaks (bridges, road crossings, etc.) across the channel or flood plain.

Final ink-jet drawings on stable base mylar
Map scale at 1"=400'
Sheet size 24"x36" -- Approximately 8 sheets

Photo transparencies semi-rectified to 1"=400'
to overlay each final drafted sheet

Fee: **$24,391.00** _____
(Initial)

NOTE:

It is our policy to map to the given control panel locations. If this does not meet your map limit requirements, please submit a drawing or diagram that shows exactly what area you want mapped. It is understood that mapping outside control boundaries may not meet standard mapping accuracies.

Areas that may be obscured due to dense trees, brush or dark shadows may not be identified (i.e. dashed contours or labeled) on DTM products. These areas may contain weak x,y,z data and require field survey check or verifications.

All products containing digitized information must be reviewed for correctness and completeness within 30 days of receipt and we need to be notified immediately if there are any discrepancies. This policy enables us to better satisfy our customers and eliminates possible costs to regenerate the data.

PAYMENT AGREEMENT:

As per this agreement, payment for the above services
will not exceed 10 days after you receive payment.

Project fees may need to be adjusted if this project is not initiated within 270 calendar days.

Re: UPPER LAS VEGAS WASH FEMA PROJECT

In the event our photogrammetric services are not paid within the agreed time frame as outlined in this letter, there will be a 1-1/2% per month late fee added to the unpaid balance.

JOB SCHEDULE:

We anticipate completion of this project to be
15 consecutive working days for Task I,
10 consecutive working days for Task II,
30 consecutive working days for Task III, and
40 consecutive working days for Task IV after we are in receipt of this signed contract.

It is important to both your firm and our company that work schedule estimates are on time. Our current number of working days to complete this project may need to be adjusted if:

A. This project is not initiated within 45 calendar days,
B. Weather causes photography delays.

Your assistance in helping us serve you is appreciated.

Please contact Ellis Hyde should you have any questions concerning this proposal, survey control requirements or to arrange a flight schedule.

Further communication on this project should be with our Production Manager, Gary Finnie who will supervise the project.

All services and finished materials will be prepared in strict accordance with generally accepted photogrammetric standards.

If this meets with your approval, please sign and return the enclosed copy.

Sincerely,

Ellis O. Hyde
KENNEY AERIAL MAPPING INC.

Accepted by

Edward Wallace
NORTHWEST HYDRAULIC CONSULTANTS INC.

EOH/ja

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: June 7, 1995 Job Number: 50010

From: Ed Wallace

To: Ellis Hyde
Kenny Aerial Surveys

Fax: 602/340-1877
Tel: 702/368-7574

Pages to Follow: 7 Original in Mail: no

Please call immediately if you do not receive all pages of this transmission.

Items to follow: Attachment B - Upper Las Vegas Wash

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: June 6, 1995 Job Number: 50010

From: Ed Wallace

To: Ellis Hyde
Kenny Aerial Surveys

Fax: 602/340-1877
Tel: 702/368-7574

Pages to Follow: 15 Original in Mail: no

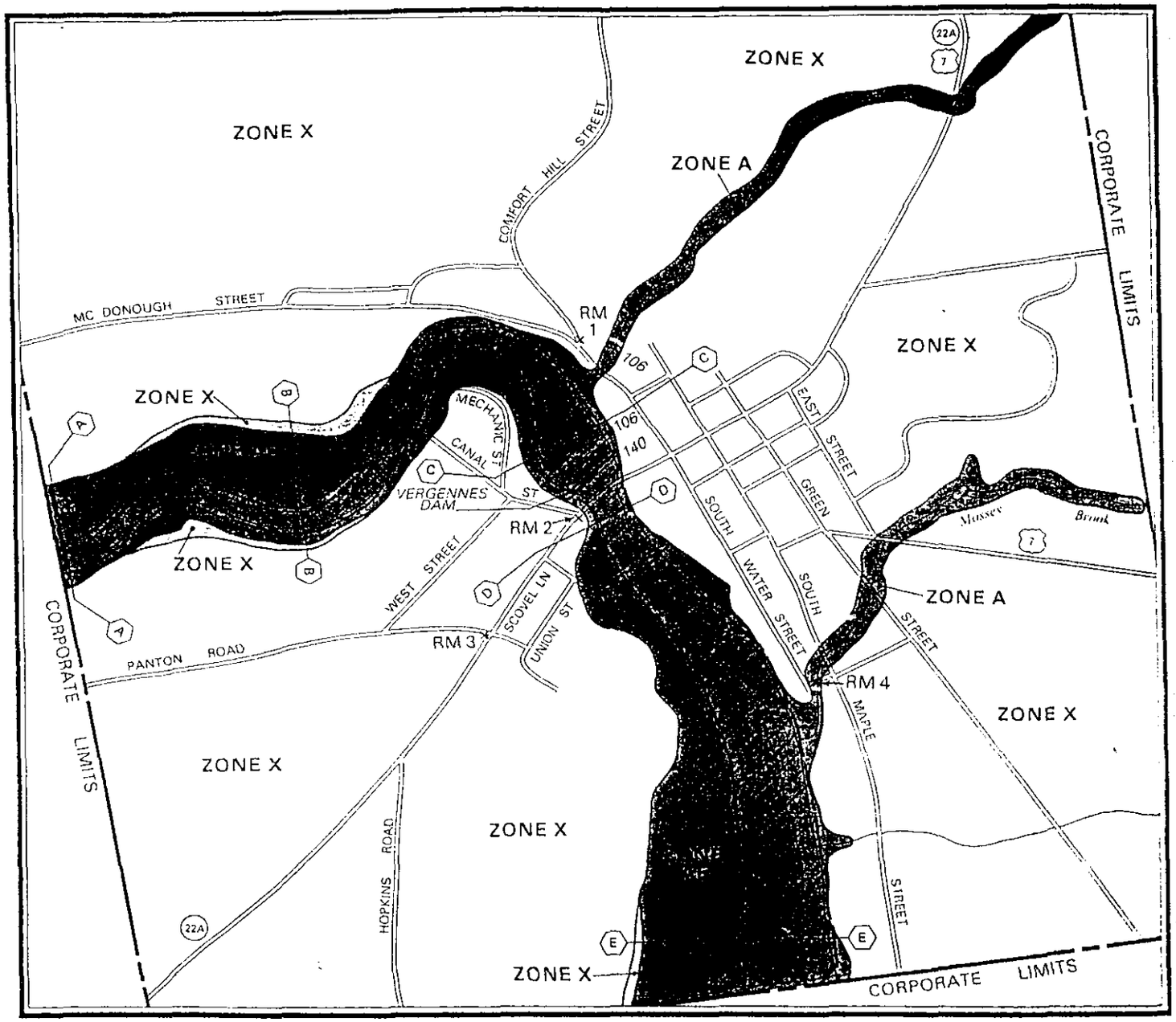
Please call immediately if you do not receive all pages of this transmission.

Items to follow: Surveys specifications for flood insurance study

FEMA 37

FLOOD INSURANCE STUDY

Guidelines and Specifications for Study Contractors



FEDERAL EMERGENCY MANAGEMENT AGENCY

Federal Insurance Administration

MARCH 1993

APPENDIX 4. AERIAL MAPPING AND SURVEYING SPECIFICATIONS

A4-1 INTRODUCTION

In general, photogrammetric methods should be selected for use when the 100-year floodplain cannot be delineated using the available map information to an accuracy equivalent to that ordinarily obtainable with a 5-foot contour interval topographic map, which meets national map accuracy standards.

Standard photogrammetric methods can provide the information needed to prepare an FIS, including cross-sectional data and topographic contours of the floodplain. Other secondary benefits of aerial survey techniques include the updating of base map features, estimation of Manning's roughness coefficients, identification of hydraulic control structures, and selection of cross-section locations.

Photogrammetry becomes more economical as the required number of cross sections increases. Its advantages are greatest where accurate topographic maps do not exist; where terrain is rough or swampy, making ground surveys difficult or impossible; or where clearing survey lines on private property is a problem.

Schedule requirements are an important consideration in the decision regarding the applicability of aerial photogrammetry. In many areas, good aerial photography can be obtained only during short periods of the year, when foliage does not obscure the landscape and the ground is free of snow. Poor weather and difficult terrain conditions can also delay required complimentary (and supplementary) ground surveys. However, these factors have no effect on the schedule for determination of cross sections and contours by photogrammetry once photography and ground control have been completed. The study schedule should reflect these considerations to avoid delays in completing the study.

The guidelines herein shall be followed in performing photogrammetry surveys. Should the Study Contractor also perform the photogrammetric work, then any reference herein to Photogrammetric Subcontractor shall be understood to mean Study Contractor.

A4-2 SCOPE

The Study Contractor is responsible for providing the specifications for the aerial photography as well as for the photogrammetric work required. The area to be flown and the approximate location and vertical ranges of the cross-sectional information needed to represent all reaches under study must be determined by the Study Contractor.

In planning for photogrammetry, the Study Contractor should make an approximate analysis to estimate the 100- and 500-year flood elevations for every reach for which detailed study is required in order to estimate the extent of horizontal aerial photo coverage required. Where available, FIA FIRMs, U.S. Geological Survey flood-prone area maps, or similar studies may be used for this purpose.

C. Photogrammetric Compilation

Photogrammetric compilation for an FIS normally includes determination of floodplain cross-section geometry; plotting of 4-foot contours in the floodplain; and preparation of a planimetric manuscript map. The compilation requires high-precision stereoplotting instruments and experienced stereoplotter personnel.

(1) Cross Sections. The Photogrammetric Subcontractor will provide the Study Contractor with: a photoindex of all photography on a sheet that is no larger than 24 inches x 36 inches; one set of black and white contact prints of photographs on resin coated, neutral toned, medium weight paper with matte surface; two sets of black and white prints of alternate photographs enlarged 2x on resin coated, neutral toned, medium weight paper with matte surface; and, one set of black and white prints of alternate photographs enlarged 2x and screened (120 lines on print) on frosted, 0.004-inch-thick mylar with emulsion on back. All must provide complete single coverage of the flight area. On the 2x photographs, the Study Contractor will designate the position, approximate termini, and minimum range in elevation for each cross section to be read, and the position of approximately two photo-identifiable ground points near each cross section. The range in elevation is the vertical distance from the water surface at the time of photography to the upper limit of the cross section. If the channel is dry, the lowest point in the streambed is used to define the range.

Each cross section shall cross the entire 500-year floodplain and should be carefully selected to be representative of reaches that are as long as possible, without permitting excessive conveyance change between sections.

One copy of each annotated 2x photograph shall be returned to the Photogrammetric Subcontractor.

(2) Plotting and Presentation of Elevation Points. The Photogrammetric Subcontractor, using a stereoplotter, will read an elevation for the top of each designated identifiable ground point designated by the Study Contractor and a profile for each designated cross section. The approximate terminus of each cross section will be extended by the Photogrammetric Subcontractor until the range in elevation of that cross section exceeds the minimum range marked on the annotated photograph print by no more than 10 percent. Elevations to read to the nearest 0.5 foot will be taken at the three most significant gradient breaks on each bank and at enough intermediate points to satisfy the following criteria: (1) no adjacent points separated vertically by more than 20 percent of range; (2) no adjacent points separated horizontally by more than 5 percent of the complete channel cross-section width; and (3) no adjacent points in the main channel separated by more than 10 percent of main channel width or 2 feet, whichever is greater. Specified spacing is illustrated on Figure A4-3 (Figures 1 and 2). Elevations and stations shall be read at each edge of water. Zero station (initial point) for each cross section will be the finally adopted terminus on the left bank (looking downstream). Station shall be the distance to the nearest foot measured along the straight, curved, or zig-zag alignment of the cross section. The Photogrammetric Subcontractor will furnish the information, in the format illustrated by Figure A4-4, where the stream is within the low water channel. Where the channel is dry, the "RIGHT BANK ETC." subtitle

Figure A4-1 provides an example of a Location Map showing the areas (generally a little greater than the estimated 500-year flood limits) to be covered by stereophotography. The aerial photogrammetric subcontract generally includes establishment of the following:

- Photogrammetrically obtained stream and valley cross sections (portions above water)
- Planimetric compilation manuscript map copy
- Contours (4-foot) of floodplains from the waterline to the nearest 4-foot contour above the 500-year flood elevation line
- Contiguous contours
- Contours of 100- and 500-year floodplain elevations (if profiles have been determined from previous studies)
- Tabulations of ERM and bench mark information

A4-3 SPECIFICATIONS

A. Aerial Photography

The floodplain area for which detailed study is required should be outlined by the Study Contractor. The Photogrammetric Subcontractor shall obtain, while the streams are within the main channels, stereoscopic photography of the entire area outlined on the location maps (Figure A4-1) adequate to determine ground point elevations, within limits of accuracy described in Section A4-3C(5)(d).

The Photogrammetric Subcontractor shall store the film negatives for 3 years after completion of the contract, and the film negatives will be available to FIA without cost during that period.

Normally, special photography must be flown for each community being studied. Stereophotographic coverage of the floodplains must be obtained during an optimum time of year, using a first-order 6-inch (153±3 mm) focal length certified aerial camera calibrated within the last 3 years. Any wide-angle aerial camera with a planigon, pleogon, or avigon lens (or their equal) having a radial distribution of less than 20 micrometers is acceptable. A data chamber, imaged at the edge of each photograph, will display flying height, time, date, and level data. If the chamber is either malfunctioning at the time of flight or not available, then a manual log of the information must be maintained. The photographic flight height for a 6-inch camera lens shall not exceed 7,200 feet, if optic train plotter equipment is to be used. The flight height shall not be over 6,000 feet for analglyphic projection type plotters with a white light source (with no filters), and not over 4,800 feet if a filtered light source is used. The photography must be flown while the sun angle is above 30 degrees and the watercourses are in the main channels, and it must be suitable for use in a stereoplotting instrument to determine spot elevations of ground points within the accuracy requirements described in Section A4-3C(5)(d). The Study Contractor should ascertain the ability of the equipment and personnel used for the project, and then decide on the necessary flight height that will achieve the required accuracies holding the above maximum. Aerial surveys shall be carried out under the direct supervision of a registered civil engineer, registered land surveyor, or certified photogrammetrist. It is recommended that the Study Contractor obtain a signed statement from the Photogrammetric Subcontractor indicating the

personnel and equipment that will be utilized for the project (see Figure A4-2).

B. Control

(1) Vertical Control. The Photogrammetric Subcontractor shall perform necessary field surveys to maintain vertical photogrammetric control, with all elevations referred to NGVD. These surveys shall use third-order leveling procedures and should normally be accomplished by trigonometric or differential leveling using transit-stadia or transit-electronic distance measurements. Vertical control points for stereo-models may be established by other than third-order procedures if elevations are accurate to within ±0.4 foot and are determined from bench marks of third-order or higher accuracy. Primary control will consist of a network of control levels (see Section A4-4, "Glossary"). Enough points shall be included in the primary network so that no stereo-model ground-surveyed control point (picture point) is farther than 1,000 feet from the nearest primary control point in that network. In addition, elevations should be determined at points that represent significant breaks in slope. Elevations of the independent stereo-model or analytical control points shall be determined by tide level logs, except for those points covered under the use of aerial analytical triangulation in the Study Contractor's proposal.

(2) Horizontal Control. Horizontal accuracy must be adequate to provide the vertical accuracy specified. Absolute horizontal position (latitude, longitude, or grid) is not essential. Existing government control may be used, where available, or landmarks on U.S. Geological Survey 7.5-minute series quadrangle sheets may be scaled at the risk of the Photogrammetric Subcontractor that the inherent errors will not affect the vertical accuracy. The horizontal control established by the Photogrammetric Subcontractor must be adequate to provide the specified vertical accuracy and to ensure true horizontal scale (not geographic position) within 100 feet per mile on the map manuscript furnished.

(3) Analytic Control. Aerial analytical triangulation may be used by the Photogrammetric Subcontractor for horizontal and vertical control. The maximum number of stereo-models acceptable in photogrammetric bridging is 4 for vertical control and 5 for horizontal control. Strip adjustment is acceptable for single flight lines, but simultaneous bundle adjustment shall be used on two or more parallel flight lines. The Root Mean Square Error for aerial analytical triangulation is 1:8,000 relative error as a fraction of flight height with horizontal and vertical points. The Study Contractor must recognize these conditions when preparing the proposal. Statements of Work involving aerial analytical triangulation that are submitted to the Regional PO must indicate what firm will do the photogrammetric work; describe the proposed procedures referencing these guidelines; list intended personnel and their credentials; and specify equipment to be used, with dates of last calibration tests. These are all subject to the approval of the Regional PO (see Figure A4-2).

(4) Bridges and Hydraulic Structures. Surveys of all bridges and hydraulic structures and underwater sections will be obtained by the Study Contractor from reliable available sources, or by field surveys where no information exists. Bridges and hydraulic structures may not be surveyed in part, or in total, by aerial photogrammetric methods.

the low water channel. Where the channel is dry, the "RIGHT BANK ETC." subtitle will be eliminated and the tabulation will be one continuous array of stations and elevations. Where the stream is in more than one channel, separate arrays of stations and elevations, headed by the subtitle "ISLAND" shall be inserted, one for each island, between the left and right bank arrays. The plotting and listing shall be done using a line printer, as illustrated by Figure A4-4, or a continuous automatic plotter if the plot is confined without breaks to the one sheet and the tabulation is contained on the same sheet, or by manual plotting and tabulation on an 8.5-inch x 11-inch sheet similar to Figure A4-4. By convention, the plot shall be viewed looking downstream. A computer card format that includes provision for card sequence and cross-section label and, for each ground point, the station and ground elevation compatible with the Photogrammetric Subcontractor's digitizer (described on Figure A4-2) may be determined by the Study Contractor. The Photogrammetric Subcontractor may use the format to furnish complete data for all cross sections. Elevations of designated identifiable ground points shall be written on the map manuscript sheet only.

(3) Planimetric Map Manuscript. The Photogrammetric Subcontractor shall compile a planimetric manuscript map in pencil on 4-millimeter, mylar-type material at a scale of 1 inch = 400 feet (1:4,800) or smaller. The PO shall approve the final map scale. The map will be used to control transfer of flood boundaries and to update base map information and shall include the areas within the compilation limits of the stereo-models required for cross-section measurement, but need not go beyond the flight area plotted on the location maps. The map will show the alignment of all cross sections read, with zero stations plotted and labeled; low water outlines of streams; all bridges, dams, dikes, and levees; all streets, highways, and railroads; locations and elevations of all ERMs or bench marks specified; and any contours that are specified.

The Photogrammetric Subcontractor will then plot contours of the areas shaded on the location map (see Figure A4-1). The contours will start at the next even foot elevation above the water surface and continue at 4-foot intervals until the shaded area edge is reached. The specified format is illustrated in Figure A4-5.

The compilation manuscript will include 4-foot contour lines on each bank of each stream for which cross sections were read. The contours will be used by the Study Contractor to delineate floodplain boundaries between cross sections after precise flood elevations are computed. In situations where the 100- and 500-year flood elevations are available, or can be closely approximated in advance of the photogrammetric compilation, the Study Contractor should consider the use of "bracketing contours" that cover only the ranges of elevations near those of the floods to be delineated on the work maps. Compilation costs can often be reduced in this manner by eliminating the plotting of contours above or below the expected range of these floods. The Study Contractor should bring the potential use of this approach to the attention of the Regional PO and obtain approval prior to its use.

The Photogrammetric Subcontractor shall prepare a final freehand inked tracing of only the material specified in the subcontract for the compilation manuscript and furnish two copies of the tracing. The copies should be prepared at a scale of 1:4,800 or smaller (as approved by the Regional PO), in a set of sheets each

no larger than 24 inches x 36 inches, screened at about 120 lines per inch, so that line work on the copies furnished is 30 percent black and 70 percent transparent, on 4-mil mylar with emulsion on back and matte finish. Each sheet shall contain a simple legend indicating community name, scale, and north arrow. A diagram indicating placement of each sheet within the set shall be included either on each sheet or on a separate index sheet. The specified format is illustrated in Figure A4-5.

(4) Bench Marks and ERMs. The Photogrammetric Subcontractor shall furnish a list of descriptions and elevations of enough points, bench marks, or ERMs, readily identifiable in the field at a future date, whose elevations are known or have been determined to third-order accuracy by the Photogrammetric Subcontractor. As a general rule, ERMs should be documented within or near the 100-year floodplain for areas studied in detail with an approximate density of two per mile of stream length or four per square mile of floodplain, as appropriate. The marks are required for future use by the public in determining first-floor elevations; therefore, a good engineering description of the mark location shall be furnished by the Photogrammetric Subcontractor. Only marks on such permanent structures as fireplugs, culvert walls, and bridge abutments are considered readily identifiable. If curbs or sidewalks are used, 0.5-inch diameter holes shall be drilled or an "X" that is at least 2 inches by 2 inches shall be chiseled in the concrete at least 0.25-inch deep. Any newly established ERMs must be done during the normal courses of obtaining cross sections or vertical control surveys.

(5) Accuracy Requirements.

(a) Contours. The contour interval shall be 4 feet. Ninety percent of the elevations determined from the solid-line contours of the planimetric maps shall have an accuracy with respect to true elevation of one-half the contour interval or better and the remaining 10 percent of such elevations shall not be in error by more than one contour interval.

(b) Coordinate Grid Lines (if used). The plotted positions of each plane coordinate grid line shall not vary by more than 0.01 inch from true grid on each map.

(c) Horizontal Control. Each horizontal control point shall be plotted on the map, within the coordinate grid in which it should lie, to an accuracy of 0.01 inch of its true position as expressed by the plane coordinates computed for the point. Should non-coordinate control procedures be utilized, the same accuracy shall pertain to the plotting of any type of control points.

(d) Spot Elevations. Ninety percent of all spot elevations placed on the maps shall have an accuracy of at least one-fourth the contour interval, and the remaining 10 percent shall not be in error by more than one-half the contour interval.

(e) Planimetric Features. Ninety percent of all planimetric features that are well defined on the photographs shall be plotted so that their position on the maps shall be accurate to within at least 0.025 inch of their true coordinate position. None of the features shall be misplaced on the maps by more than 0.05

inch from their true coordinate position. When map production is accomplished without the benefit of a grid coordinate system, then the accuracy shall be interpreted as the distance between any two well-defined points.

(6) Quality Control Survey

(a) Check Profiles. The map accuracies called for in the specifications are critical, thus, map accuracy checks, by ground survey profile procedure, shall be required. The Study Contractor is responsible for performing the accuracy check. A report of the findings of the quality control checks shall be submitted to the Regional PO upon request.

The minimum amount of ground-surveyed map check profiles shall be equal to one check profile for each three stereo-models whose flight path is basically parallel to the project corridor, or at intervals along the project corridor equal to this distance.

The position of the ground-surveyed map check profile shall be at a point where the contours are of average density of the three-model set being checked and where a minimum of three distinct planimetric features are on or adjacent to such a line.

The length of the ground-surveyed map check profile shall be a minimum of the average width of the corridor within the three-model set being tested or across a minimum of 10 contours, whichever is the lesser horizontal distance. If physical conditions prohibit a profile meeting the above minimum requirements, the requirements may be met by using profiles of lesser length as long as the sum of all profiles meet the minimum requirements, as described above, and at least one of the profiles is one-half of the average corridor width or crosses at least 5 contours.

Each end of a ground-surveyed map check profile must be tied to the plane coordinate grid and vertical control system, used as primary map control, by a horizontal and vertical traverse having a minimum accuracy closure of the third order. As an alternate procedure, the horizontal location of the line may be tied to the map by terminating each end of the ground-surveyed check profile line to a distinct planimetric map feature (road intersection, building corner, or the like) by direct tie or right-angle offset.

(b) Contours. The accuracy of the contours shall be checked by profile methods. The check profiles shall be measured by leveling along a staked traverse that has been surveyed between the above-described profile terminus points by transit traverse. Elevation measurements shall be made at points on the ground where major changes in ground slope exist along the traverse and where each contour elevation is intersected by the traverse. The horizontal distance between elevation measurements shall not exceed 100 feet. Profile elevations measured on the traverse shall be compared with elevations determined from the contours that cross the traverse where it is plotted by coordinates or horizontal position on the map.

(c) Planimetric Features. The accuracy of well-defined planimetric features shall be checked by comparing coordinates, determined for the features by ground

surveys, with the coordinates of the same features as measured from their map position or by their distance from the profile terminus points.

The ground-surveyed check profile information shall be delivered, upon request, to the Regional PO in the form of neatly prepared and maintained field books and a set of paper prints of the project maps on which the check profiles have been plotted from the field book information.

If a profile check line fails to prove the accuracy, then one additional check line parallel to and at least 1,000 feet from the failed line will be permitted. The same methods shall be used in checking the accuracy along this profile as along the first, and the average of the two shall be used in determining the accuracy of the map or maps being tested. If the accuracy meets specification requirements by this averaging process, the map or maps shall be accepted. If any map does not meet the accuracy requirements set forth in the specification, the Photogrammetric Subcontractor shall, at his own expense, make the appropriate corrections and recheck the maps within a period of time specified by the Study Contractor and the Regional PO.

A4-4 GLOSSARY

The following terms, as used in this Appendix, are defined as follows:

Bench Mark (BM) - A permanent monument established by any Federal, State, or local agency, whose elevation and description are well documented and referenced to NGVD.

Connecting Levels - A line of differential or trigonometric levels (stadia or electronic distance measurement) run to half-tenths of a foot between a control point and a cross section, with closure that, in the Study Contractor's judgment, will not cause errors to exceed specified tolerance, but in no case greater than 0.3 foot.

Control Levels - A line or network of BMs, ERMs, or elevation reference points run to hundredths of a foot by differential or trigonometric (electronic distance measurement) leveling methods to third-order accuracy limits (0.05 foot x square root of distance in miles) to serve as starting elevations for connecting levels to determine picture point control elevations.

Differential Levels - The determination of elevations by successive measurement of vertical distances between ground points and horizontal planes projected by an engineer's level.

ERM - A permanent monument not included in the National Geodetic Survey or U.S. Geological Survey network but whose elevation has been determined by levels from a BM with copy of field notes or documented summary of levels from BM or ERM furnished.

Elevation Reference Point (ERP) - A temporary mark whose elevation has been determined by levels from a BM or ERM with copy of field notes or documented summary of levels from BM or ERP furnished.

Flight Height - The height of the camera in feet above the mean elevation of the floodplain.

Floodplain - The portion of a river valley that is inundated only during floods.

Gradient Break - A point along the cross section where the slope of the ground changes suddenly, such as the edge of the floodplain or bottom of the main channel bank (the three most significant gradient breaks on each bank of a smooth cross section are usually the most important points to be surveyed.)

Left Bank - The stream bank on the left side when looking downstream.

Main Channel - That portion of a stream channel that conveys all flow when the stream is below bank-full stage, generally a narrow portion of the valley with steep banks.

Quality Control Surveys - The surveys made to verify accuracy of elevations, or cross-section locations, contours, planimetric features, or the distribution of ground points within the cross sections.

Range (In Elevation) - The vertical distance in feet from the water surface at time of photography to the upper limit of the cross section.

Terminus (Termini) - The end(s) of a cross-section axis.

Trigonometric Levels (Stadia) - The levels run with an electronic distance measuring device as an accessory to a theodolite or as an integrated unit.

Zero (0) Station - The left bank terminus from which stationing is measured.

FIGURE A4-1. SAMPLE LOCATION M[illegible]P

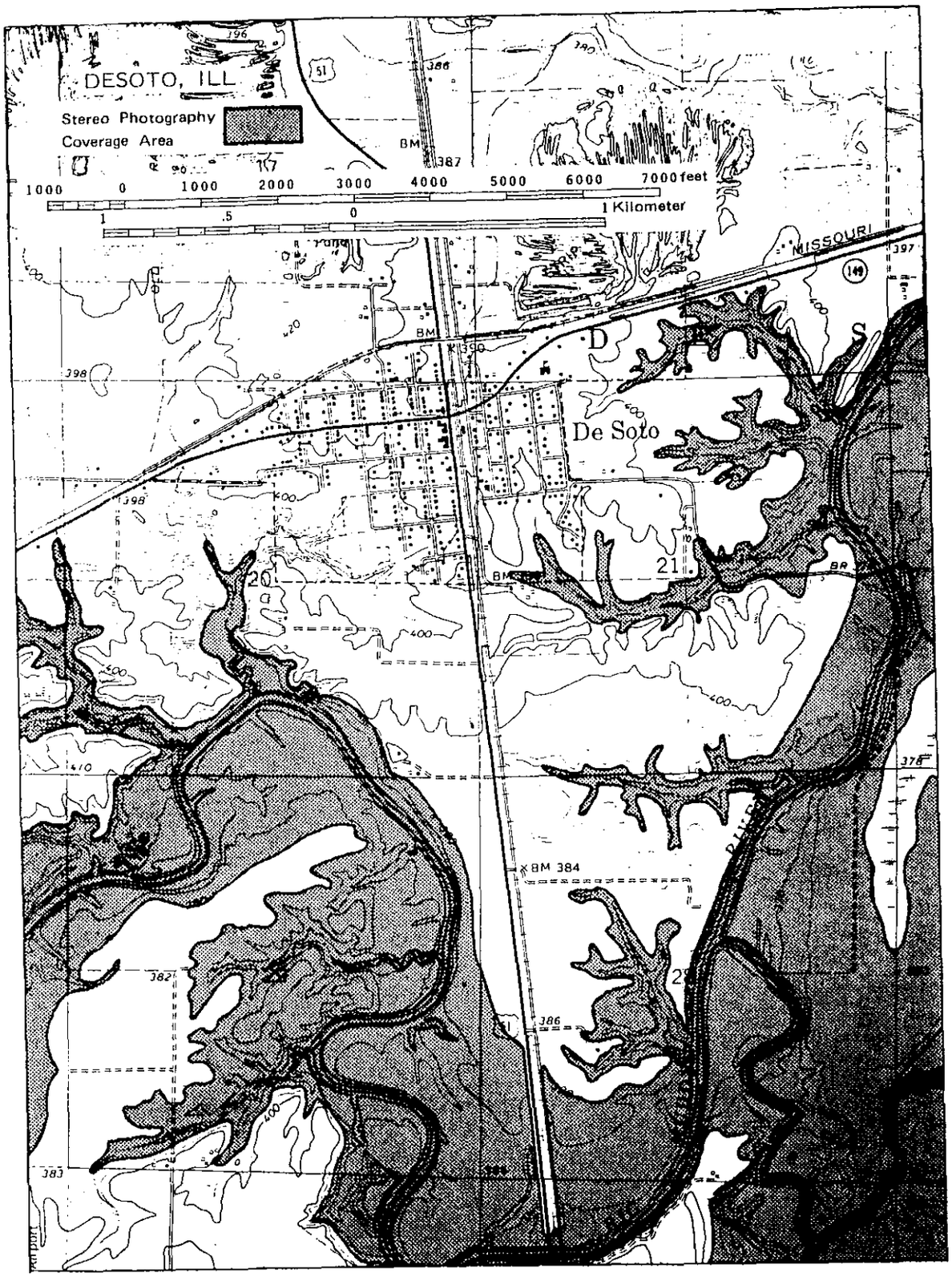


FIGURE A4-2. TABULATION OF PERSONNEL AND EQUIPMENT

List personnel and equipment proposed for use in this project. List only the one camera and the stereoplotter(s) proposed for cross section profiling. Auxiliary equipment for supplemental work such as bridging or mapping may be *described elsewhere in the proposal. If photography is to be furnished by the Geological Survey omit the information* for Pilot, Photographer, and Camera.

PERSONNEL

Position	★Employed	Name	Experience in This Position
Project Chief	_____	_____	_____Years
Compiler	_____	_____	_____Years
Compiler	_____	_____	_____Years
Compiler	_____	_____	_____Years
Pilot	_____	_____	_____Photo.F1.Hrs.
Photographer	_____	_____	_____Photo.F1.Hrs.
Field Party Chief	_____	_____	_____Years
Field Party Chief	_____	_____	_____Years

CAMERA

★Owned

Make, Model, Ser. No. _____

Certificate for lens, cone, and magazine as one unit

USGS Cert. dated _____ Mfg. Cert. dated _____

Flight Height _____ Distortion correction devices (if any) _____

STEREOPLOTTER(S)

Make	Model	Serial No.	Estimate of "C" Factor	★Owned
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

DIGITIZER

☐ None proposed, manual listing and plotting planned. ☐ Is part of plotter listed above.

Make, Model, Serial No. _____

Type ☐ XYZ (can read curved cross section). ☐ XZ (straight sections only).

Other (describe)

★1.--By proposing firm. ★2.--By Subcontractor. ★3.--Other (Explain)

Note. Qualifications, education, and experience of administrative personnel should be furnished on other than this form.

_____

Contractor or Authorized Agent

FIGURE A4-3.
EXAMPLES OF CROSS SECTION GROUND POINT SPACING

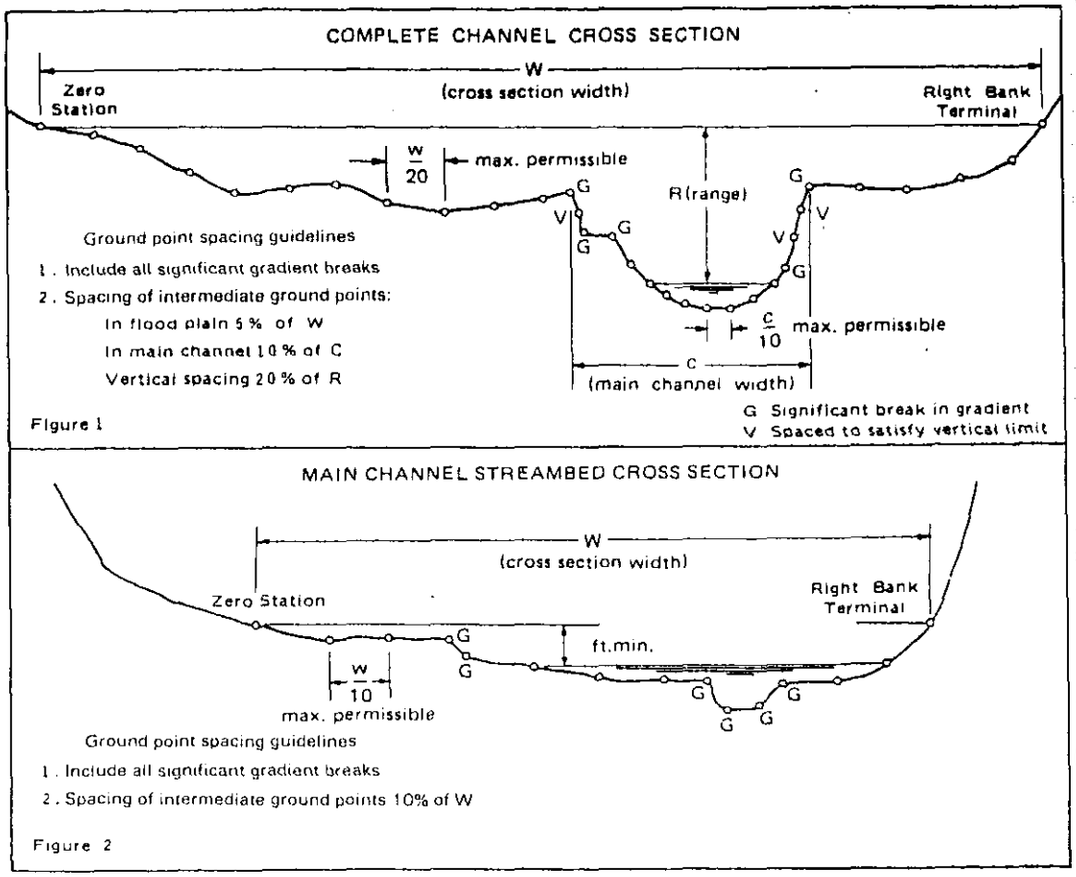


FIGURE A4-4.

EXAMPLE OF AN ACCEPTABLE METHOD OF PRESENTATION OF CROSS SECTION DATA LISTING AND CROSS SECTION PLOTS

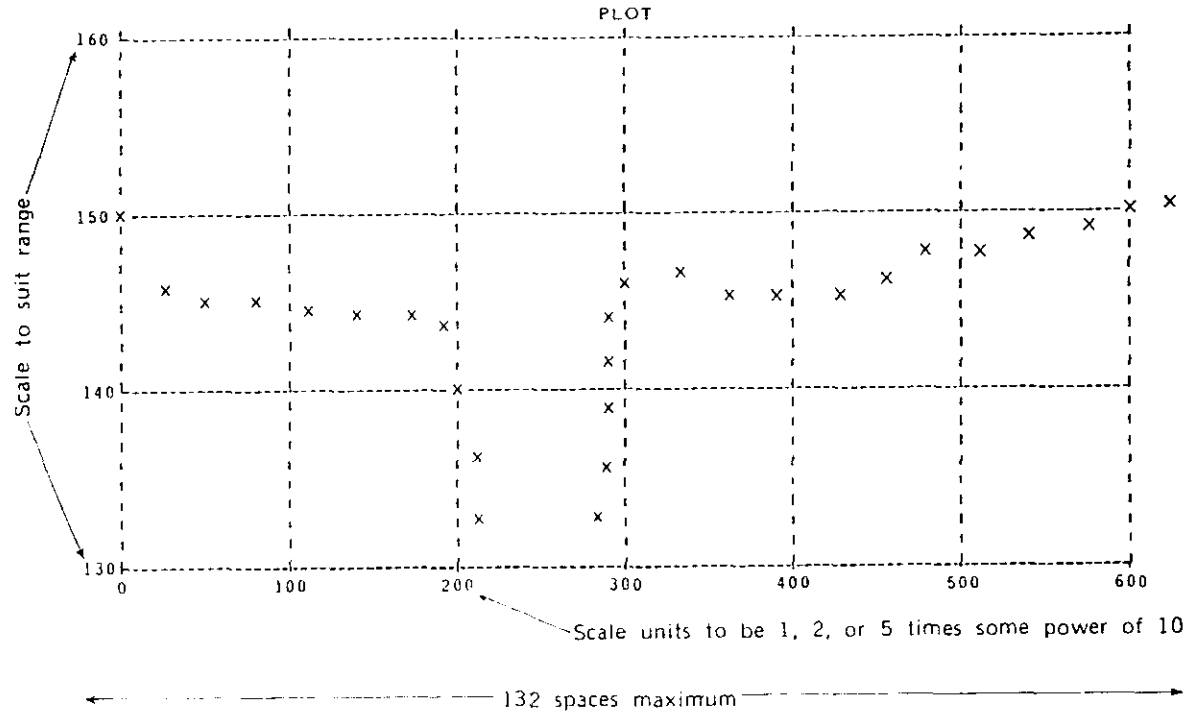
WEST KARNVILLE, WISC.
CROSS SECTION OF

LEFT BANK (STATION–GROUND ELEVATION)

0 150.4	29 146.5	51 145.5	80 145.0	110 144.8	140 144.5	170 144.3	179 143.8
189 142.0	200 140.3	208 137.0	210 133.6				

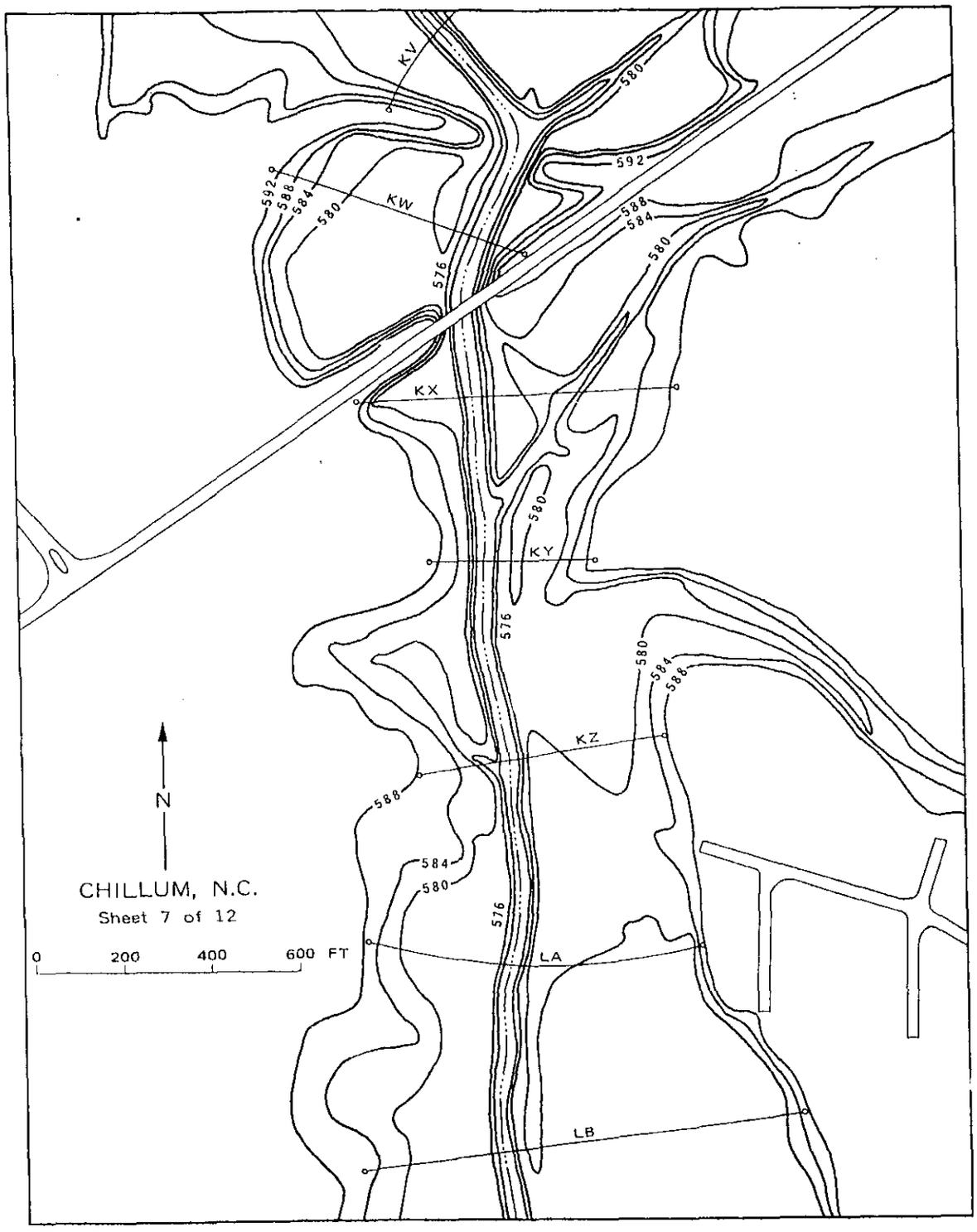
RIGHT BANK (STATION–GROUND ELEVATION)

284 133.6	287 136.4	290 139.4	291 141.8	292 144.0	300 147.1	330 147.5	360 146.5
390 146.0	420 146.5	450 147.0	480 147.5	510 148.0	540 148.6	570 149.2	600 150.0
620 150.5							



Note.--This format is for use where data were originally recorded on computer cards and can be programmed for line printer output. Hand lettered lists and manual plotting in similar format are also satisfactory.

FIGURE A4-5. FLOOD PLAIN CONTOURS



northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

FAX MESSAGE

Date: April 4, 1995 Job Number: 50010

From: Ed Wallace

To: Les Sakumoto
FEMA, Region IX
Presidio of San Francisco
Building 105
San Francisco, CA 94129

Fax: 415/923-7147

Pages to Follow: 0 Original in Mail: No

Please call immediately if you do not receive all pages of this transmission.

Les:

I spoke with the City of North Las Vegas and Kenny Aerial Surveys regarding the aerial mapping being done for the City's water system. This mapping covers a significant portion of our Upper Las Vegas Wash study area, and could potentially reduce our costs for mapping. If we could locate cross sections in time for them to be developed as part of the City's mapping work, we could realize additional savings. These cost reductions might allow available funds to be applied to other study areas. Please let me know if you would like us to pursue this opportunity by obtaining a cost estimate from Kenny Aerial Surveys and revising our cost proposal. A record of my telephone conversation with Kenny Aerial Surveys is attached.

Attachment

RECORD OF TELEPHONE CONVERSATION

DATE: 3-24 JOB: FEMA - Clark County

Individual	Organization	Telephone No.
FROM: Ed Wallace	NHC	
TO: Pete Dyroff Ellis Hyde	Kenny Aerial Surveys Phoenix	(702) 368-7574 (602) 253-6471

SUBJECT: Aerial Topo - Upper Las Vegas Wash

NOTES:

Kenny Aerial Surveys is producing aerial topo for City of North Las Vegas (2' contour) which covers a large part of our Upper LV Wash study area. Mapping coverage extends along ULV Wash to approximately Section 4/7, T19S R61E (approx. 65% of our study area). Control is being provided by the City of NLV (NAVD 88), and will be finished in about 3 weeks. If we can provide cross section locations to Kenny in the next 1±, they can digitize aerial cross sections which then will be topo. This would avoid resetting the models to digitize cross sections. Aerial coverage could easily be extended to the remainder of our study area by enlarging the control net to the west and flying the area. The portion of the work has less critical timing.

(continued on back)

ACTIONS REQUIRED:

Check with FEMA to see if cross section locations can be determined quickly enough to save resetting models. Obtain estimate from Kenny for topo mapping/cross sections.

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date 10/13/94 Job No. 50010

From Ed Wallace

To **Randy Tarr, P.E.**
Development and Flood Control Coordinator
Department of Public Works
2266 Civic Center Drive, Suite C
P.O. Box 554130
North Las Vegas, NV 89030

Regarding **Returning Materials**

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [X] for your use
[ ] for approval [ ] for review and comment

Remarks

We are returning the following materials to you:

Predesign Report for the Upper Las Vegas Wash Detention Basin
North Las Vegas Detention Basin Outlet Modification Report
Flood Control Facilities Plan for the Northern Las Vegas Wash

Thank you for loaning these reports to us,

Ed Wallace

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date 10/13/94 Job No. 50010

From Ed Wallace

To **Randy Fultz**
Project Manager
Flood Control
Department of Public Works
Engineering Planning Division
City Hall
400 East Stewart
Las Vegas, NV 89101

Regarding **Returning Materials**

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [X] for your use
[ ] for approval [ ] for review and comment

Remarks

We are returning the following materials to you:

Washington Avenue Conveyance System Improvements Predesign Report.

Thank you for loaning this report to us,

Ed Wallace

Transmittal Letter

northwest hydraulic consultants inc.

3950 Industrial Boulevard, Suite 100C
West Sacramento, California 95691
(916) 371-7400
fax: (916) 371-7475

Date 10/13/94 Job No. 50010

From Ed Wallace

To **Phu T. Simpson**
Civil Engineer
Public Services Building
401 S. Fourth St. 2nd Floor
P.O. Box 554130
Las Vegas, NV 88155-4130

Regarding **Returning Materials**

We Are Sending [X] attached [ ] separate by _____

This is [ ] as requested [X] for your use
[ ] for approval [ ] for review and comment

Remarks

We are returning the following materials to you:

Final Predesign Memorandum Sloan channel - Owens Avenue to the Las Vegas Wash. July, 1993.
Final Predesign Memorandum Appendix B
Drainage Study for Special Improvement District No. 94. March, 1994

Thank you for loaning these reports to us,

Ed Wallace

MICHAEL BAKER, JR., INC.

Baker

3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304
(703) 960-8800

Northwest Hydraulic Consultants, Inc.	**DATE:** October 11, 1994
3950 Industrial Boulevard	**REQUEST IDENTIFICATION NUMBER:** B9409142
Suite 100C	**RE:** Request for Flood Insurance Study (FIS) backup
West Sacramento, California 95691	data for the Cities of Las Vegas and North Las
Attention: Mr. Edward E. Wallace, P.E.	Vegas, and Clark and Washoe Counties, Nevada

THE INFORMATION DESCRIBED BELOW IS ENCLOSED AND IS BEING SENT TO YOU IN THE FOLLOWING MANNER:

☒ BY MAIL ☐ BY HAND ☐ BY MESSENGER ☐ BY FEDERAL EXPRESS

COPIES	NUMBER	DESCRIPTIONS
		please see attached

THE INFORMATION IS BEING TRANSMITTED FOR THE REASONS CHECKED BELOW:

☐ FOR APPROVAL

☐ FOR REVIEW

☒ FOR YOUR USE

☒ AS REQUESTED BY You

☒ AS APPROVED BY Mr. John F. Magnotti, FEMA HQ

☐ Please return to us after using

REMARKS: Due to the amount of data generated for the area of your request, additional packages will be transmitted as soon as copying is completed. Clark County is currently under review, and is utilizing data from the incorporated areas to generate a countywide study. If you have any technical or programmatic questions regarding the Clark County materials, please contact Ms. Patti E. Sexton of this office at the number listed above. If you have any general questions regarding this transmittal, or if we may be of further research assistance, please contact Ms. Diana H. Bradley of my staff at the number listed above.

IF THE ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE.

Signed Diana H. Bradley
for **Anthony P. Appleby**
Library Manager

cc: Mr. John F. Magnotti, FEMA HQ

Baker

Clark County, Nevada
B9409142
October 11, 1994

The following materials are being transmitted:

COPIES	NUMBER	DESCRIPTIONS
1	1	Best Available Data Letter and enclosures for the City of North Las Vegas
1	1	HEC-2 computer printouts denoting multiple profiles, summary printouts, revised floodway, and revised natural profile runs for Las Vegas
1	2	WSP-2 computer printouts for Las Vegas Wash
1	1	WSP-2 computer printouts for Las Vegas Creek
1	1	Computer Printouts for Las Vegas Wash Flood Hazard Analysis
1	2	HUD-15 computer printouts for Las Vegas Wash in the City of Las Vegas and Clark County
1	1	Computer printouts denoting cross-section locations and/or indices to computer printouts for Las Vegas Wash and Washington Avenue Channel
1	1	HEC-2 computer printouts for Washington Avenue Channel
1	27	Work maps, Overflow Analysis of the Las Vegas Wash and Tributaries
1	1	Clark County Resource Inventory and Geographic Information System, prepared by Environmental Systems Research Institute, March 1983
1	1	Technical Memorandum No. 2, prepared by WRC Engineering, Inc., December 1989
1	1	HEC-2 Computer printouts for the Las Vegas Wash Overflow Study, April 9, 1990
1	1	Engineering back-up data for Sloan Channel, prepared by James M. Montgomery Consulting Engineers, Inc., March 3, 1986
1	1	Las Vegas Valley Overflow Study, Hydraulics Branch Index Files, Wordperfect Datafiles, for Las Vegas Wash and Las Vegas Creek
1	1	TR-20 hydrology for Las Vegas Wash
1	1	Flood Plain Management Master Plan for the City of North Las Vegas, by Montgomery Engineers of Nevada, April 1983
1	1	Flood Flow Frequency Analysis, Supplement to Las Vegas Wash and Tributaries Flood Hazard Analysis, Clark County, Nevada, prepared by U.S. Department of Agriculture, Soil Conservation Service, July 1978

Baker

Clark County, Nevada
B9409142
October 11, 1994

The following materials are being transmitted:

COPIES	NUMBER	DESCRIPTIONS
1	1	Comprehensive Stormwater Management Plan - Phase II, Hydrologic Techniques and Findings, Interim Draft, October 1982
1	1	Best Available Data Letter and enclosures, for the City of North Las Vegas, January 30, 1989
1	1	WSP-2 computer printouts for the Las Vegas Flood Hazard Analysis, Extension of Profiles to Lone Mountain Road
1	1	HEC-2 computer printouts for Las Vegas Wash Overflow Study
1	1	Set of construction plans pertaining to Washington Avenue for the City of Las Vegas
1	1	Technical Documentation Report, by the U.S. Army Corps of Engineers, Los Angeles District, October 1991
1	1	Flood Plain Information Study, Lower Las Vegas Wash Report, by the U.S. Army Corps of Engineers, Los Angeles District, December 1967, plates 2 - 10
1	9	Sets of microfiche containing FIS back-up data for the Cities of Las Vegas and North Las Vegas, and Clark and Washoe Counties
1	10	Work maps denoting water-surface elevations, cross-section locations, flood boundaries, and topography for Las Vegas Wash
1	2	Letters of Correspondence dated June 15, 1988, and July 19, 1988
1	1	Hydrologic Documentation for Feasibility Study, Las Vegas Wash and Tributaries, April 1988

northwest hydraulic consultants inc.

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seattle

October 18, 1994

Ms. Carol Radman
Radman Aerial Surveys
6620 24th Street
Sacramento, CA 95822

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Ms. Radman:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

At this time, your estimate should be sufficiently detailed and accurate to assist us in establishing a budget for the work. However, we anticipate that the scope of services will likely be reduced by FEMA to match available funding. A detailed scope of work will be developed by December 1, and if selected to perform the work, your firm will have the opportunity to provide a specific cost proposal based on the more detailed scope of work.

Please call me with any questions regarding the preliminary scope of work and your estimate.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

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October 18, 1994

Mr. Don Johnson
Geonex Cartwright
5979 Freeport Boulevard
Sacramento, CA 95822

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Mr. Johnson:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

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Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

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west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

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Mr. Dennis Clift
Psomas & Associates
2485 Natomas Park Drive
Sacramento, CA 95833

October 18, 1994

Subject: *Surveying and Mapping for Flood Insurance Studies in* Clark and Washoe Counties, Nevada

Dear Mr. Clift:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

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Please call me with any questions regarding the preliminary scope of work and your estimate.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

northwest hydraulic consultants inc.

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west sacramento, california 95691-3430
(916) 371-7475 - fax
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October 18, 1994

Mr. Bow Bowman
Kercheval Engineers
333 N. Rancho Drive
Suite 660
Las Vegas, NV 89106

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Mr. Bowman:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

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Please call me with any questions regarding the preliminary scope of work and your estimate.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

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west sacramento, california 95691-3430
(916) 371-7475 - fax
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sacramento
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edmonton
seattle

October 18, 1994

Mr. Bob LaRiviere
Pyramid Engineers
330 Crampton Street
Reno, Nevada 89502

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Mr. LaRiviere:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

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Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

northwest hydraulic consultants inc.

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west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Mr. Harry Erickson
SEA, Inc.
950 Industrial Way
Sparks, NV 89431

October 18, 1994

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Mr. Erickson:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

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Please call me with any questions regarding the preliminary scope of work and your estimate.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

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(916) 371-7400

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vancouver
edmonton
seattle

Cooper Aerial
3750 S. Valley View
Suite 6
Las Vegas, NV 89103

October 18, 1994

Subject: Surveying and Mapping for Flood Insurance Studies in Clark and Washoe Counties, Nevada

Dear Sirs:

Northwest Hydraulic Consultants (NHC) has been selected by FEMA to perform flood insurance restudies for several areas in Clark and Washoe counties. As part of this work, aerial mapping and surveyed cross sections of streams are required for use in hydraulic modeling. NHC requests that your firm review the enclosed Preliminary Scope of Work for each county and provide an estimate for surveying and mapping services. Depending on your firm's geographic location and capabilities, you may wish to provide an estimate for only one county. NHC is preparing a preliminary estimate of cost for consideration by FEMA at the end of this month. Therefore, we will need an estimate from your firm by October 27.

At this time, your estimate should be sufficiently detailed and accurate to assist us in establishing a budget for the work. However, we anticipate that the scope of services will likely be reduced by FEMA to match available funding. A detailed scope of work will be developed by December 1, and if selected to perform the work, your firm will have the opportunity to provide a specific cost proposal based on the more detailed scope of work.

Please call me with any questions regarding the preliminary scope of work and your estimate.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.
Principal

Encl.

northwest hydraulic consultants, inc.

3950 industrial blvd. suite 100c
west sacramento, ca 95691
916-371-7400
916-371-7475 fax

FAX MESSAGE

Date: 9/22/94 Project number: _____

From: Ed Wallace

To: Tony Appleby Tel 703/~~535~~ 960-8800

Fax #: 703/329-3023

City: Alexandria, VA

Pages to follow: 3 Original in Mail: ✓

Please call immediately if you do not receive all pages of this transmission.

Remarks:

northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100C
west sacramento, ca 95691
(916) 371-7400
(916) 371-7475 fax

sacramento

seattle

Mr Tony Appleby
Michael Baker Jr. Inc.
FEMA Project Library, Suite 600
3601 Eisenhower Ave.
Alexandria, Virginia 22314

September 21, 1994

Subject: Archived materials for FEMA 1995 Restudies in Nevada

Dear Mr. Appleby:

Northwest Hydraulic Consultants (NHC) is in the process of developing a scope of work for Flood Insurance Restudies for FEMA Region IX in Clark and Washoe Counties. We request that all relevant archived materials in the areas of study be sent to us for review. The following are potential areas of study:

Clark County

1) Las Vegas Wash, I-15 to Upper Limit of Flood Control Facilities near Moccasin Road.
2) Washington Avenue Drainage System, Las Vegas Wash to I-15.
3) Las Vegas Wash, Pabco Road to Charleston Boulevard.

Washoe County

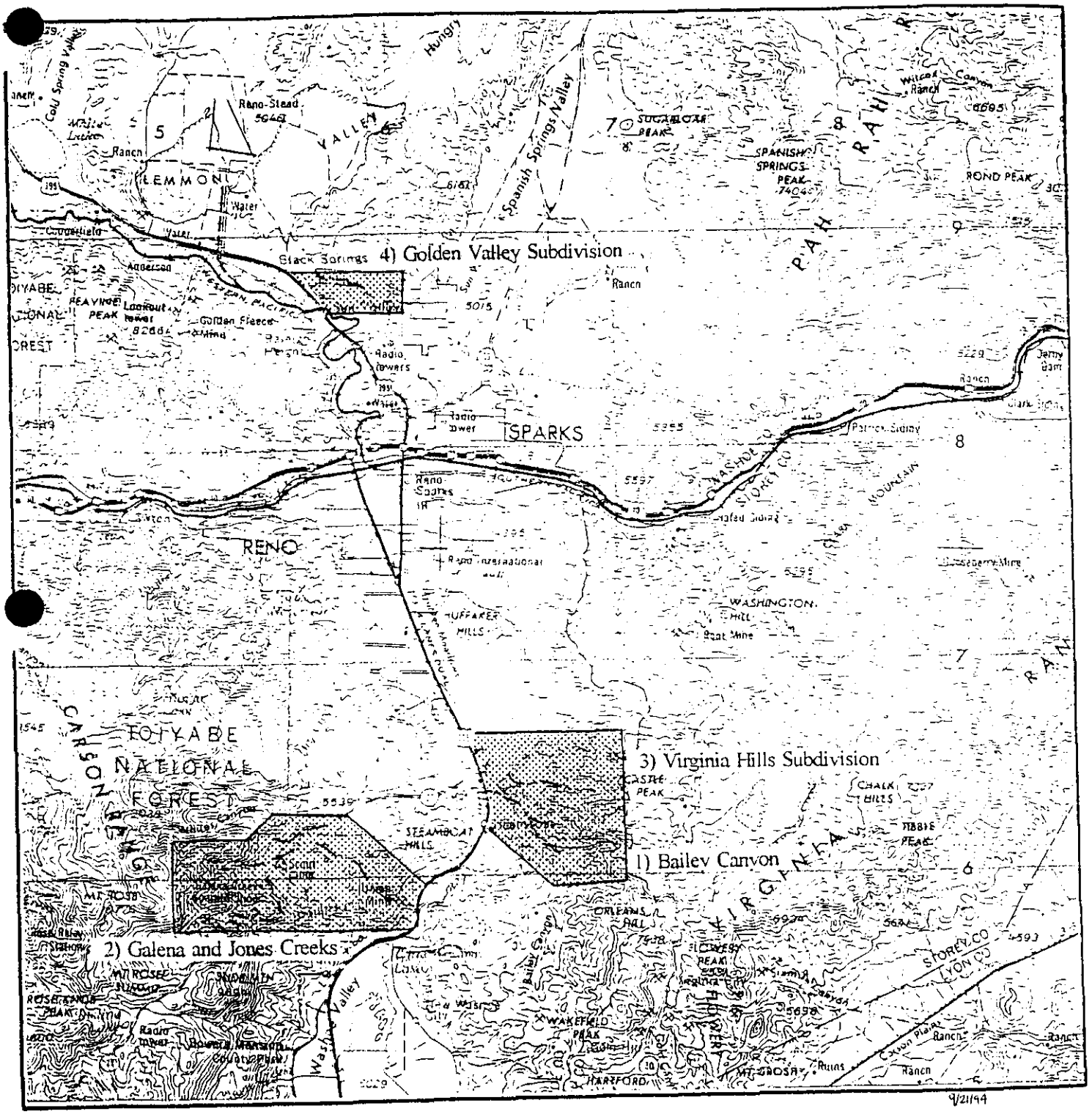
1) Bailey Canyon, from Steamboat Slough to Toll Road.
2) Galena Creek and Jones Creek, from US395 to Mt. Rose Highway.
3) Virginia Hills Subdivision, from easterly subdivision boundary to Miraloma Road.
4) Golden Valley Subdivision, from US395 to Golden Valley Road.

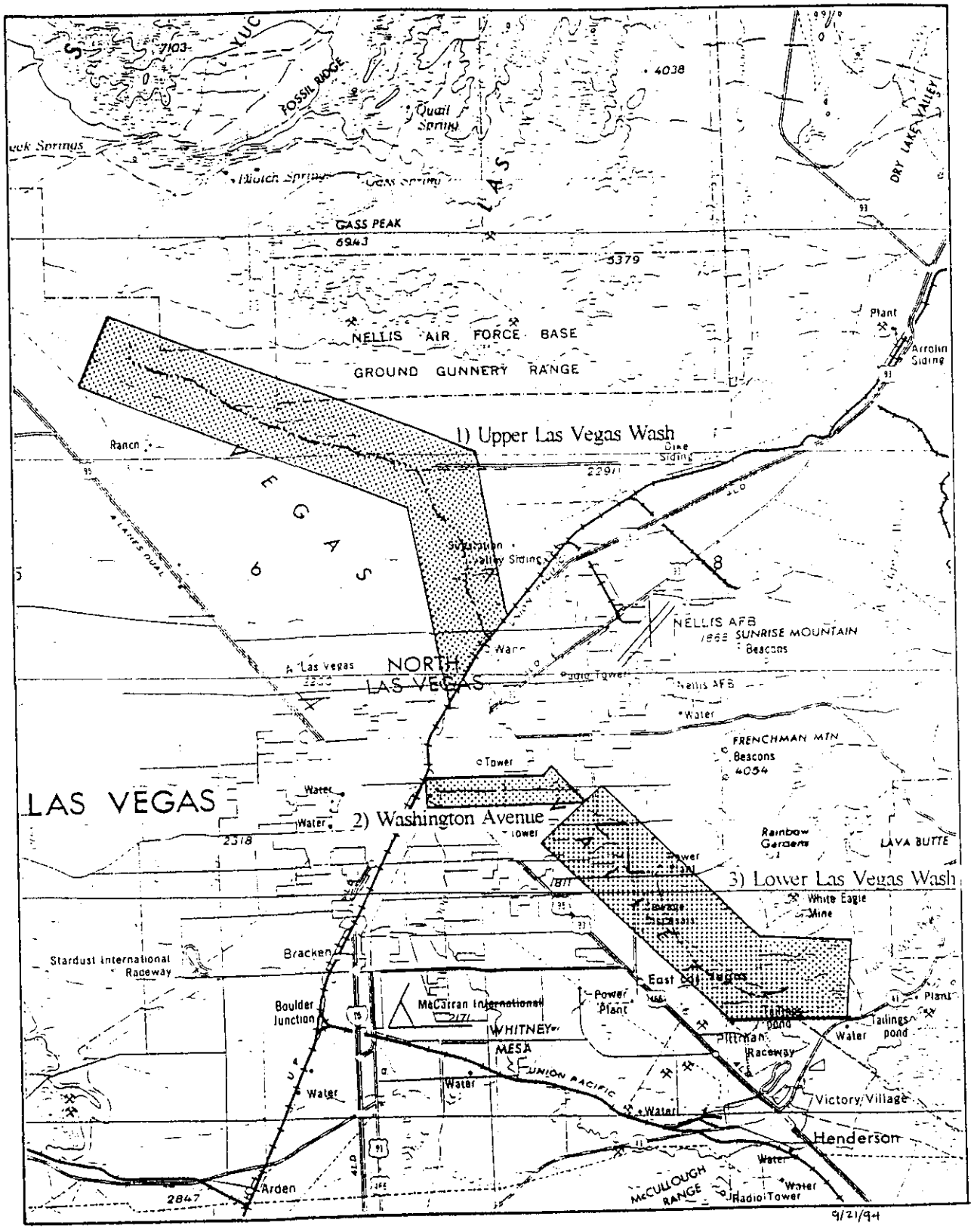
A map is enclosed for each of the counties indicating the general areas of study. We would like to obtain all of this information at your earliest convenience, but have a higher priority for the Clark County information. We need to have all the information no later than October 10 in order to formulate our scope of work. Thank you for your assistance in assembling this information. Please call me if you need additional information on our study areas.

Sincerely,
Northwest Hydraulic Consultants

Edward E. Wallace, P.E.

cc: Les Sakumoto, FEMA Region IX


4) Golden Valley Subdivision
3) Virginia Hills Subdivision
1) Bailey Canyon
2) Galena and Jones Creeks
RENO
SPARKS
TOIYABE NATIONAL FOREST
CARSON RANGE
VIRGINIA RANGE
PAH RAH RANGE
LEMMON VALLEY
Spanish Springs Valley
Golden Valley
Virginia Hills
Bailey Canyon
Galena Creek
Jones Creek
Washoe Valley
Steamboat Hills
Huffaker Hills
Washington Hill
Peavine Peak
Mt. Rose
Slide Mtn.
Rose Knob Peak
Sugarloaf Peak
Spanish Springs Peak
Bond Peak
Castle Peak
Chalk Hills
Wakefield Peak
Lower Peak
Mt. Grosh
Hartford Hill
Orleans Hill
Reno-Stead
Black Springs
Golden Fleece Mine
Radio Towers
Reno-Sparks IR
Reno International
Patrick Siding
Verdi
Hungry Valley
Cold Spring Valley
Truckee River
Steamboat Creek
Whites Creek
Hunter Creek
Bailey Canyon
Jones Creek
Galena Creek
Washoe Valley
Scott Mine
Boomerang Mountain
Clay Peak
Peavine Peak Lookout tower 8266
Sugarloaf Peak 7771
Spanish Springs Peak 7404
Bond Peak 8305
Castle Peak 7818
Wakefield Peak 5698
Mt. Grosh 5593
Mt. Rose 10,776
Slide Mtn. 9,698
Rose Knob Peak 9,440
Reno-Stead 5040
Black Springs 5015
Patrick Siding 5229
Verdi 5295
Washington Hill 5295
Huffaker Hills 5557
Hartford Hill 5029
Orleans Hill 7438
Lower Peak 5682
Mt. Grosh 5593
Steamboat Hills 5539
Scott Mine 5024
Boomerang Mountain 5029
Clay Peak 5545
Peavine Peak 8266
Sugarloaf Peak 7771
Spanish Springs Peak 7404
Bond Peak 8305
Castle Peak 7818
Chalk Hills 7681



Clark County
Study Areas

FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation Division - Risk Assessment Team
Presidio of San Francisco, Building 105
San Francisco, California 94129
Region IX

Date: August 30, 1994

To: ***Tony Appleby***
Baker Engineers

From: Les Sakumoto, P.E.
Civil Engineer, FEMA, Region IX

Re: Request for Archived Materials
1995 Restudies - Nevada & California
Northwest Hydraulics FIS 95-21
Borcalli Associates FIS 95-20

Tony:

Northwest Hydraulic Consultants and Borcalli & Associates have been selected as Study Contractors for the FY95 Restudies in Nevada and California. I would appreciate it if you would provide them with the archived materials and LOMA/LOMRs for the areas that they will be working in when the requests are made.

Thanks ..... Les

fax transmittal

File: fxnwh.003

5001 0

FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation Division - Risk Assessment Team
Presidio of San Francisco, Building 105
San Francisco, California 94129
Region IX

Date: August 30, 1994

To: ***Pat English, Contracting Officer***
Kim Kaiser, Contract Specialist

From: Les Sakumoto, P.E.
Civil Engineer, FEMA, Region IX

Re: 1995 Restudies - Nevada & California
Northwest Hydraulics FIS 95-21
Borcalli Associates FIS 95-20

Pat & Kim:

Because the last Time and Cost meetings for the FY95 Flood Insurance Restudies will be held during the week of September 19, 1994, I have asked the Study Contractors (Northwest Hydraulic Consultants and Borcalli & Associates) to have them delivered to Acquisition and the Project Officer no later than December 1, 1994. I have given them this extra time so that they will do a good job on the scope of the project and have the time to review the archived materials from the TEC. It usually takes the TEC about 30-45 days to forward the materials to the SC. I am also going to be on annual leave during the month of November and would therefore, serve no purpose in rushing them to complete the submittals in 30 days. After I get back in December, I should be able to deliver the PO's Technical Evaluation and Independent Government Estimate by January.

Thanks ..... Les

Kim: I have asked Northwest Hydraulics to give you a call on the matter of the criteria for evaluating a "Disadvantaged Business".

fax **t r a n s m i t t a l**

File: fxnwh.002

5001o

FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation Division - Risk Assessment Team
Presidio of San Francisco, Building 105
San Francisco, California 94129
Region IX

Date: August 30, 1994

To: ***Gerald Mutter/Ed Wallace/Bob MacArthur***
Northwest Hydraulics - 916-753-1904 Fax

From: Les Sakumoto, P.E.
Civil Engineer, FEMA, Region IX

Re: T&C Meeting for the 1995 Restudies - Nevada

Gerald / Ed / Bob:

The following are the locations of the T&C meetings for the Nevada 1995 Restudies:
Meet Kevin at 9:00 am.

Wednesday: September 7 @ 10am 8:30

Clark County Flood Control Dist.
301 East Clark Ave., Suite 301
Las Vegas, Nevada

Point of Contact: Kevin Eubanks
702-455-3139

Thursday: September 8 @ 1pm

Washoe County
1001 East 9th Street
Reno, Nevada

Point of Contact: Kimball Corbridge
702-328-2041

I spoke with Kim Kaiser, contract specialist, about the technical requirements for a "Disadvantaged Business" and she said that it is a function of the type of contract and suggested that you call her directly at 202-646-3741.

fax transmittal

File: fxnwh.001

CERTIFICATION

FEDERAL EMERGENCY MANAGEMENT AGENCY
FLOOD INSURANCE RESTUDY
CITY OF NORTH LAS VEGAS, CITY OF LAS VEGAS, AND CLARK COUNTY, CALIFORNIA
CONTRACT NO. EMW-95-C-4840

This is to certify that all work accomplished in the conduct of this FIS was done in accordance with the Statement of Work and General Provisions of Contract No. EMW-95-C-4840, and all amendments thereto, together with all such modifications, either written or oral, as the Regional PO and/or the Contracting Officer or their representatives have directed, as such modifications affect this contract, and that all such work has been accomplished in accordance with sound and accepted engineering practice within the contract provisions for respective phases of the work.

Edward E. Wallace

Edward E. Wallace

4.20.98

Date

UPPER LAS VEGAS Wash Volume II

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 2
Review of Flood Control Structures

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 2
Review of Flood Control Structures

A. Summary of Flood Control Structure Review

B. Evaluation of North Las Vegas Detention Basin Diversion Dike

C. Correspondence

D. Engineering Backup

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Summary of Flood Control Structure Review

This volume of the TSDN documents the review of existing flood control structures in the study area. The performance of the flood interception and detention facilities in the upper portion of the study area is critical to the development of realistic peak discharge estimates downstream in developed areas. The flood control structures of primary concern in this regard include the Upper Las Vegas Wash Interception Berm and Detention Basin, the Range Wash Diversion Dike, and the North Las Vegas Detention Basin and Diversion Dike. The structures in the upper portion of the study area are located on alluvial fans, and are thus subject to unpredictable flow paths and high sediment loads. The probable performance of these structures during a major flood event was reviewed based on available design information and field geomorphic reconnaissance. Other existing flood control structures in the lower portion of study area (King Charles Channel, N-Channel, etc.) were evaluated primarily through the use of hydraulic modeling. This modeling is described in Volumes 3 and 4 of the TSDN.

NHC prepared a memorandum in August 1996 describing the flood interception and detention structures in the upper portion of the study area and the available design information. This memorandum raised questions concerning the performance of these structures and their conformance with FEMA criteria.

In September 1996, the memorandum was discussed with FEMA and the Technical Evaluation Contractor (TEC) in a teleconference. It was agreed during this conversation that the Upper Las Vegas Interception Berm and Detention Basin had received adequate prior review by FEMA, and could be assumed to perform adequately during a major flood event. This assumption is conservative for the purpose of computing flows in the Upper Las Vegas Wash study area. No record of prior FEMA review of the North Las Vegas Detention Basin Diversion Dike was known at the time of the teleconference. It was agreed that the TEC would research the review history for this structure.

The performance of the West Range Wash Diversion Dike was considered uncertain given available information. A request was made by FEMA to Clark County Regional Flood Control District for additional data for the West Range Wash Diversion Dike in September 1996, and in November 1996 a letter from FEMA notified CCRFCD that work was stopped on the Upper Las Vegas Wash Flood Insurance Study until the questions regarding the West Range Wash were resolved. Additional technical information was submitted to FEMA, and in January 1997 a LOMR was issued for the West Range Wash based on the effects of the West Range Wash Diversion Dike.

In telephone conversations during March and April 1997, the TEC notified NHC that the North Las Vegas Detention Basin Diversion Dike had not been previously reviewed by FEMA. NHC prepared a letter to FEMA summarizing the updated hydrology and preliminary hydraulic analysis at the structure. Based on the the preliminary analysis , the dike did not meet FEMA freeboard requirements for levees, and did not appear to be designed to withstand sustained overflows. FEMA was advised in this letter that NHC was unable to conclude, based on available information and FEMA guidelines, that the dike would withstand the 100-year flood without failure. NHC recommended confirming the hydrology and preliminary hydraulic analysis with CCRFCD, and proceeding with flood plain mapping for scenarios with and without the dike in place.

FEMA wrote a letter to CCRFCD in May 1997 notifying the district of the unexpected development at the diversion dike, and requesting confirmation of the hydrology and the hydraulic analysis. The CCRFCD subsequently retained a consultant to prepare an analysis of the structure. This report (Montgomery Watson, 1998) concludes that the structure would perform adequately in the 100-year event. After reviewing the report, NHC prepared an April 8, 1998 letter that provides comments and suggestions that may be used by FEMA in reviewing the report and the structure. As directed by FEMA's project officer, the study was completed by NHC for two independent cases, with and without the North Las Vegas Detention Basin Diversion Dike in place. For this reason, the TSDN is organized to clearly separate the engineering analyses for these two cases. The appropriate condition may be applied by FEMA to complete flood hazard mapping for the area after technical review of the diversion dike.

This volume of the TSDN (Volume 2) includes documentation and correspondence concerning review of the flood control structures, including the evaluations of the North Las Vegas Detention Basin Diversion Dike by NHC and CCRFCD. Volume 3 contains the engineering analyses for the 'With North Las Vegas Detention Basin Diversion Dike' case, and Volume 4 contains the analyses for the 'Without North Las Vegas Detention Basin Diversion Dike' case.

northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 8, 1998

SUBJECT: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

Northwest Hydraulic Consultants' (NHC) analysis of the diversion dike at the North Las Vegas Detention Basin indicates that overflow of the diversion dike would occur during the base flood event. This overflow was computed to occur without considering effects such as sediment deposition, bar and bedform roughness, roll waves, and water surface fluctuations arising from flow transitions from critical and supercritical flow upstream of the diversion dike to subcritical flow at the diversion dike. In NHC's opinion, all of these effects may occur during a major flood event. The stability and resistance to failure of the diversion dike during sustained overtopping events is questionable as well. During the conduct of the flood insurance restudy for Upper Las Vegas Wash, NHC was unable to conclude that the structure met FEMA performance standards during the base flood event. These issues were raised in our letter to FEMA Region IX dated April 28, 1997.

In response to these concerns, a report was prepared by Montgomery Watson (MW) and Chen Engineering Technology (CET) to further evaluate the integrity of the dike during the base flood event. The report was provided to the City of North Las Vegas in February 1998. We have had the opportunity to review the information provided in this report, and still have the concerns expressed in our April 28, 1997 letter. We understand that FEMA and the TEC will review the MW and CET report, and may also review other backup information not presented in the report. NHC offers the following suggestions and special concerns for FEMA and the TEC for use in their review of the diversion dike.

1. If the diversion structure is to perform as a levee, then the structure should meet FEMA's minimum requirements for levee integrity. Central to certifying a levee for providing flood protection, FEMA's requirements state that the structure must have a minimum of 3 feet of freeboard over the computed base-flood water surface elevation. Both NHC's and MW's analysis of water surface elevations through the diversion

RIVER ENGINEERING / HYDRAULIC MODEL TESTING / HYDRAULIC ANALYSIS AND DESIGN / COASTAL ENGINEERING
HYDROLOGY / SEDIMENTATION ENGINEERING / NUMERICAL MODELING / APPLIED RESEARCH / FORENSIC ENGINEERING

structure reach indicate that the freeboard requirement is not met.

2. Alternatively, if the structure is to perform as a spillway, then the structure must be designed to maintain stability during overtopping. Toe scour protection, energy dissipation, and foundation support during overtopping events are critical for maintaining spillway structure stability. The cutoff wall must be sufficiently deep to protect the spillway from toe scour along the entire length of the spillway. The diversion dike record drawing included as an attachment to the MW report was used to develop the profile elevations of the diversion weir crest, ground elevation of the downstream spillway face, and the footing elevation supporting the spillway face. This information is provided on the attached Figure 1. The figure indicates that the existing channel invert elevation is below the footing elevation for the central portion of the spillway structure. A possible erosion scenario during an overtopping event includes rapid headcutting and lateral migration of existing channels downstream of the spillway face. Since the invert elevation of these channels is below the elevation of the footing in the central portion of the spillway, the lateral migration could undermine the footing in the central portion of the spillway and lead to failure of the structure.

3. Flow curvature and flow state transitions from supercritical or critical flow to subcritical flow through the diversion dike reach greatly complicates the hydraulic analysis and determination of water surface elevation and velocity distribution through the reach. Superelevation effects alone would increase water surface elevations on the order of 1 foot at the transition. Flow instabilities resulting from the transition from super- to subcritical flow and the curvature effects would lead to further water surface instabilities. These instabilities are not computed or accounted for in the 1-dimensional HEC-2 or HEC-RAS modeling procedures. The statement made in the cover letter of the MW report that

   "...the computed 100-year water surface elevation is approximately 2 inches below the top of the armored portion of the diversion structure. In other words, no overtopping occurs."

   should be tempered with an analysis of the uncertainties in computing water surface elevations under the complex conditions that exist at the diversion dike. Within the limits of accuracy of 1-dimensional hydraulic modeling, the MW report thus appears to confirm NHC's results that the structure does not meet FEMA freeboard requirements and that overtopping (given the uncertainties involved) is likely. The analysis presented still fails to account for the very real effects of flow curvature and flow state transition on water surface elevations.

4. In the cross-sections plotted for the HEC-6 and HEC-RAS models presented in the MW report, no discussion of effective conveyance width is presented. Several of the cross-sections are cut through both the main channel section and small tributary arroyo sections. The flow area in the tributary sections would be ineffective in providing conveyance to flow during floods arising from the Upper Las Vegas Wash.

5. The report does not provide adequate information to evaluate several sedimentation issues. HEC-6 is a 1-dimensional model, and must be carefully applied to situations such as this one with complicated hydraulic conditions. HEC-6 is a useful tool for evaluating sediment dynamics. The model can provide insight in identifying channel reaches subject to sediment deposition and erosion, and the feedback of bed profile changes on the flow hydraulics. However, direct application to situations such as this one, with little if any hydraulic and sediment transport calibration and verification data, should be used to address sedimentation and hydraulic response in a more qualitative rather than quantitative sense. HEC-6 is probably useful in this case in identifying uncertainties and testing computational sensitivities, but a single, explicit result from HEC-6 can not be realistically expected. Several specific comments on this application of HEC-6 follow:

   - All of the hydrodynamic issues discussed previously (superelevation, super- to subcritical flow transitions, flow curvature) are applicable to the analysis using HEC-6 for bed profile stability through the reach.

   - No discussion of the development of the inflowing bed and bank material sediment rating curve was provided. Sedimentation study results require an accurate assessment, through field measurement or sensitivity analysis, of the boundary conditions at the inflow to the study reach.

   - The results also indicate substantial deposition through the upper cross sections of the study reach. This may not be reasonable, as this portion of the study reach is flowing at critical or supercritical conditions. Substantial deposition would more likely be expected after the flow transitions to subcritical flow. The HEC-6 results indicate, however, that relatively little sediment deposition occurs through this reach.

   - The study results indicate incision through and downstream of the choke control section of the reach. This reach is lined with soil cement. Soil cement is not immune to erosion, however we question the applicability of the Tofalletti and Meyer-Peter Mueller sediment transport functions for computing scour in soil cement. The conclusions stated that the channel steepens due to sediment

deposition in a supercritical flow section and erosion through a section lined with soil cement should be reconsidered. In addition, if the results are implying that scour of the soil-cement channel is likely during the base flood event, then the stability and performance of the entire diversion channel during the base flood event are questionable.

NHC completed flood hazard mapping for the conditions of (1) the base flood routed through the North Las Vegas Detention Basin and (2) with the failure of the diversion dike during the base flood event. The appropriate condition may be applied after technical review of the performance of the diversion dike. We hope these comments are useful in FEMA's review of the structure.

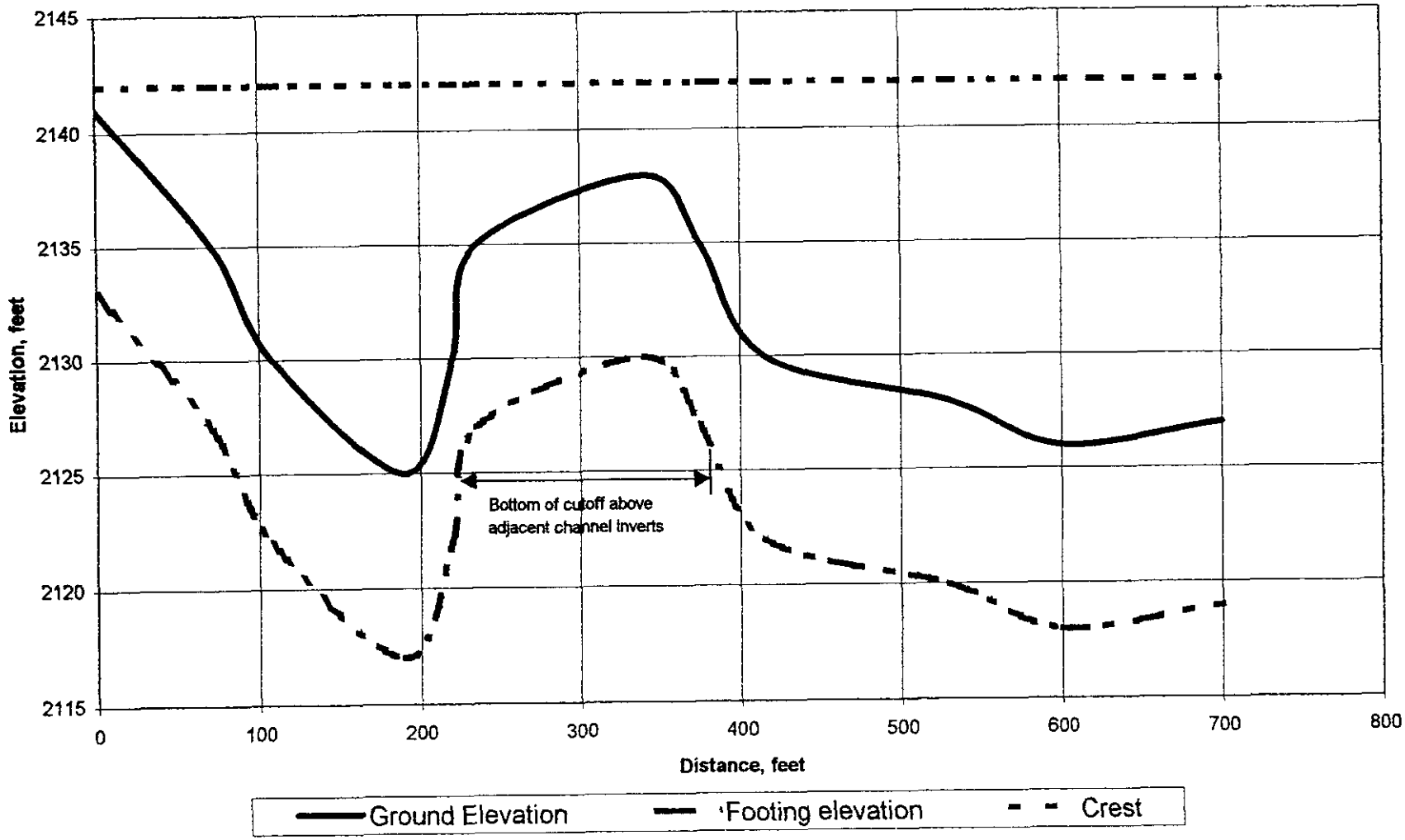
Sincerely,
Northwest Hydraulic Consultants, Inc.

Edward E. Wallace, P.E.
Principal

projects/50010/mwrev.wpd

North Las Vegas Diversion Dike

Figure 1. Profile Comparison of Weir Crest, Ground, and Footing Elevations



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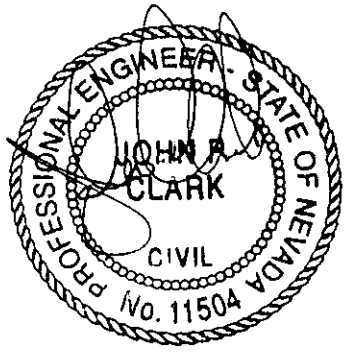
-CORRECTED- -

City of North Las Vegas

Report for

North Las Vegas Detention Basin Diversion Structure Evaluation

February 1998



2/25/98

MONTGOMERY WATSON

February 25, 1998

Mr. James A. Bell, P.E.
City of North Las Vegas
2266 Civic Center Drive
North Las Vegas, Nevada 89030-6316

Subject: North Las Vegas Detention Basin Diversion Structure Evaluation

Dear Mr. Bell:

At the request of the City of North Las Vegas (CNLV), Montgomery Watson has evaluated the effectiveness of the North Las Vegas Detention Basin diversion weir. This analysis was conducted in response to a letter from the Federal Emergency Management Agency (FEMA) to the Clark County Regional Flood Control District (CCRFCD) dated May 5, 1997. Along with their letter, FEMA transmitted a correspondence from Northwest Hydraulic Consultants, Inc. (NHC) questioning whether the subject facility meets FEMA levee criteria and recommending that FEMA not credit this regional flood control facility. A copy of the May 1997 FEMA letter is attached as Appendix A.

On September 29, 1997, Montgomery Watson received the notice-to-proceed on a project to analyze the effectiveness of the North Las Vegas Detention Basin diversion weir and its compliance with regulations of the Federal Emergency Management Agency (FEMA). This report summarizes the findings of the analysis and is divided into four sections. These sections include descriptions of the hydrologic analysis, the channel hydraulic analysis, the sediment transport analysis, and a summary of the findings.

The North Las Vegas Detention Basin is an off-channel, regional facility (LVUP0405 in the 1996 Clark County Regional Flood Control District Las Vegas Valley Master Plan Update). The diversion structure in question was designed to divert flows up to the 100-year event from Las Vegas Wash into the basin. Flows of a higher magnitude overtop the 115-foot long concrete-lined control structure portion of the diversion berm and continue downstream in Las Vegas Wash. The detention basin has a storage volume of approximately 1,650 acre-feet. This design minimizes the cost of the PMF spillway protecting the detention basin embankment by limiting the PMF inflow while ensuring proper function during the design event (100-year).

Hydrologic Analysis

On November 5, 1997, HEC-1 hydrologic models in support of NHC's analysis were supplied to the project team through Kevin Eubanks at CCRFCD. A review of the

3014 West Charleston Blvd.
Las Vegas, Nevada
89102-1944

Tel: 702 878 8010
Fax: 702 878 7833

modeling did not result in any differences in modeling approach. Components of the NHC HEC-1 model which were reviewed include:

- storm distribution (SDN5) for a watershed greater than 10 square miles in area
- storm centering (hydrologic subareas receiving precipitation from the Interbasin Storm)
- routing and combining of hydrographs in the schematic diagram
- adjusted precipitation depths for 100-year, 6-hour design storm (with the 1.43 NOAA correction factor)
- depth-area reduction factor (0.66) for the 54 square mile watershed area
- curve numbers
- lag times

The NHC HEC-1 model for the Interbasin Storm yields a 100-year, 6-hour peak discharge of 8,540 cfs at the diversion dike. Of this inflow, their model shows that approximately 190 cfs overtops the diversion dike and continues downstream in Las Vegas Wash while the remaining 8,340 cfs enters the detention basin. Several storm centerings have been investigated in past efforts (Black & Veatch, 1990; CCRFCD, 1986, 1991, and 1996). NHC used the 54 square mile Interbasin Storm centered over the watershed between the Upper Las Vegas Wash Detention Basin and the North Las Vegas Wash Detention Basin. This storm is considered critical for this analysis, as it yields the highest peak discharge to the diversion structure.

A copy of the NHC HEC-1 output is included in Appendix B.

Channel Hydraulic Analysis

To evaluate the performance of the diversion dike in conveying the design discharge to the North Las Vegas Detention Basin, Montgomery Watson assembled a HEC-RAS model of the diversion structure using cross sectional data extracted from topographic mapping flown in 1996 and supplied to Montgomery Watson by CNLV. This mapping is referenced to the NAVD 1988 datum. Conservatively, the full design discharge of 8,540 cfs was used in this analysis (see previous section). A roughness coefficient of 0.025 was used to simulate the concrete and soil cement lined structure. Where cross sections extend beyond the concrete lining to undisturbed desert areas, a roughness coefficient of 0.040 was used. The starting condition for the model was assumed to be critical depth which is appropriate for the constricted portion of the channel immediately downstream of the control (overflow) section. The results of the HEC-RAS model indicate that the 100-year computed water surface elevation is approximately 2 inches below the top of the armored portion of the diversion structure. In other words, no overtopping occurs.

This is in contrast to the NHC analysis which indicated 200 cfs would overtop using the typical section from the 1983 construction drawings to develop cross sectional data. The sheet of the as-built plans used by NHC did not have contours on it. The NHC cross sections did not model the actual constructed diversion structure as accurately as the ones taken directly from the 1996 aerial topography. According to the NHC HEC-2 analysis, their cross sections are all parallel to one another, where Montgomery Watson's cross sections follow the actual channel alignment. Figure 1 presents Montgomery Watson's HEC-RAS cross sections on the 1996 topographic basemap. It is noted that the topography on the 1983 drawings is referenced to the NGVD29 datum whereas the 1996 mapping is referenced to the NAVD88 datum.

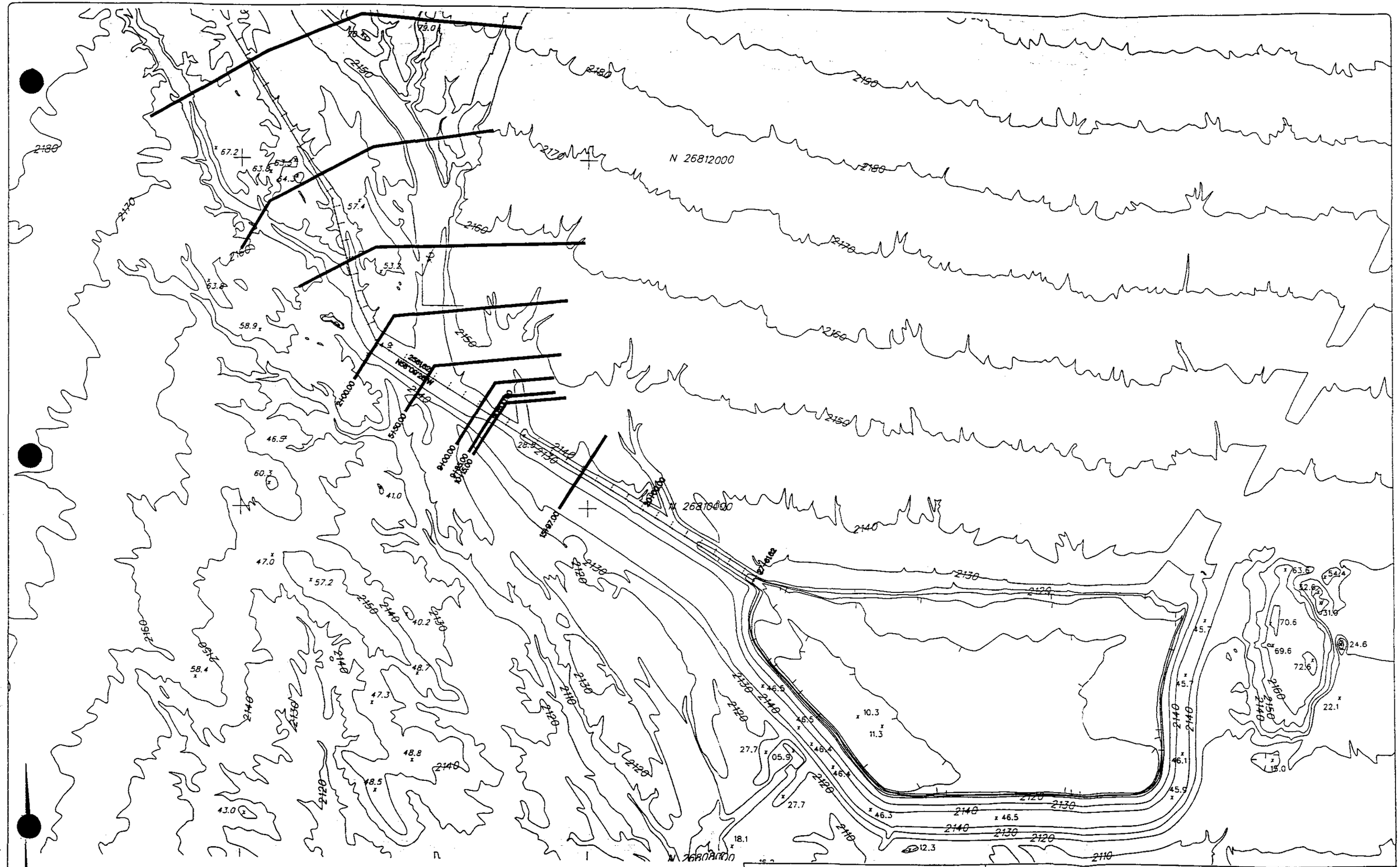
According to the NHC HEC-2 model, a very small amount of overtopping of the diversion structure is anticipated during the 100-year design event (200 cfs), Montgomery Watson reviewed the design integrity of the structure in the event that a higher discharge were to occur. The diversion structure is armored on both sides and along the top with 6-inch thick concrete slope protection with #4 bars at 18-inch C.C. E.W. This armoring continues across the bottom of the 75-foot wide diversion channel. To further ensure the structural integrity of the structure, there is a 5-foot deep, 8-inch thick concrete cutoff wall with #4 bars at 12-inch E.W. and a 2-foot wide concrete footing at the upstream side of the channel lining. Similarly, there is an 8-foot deep, 8-inch thick concrete cutoff wall with #4 bars at 12-inch E.W. and a 2-foot wide concrete footing at the toe of the diversion structure's downstream slope where flows in excess of the diversion structure capacity would be discharged back to Las Vegas Wash.

A copy of the NHC HEC-2 output and the Montgomery Watson HEC-RAS output, along with cross section plots are included in Appendix C. A copy of the selected sheets of the 1983 as-built plans are included in the back pocket of this report (including sheets with and without contour information).

Sediment Transport Analysis

A sediment transport analysis was performed for the North Las Vegas Detention Basin site by Chen Engineering Technology (CET). CET's evaluation consisted of an estimation of sediment inflow from the watersheds tributary to the North Las Vegas Detention Basin diversion structure site based on the Interbasin Storm centering, an analysis of the effects of erosion and sedimentation on flood conditions, a determination of the need for sediment traps to control sedimentation at the detention basin, and a determination of whether sediment deposition causes a larger amount of flow over the diversion berm.

The total sediment inflow to the basin was computed using a combination of two analyses -- the Modified Universal Soil Loss Equation (MUSLE) for sediment supplied from upland areas and the U.S. Army Corps of Engineers' HEC-6 (Scour and Deposition in Rivers and Reservoirs) for stream bank and bed erosion for watershed basins with defined channels.



MONTGOMERY WATSON

HEC-RAS CROSS-SECTIONS

FIGURE 1

For the 100-year flood event (using the full 8,540 cfs), upland and stream sediment yields were estimated to be 48,040 tons and 9,030 tons, respectively, for a total of 57,070 tons.

CET's analysis of the effects of sedimentation during various flood events concluded that, during the 100-year event, up to 1.4 ft of sediment would deposit near the side spillway section, where channel slopes become milder compared to upstream slopes. Further downstream, the sediment hungry flow would erode the diversion channel bed in the lower reach approaching the detention basin itself.

HEC-6 was also used to assess the effect of erosion and sediment deposition on flood conditions in the channel. Both fixed- and movable-bed conditions were considered. A comparison of the results of these models indicates that the flood stage in the channel reach at the side spillway would be decreased from that indicated by the HEC-RAS model even though there was sediment deposited in this reach. This decrease in water-surface elevation is due to an increase in channel slope caused by the deposition of sediment at the side spillway and the erosion of the channel downstream of it. Therefore, no overtopping is expected to occur during the base flood when considering the effects of sediment on the diversion.

Since the channel reach near the side spillway serves as a natural trap for coarser sediments, sediment deposition in the detention basin resulting from the 100-year flood event is expected to be insignificant (less than 1.0 ft). No additional sedimentation traps are required in the tributary watershed. Sediment deposited in the channel and detention basin should be removed, particularly after flood events, to maintain the effectiveness of the system.

A copy of the CET report on sediment transport is included in Appendix D.

Summary and Conclusions

Montgomery Watson has reviewed the NHC hydrologic and hydraulic analyses and has performed separate hydraulic analyses of the diversion structure. Based on this review and analyses, we feel confident that the diversion berm and control structure will operate as designed during the 100-year design event. The NHC hydrologic analysis appears appropriate and we concur with the revised 100-year, 6-hour peak discharge of 8,540 cfs at the diversion structure. However, we feel that using the 1996 topographic mapping to develop cross sectional data for the channel hydraulic model is more appropriate than using the typical section from the 1983 plans without contours.

The HEC-RAS hydraulic analysis performed for this review indicates that virtually all of the 100-year design discharge is intercepted by the diversion structure and conveyed into the North Las Vegas Detention Basin. With the full 8,540 cfs design discharge, the computed water surface elevation is within inches of the crest of the concrete-armored control structure portion of the diversion structure. By design, this control structure portion of the

diversion structure cannot be allowed to divert additional flows during events in excess of the design storm and, therefore, cannot have freeboard, or too much runoff could be diverted into the basin during these events. Such excess diversion would change the design parameters for the detention basin PMF spillway.

The results of the sedimentation analysis do not indicate that the clear-water design flow requires bulking, as the undetained portion of the watershed tributary to the North Las Vegas Detention basin will not generate a significant amount of sediment load. No overtopping of the diversion structure is expected, even with sediment loading. However, periodic maintenance to remove accumulated sediment (particularly after flood events) should be performed to ensure the proper operation of the channel and detention basin.

References used in performing this analysis are listed in Appendix E. We are available to discuss the results of this analysis with you at your convenience. Following your review of this report, we should discuss how you want to proceed in submitting the results to FEMA Region IX.

Sincerely,

John P. Clark, P.E.
Project Manager

File: 1327080.010101

cc: Lenny Badger, CNLV
Kevin Eubanks, CCRFCD
Chip Paulson, Montgomery Watson
Steve Mano, Montgomery Watson
Yung Hai Chen, CET

DRAFT
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MEMORANDUM

TO: Les Sakumoto, FEMA Region IX

FROM: Ed Wallace, NHC

DATE: August 29, 1996

SUBJECT: Review of flood control diversion structures, Las Vegas Wash Study Area

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The attached notes summarize our preliminary review of three diversion structures in the Upper Las Vegas Wash study area. The notes are based on site reconnaissance and review of design information provided by the local agencies, the Technical Evaluation Contractor (TEC) and other sources. This information is provided for the purpose of facilitating discussion of anticipated performance of the structures between you, appropriate TEC staff, and NHC. We strongly recommend that its distribution be limited to these individuals.

Please note that the attached notes are not intended to be a complete design review or performance evaluation. Rather, they summarize our thought regarding the performance of the structures based on the information we have reviewed. Although we believe that we have conducted a through information search, additional relevant information could be available. We have not, for example, directly contacted design engineers to request design information.

The field reconnaissance, information search, and review of available information have been accomplished according to the budget allocated to these tasks in our scope of work. After completion of our review, we are unable to conclude with certainty that the structures will preform adequately during major flood events. Failure of two of these structures would not affect peak discharges downstream in our study area. However, we recommend that uncertainties in the performance of all three structures, and their effects on regional flood hazards, be discussed with the TEC.

We are available for a telephone conference to discuss these topics on September 12, as you suggested in our August 13 meeting. If necessary for effieicent review of plans and site maps, we would also be available for a personal meeting with you and the TEC on that date or other date by arrangement.

cc Tom Smith, Michael Baker Jr., Inc.
Will Thomas, Michael Baker Jr., Inc.

c:\5001_\50010\8-29les.fax

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Clark County FIS
Review Notes
Diversion Structures on Alluvial Fans

1. General Description

A. Upper Las Vegas Wash Interception Berm

- 300' bottom width
- bottom slope 0.0067 ft/ft; 0.01ft/ft at downstream end
- drop structure used to control gradient
- 12" RCC slope protection on right bank, 6' toe down protection, 12" nominal riprap on the left bank
- flow enters at 45 degree angle to channel
- inflowing wash surface slope approximately 0.015 ft/ft, distributed flow in wash between fans

B. North Las Vegas Detention Basin Diversion Dike

- located on Las Vegas Wash channel approximately 2000 feet upstream of detention basin
- flow makes a 45 degree bend to the right at diversion dike; bed slope of influent wash channel is approximately 0.01 ft/ft; width is 140 feet
- transition to constructed channel is made in control structure; channel bed slope at diversion dike is 0.002 ft/ft, increases to 0.0076 ft/ft downstream of control structure; channel decreases from 70 feet width along the diversion to 35 feet downstream of the control structure
- diversion dike and control structure have 6" thick concrete slope protection with 5' and 8' deep cutoff walls on upstream and downstream sides; channel downstream has soil cement lining to 300' upstream of basin
- top elevation of diversion dike is 2142; top of embankment at detention basin is 2144; spillway crest is 2134
- The control structure forces a transition to supercritical flow, and controls the water surface elevations upstream at the diversion dike.

C. Range Wash Diversion Dike

- 120' bottom width
- bottom slope approximately 0.01 ft/ft in collection channel; 0.02 ft/ft at

downstream end
- dike slope unprotected in collection section; 12" - 24" soil cement in downstream section at higher gradient
- flow enters at 90 degree angle
- inflowing fan slope approximately 0.04

2. Available Information

A. Upper Las Vegas Wash Interception Berm

1. Black & Veatch Pre-Design Report, 1989 (No Design Report Available)
2. Supplement to CLOMR prepared by Black & Veatch, 1991
   - used computed 100-year flow depth (4.5') plus 3 feet plus 0.75 feet inflowing velocity head to determine height of berm above channel bed
   - gabion protection on left bank, mentioned in CLOMR, not constructed, replaced with riprap
   - channel velocities 10-11 fps
   - compared sediment transport on the fan to transport in the channel to evaluate potential for deposition and erosion - used Meyer, Peter and Muller (MPM) and Toffaleti
   - MPM at fan apex for 100-year hydrograph gives 9.46 af ; in interception channel gives 8.11 af - - 1.35 af of deposition, assumed to occur over 1,000 feet of channel area - gives 2 to 3 inches of deposition
   - Toffaleti at fan apex gives 49 af and in channel gives 61 af ; degradation of 12 af. Used USBR 3-slope method to estimate degradation of 3.9 feet
   - Estimated degradation volume using MPM and Toffaleti (in channel only) and applied USBR 3-slope method to estimate degradation depths of 3.2 and 8.7 feet over 970 and 2,700 foot reaches - assumed conservative because no contribution used from fan. Averaged two methods to get 6.0 feet of degradation.
   - Used four methods from USBR to estimate scour, averaged results to get 4.7 feet of scour
   - Used degradation and scour estimates to set toe down protection depth of 6 feet on right bank

B. North Las Vegas Detention Basin Diversion Dike

1. Design flows into the NLVDB are available from HEC-1 modeling by Black & Veatch. The 100-year design flow was 14,900 cfs; generated by the Sheep Mountain Storm. This flow has been reduced by construction of the Upper Las Vegas Detention Basin.

2. The Interbasin storm produces the highest peak discharge in the channel between the two basins under existing conditions, as shown in draft hydrology by NHC. The 100-year peak flow is approximately 8,500 cfs.

3. No design report is available for the NLVDB, and no information has beenreceived by NHC regarding hydraulic or sediment transport design of the diversion dike, control structure and inflow channel.

C. West Range Wash Diversion Dike

1. Flood Insurance Restudy for West Range Wash, Post, Buckley, Schuh, & Jernigan, 1996, TSDN (Contains Boyle Engineering design documentation)

- PSIA method used to estimate sediment yield, multiplied by a factor of 7 to obtain 100-year event yield. Average annual yield in the range of 0.3 to 0.5 af/sq mi
- Used Dawdy equation to estimate channel geometry on fan surface for the purpose of computing transport capacity. Computed channel is 330' wide.
- Used HEC-6 to develop inflowing load based on equilibrium conditions
- Compared hand computations using Yang equation to HEC-6 result
- Also computed average annual sediment yield by integrating event yields based on transport relationships
- Computed deposition in channel by comparing fan transport and dike transport - 65,000 tons - used time of peak as critical point - 36.8% of total event transport
- Used USBR method for estimating degradation below dams to estimate depth of deposition - result is 5.64 feet
- Sized dike by adding deposition depth, energy head and 3 feet of freeboard
- Scour not explicitly addressed in FIS TSDN

3. Evaluation of Available Information

A. Consequences of Failure

1. For both the Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike, failures would result in flooding outside the study area. The most conservative assumption for the purpose of computing flows in Las Vegas Wash is that the dikes remain in place.

2. Failure of the diversion dike at the North Las Vegas Detention Basin would significantly increase peak discharges downstream due to loss of control from the detention basin. 100-year peak flows could be more than tripled.

B. Upper Las Vegas Wash Interception Berm

1. Performance questions relate to unsteady flow and local sediment transport conditions as flows enter the interception channel. Comparison of sediment transport at the apex of the fan and in the channel at steady state does not address the question of whether deposition that affects capacity or stability will occur as flow enters the channel.

2. The two methods used yield opposite results - MPM predicts deposition while Toffaleti predicts scour. Confidence in either result should be very low based on the opposite trends indicated.

3. The USBR 3-slope method applies to degradation below dams, and is intended for use in predicting long term degradation based on bankfull channel flows. It is not applicable to this situation where flows are infrequent, vary rapidly, and inflowing sediment loads may be very high.

4. Four USBR methods for estimating scour were averaged to design the toe-down protection (calculation not reviewed). Calculations may have been based on the constructed channel geometry, rather than the channel configuration likely to occur in a flood. Local deposition along the north bank could train the flow along the south bank, increasing scour potential.

5. The orientation of the interception channel at 45 degrees to the entering flow will reduce the chance of local deposition that would completely block the channel or result in ramping over the south bank. The ground adjacent to the channel along the north bank is 2-4 feet lower than the top of the berm on the

south bank. If deposition occurs locally, flows could go around deposited sediments across adjacent ground. The general ground slopes to the southeast at 45 degrees to the channel alignment.

6. Flow reaching the interception berm has already turned to parallel fan contours in the wash between coalescing and opposing fans. It is unlikely that flow would enter the channel at a single point, but would more likely be distributed among several inlet channels.

7. Based on geomorphic inspection, the structure appears likely to function adequately to divert the 100-year design storm to the basin. This is based on the orientation of the channel, width of the channel, likelihood of distributed inlet flows, relatively small change in bed slope between the wash and constructed channel, and presence of bank and toe protection on the southern bank. However, the methodology used for estimated deposition and scour in the channel may not accurately predict its performance. The lack of performance history and/or more detailed assessment of unsteady flows with high sediment/debris loads leads to considerable uncertainty in expected performance.

B. North Las Vegas Detention Basin Diversion Dike

1. HEC-2 modeling results using the Interbasin storm show critical depth at some sections upstream of the diversion dike. The computed energy grade line for the 100-year flow in the channel just upstream of the diversion dike exceeds the top of the dike by 0.3 feet, and the computed water surface elevation at the dike is 2141.9. The top of the dike is elevation 2142.

2. The diversion dike is protected by a 6" thick concrete facing, but has no structure for energy dissipation or apron on its downstream side. Flow over the dike has the potential to undermine the 8 foot cutoff wall. In some areas the bottom of the cutoff wall is at elevation 2131, approximately 5 feet above the wash invert elevation of 2126. The design of the structure is not typical of hydraulic structures such as spillways or diversion weirs associated with dams.

3. The change in flow direction, channel dimensions, and slope that occur at the dike make its performance difficult to predict. However, there is potential for deposition of sediments as the transition occurs from flow in the natural wash to the constructed channel. Deposition would increase the likelihood for the dike to be overtopped.

4. Computed velocities in the constructed channel downstream of the control structure for the 100-year Interbasin storm are up to 20 fps. The integrity of the soil cement channel lining to withstand these velocities is questionable.

5. Performance of the dike under the 100-year Interbasin storm is uncertain. If considered a levee, FEMA standards for freeboard are not met. If considered a hydraulic structure, the design does not appear to conform to typical standards. Failure of the dike would significantly increase peak discharges downstream, from approximately 2,300 cfs to as high as 8,500 cfs.

C. West Range Wash Diversion Dike

1. Event sediment yield was estimated using the PSIA method, adjusted by a factor; and by computing transport in theoretical channel on the fan. Results agree reasonably well, but considerable uncertainty still exists in the event estimate on this steep fan surface (4%).

2. Deposition volume in the channel was computed by comparing HEC-6 results for a theoretical channel on the fan and the constructed channel. This analysis assumes a quasi-steady state sediment transport equilibrium. Actual flood conditions would be unsteady, and local hydraulic conditions at the junction of the fan channel and constructed channel can not be adequately analyzed using HEC-6.

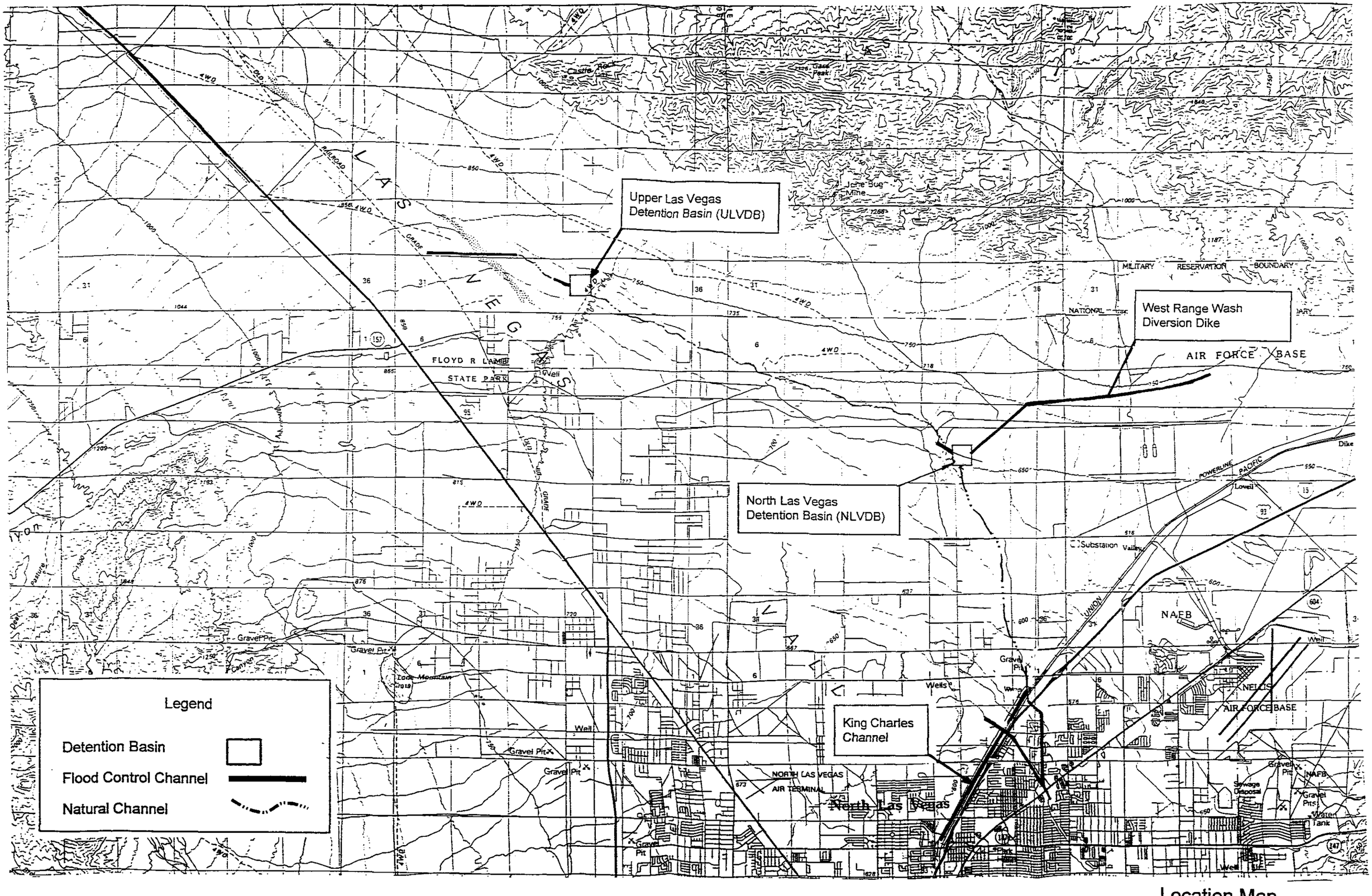
3. HEC-6 computed 36.8% of the total deposition occurs at the peak discharge of 7050 cfs. However, within 1 hour of the peak discharge 72% of the total deposition occurs at a discharge of 5900 cfs. Therefore, the greatest combined depth of deposits and flow may occur following the peak of the hydrograph.

4. The energy grade line of the incoming channel is near the top of the diversion dike, and the intersection occurs at 90 degrees. An alternative method for computing theoretical channel dimensions (Edwards & Thielmann, 1982) yields a higher energy grade line, exceeding the top of the dike.

5. Deposition is likely to occur locally near the north bank of the channel, causing the flow to split and potentially to be trained against the south bank of the channel. This channel slope is unlined and could erode rapidly where local turbulence or channel migration occurs.

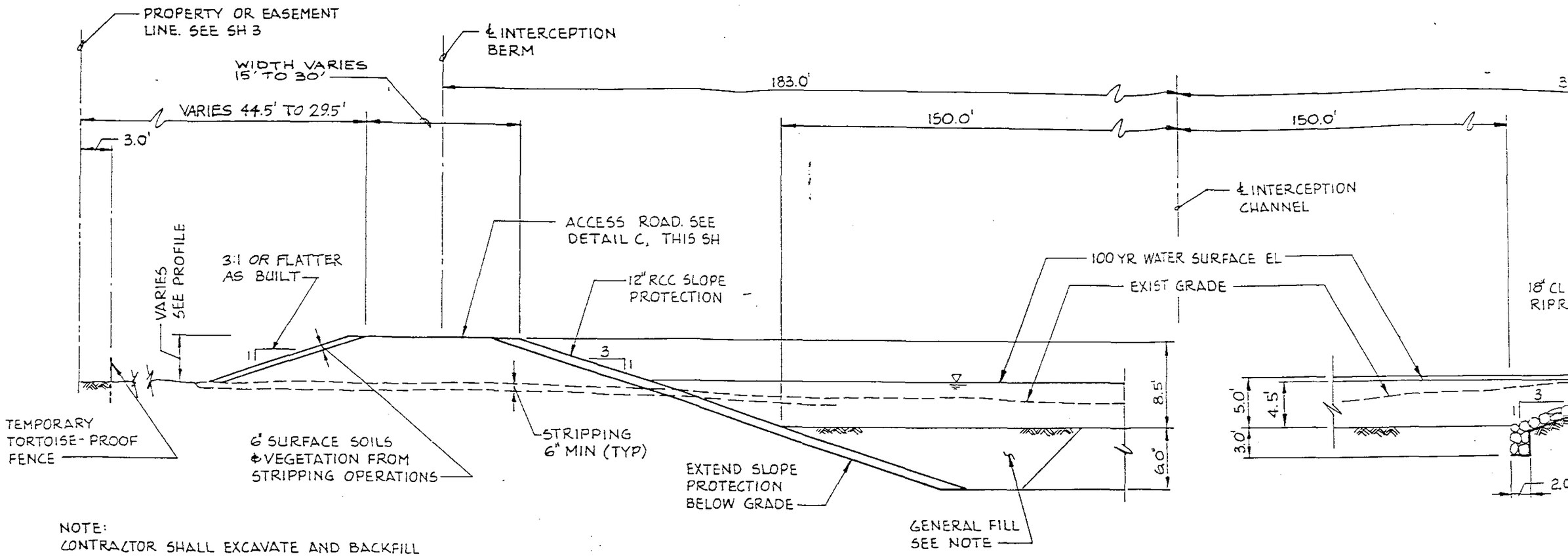
6. In some areas, the flow entering the diversion channel is deflected to the east (or upstream direction) by remnant gunnery berms upstream of the diversion channel. This change in direction will likely cause deposition at the confluence of the diversion channel and the incoming channel. Scour will likely occur downstream of the confluence as the flow gains energy.

7. The design estimates for the amount of deposition at the confluence of the fan and the diversion channel may be low. More conservative assumptions indicate flow could ramp over the berm. High energy flows will likely result in significant scour of the unlined diversion channel. The combined effects of local deposition and scour make performance of the dike uncertain.



Location Map

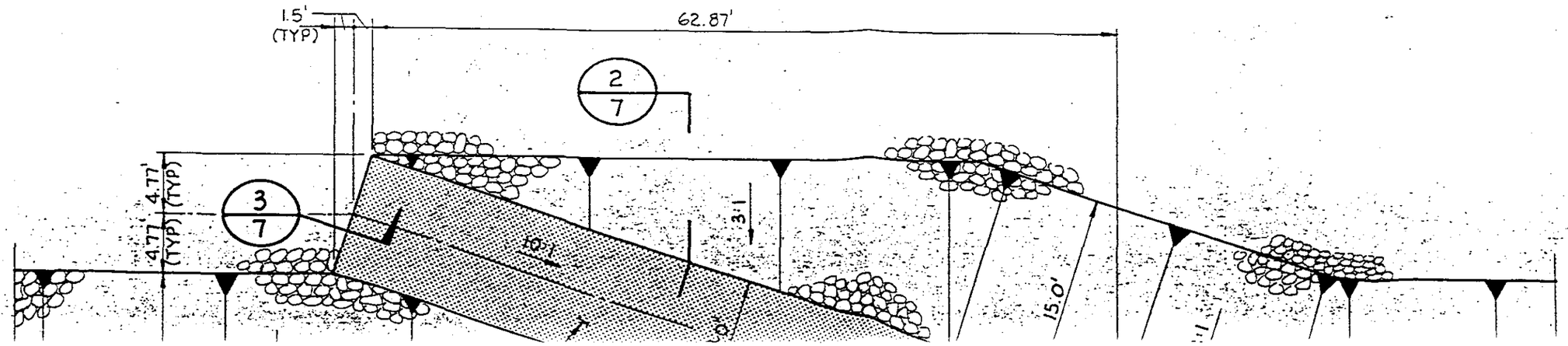
Upper Las Vegas Det. Basin



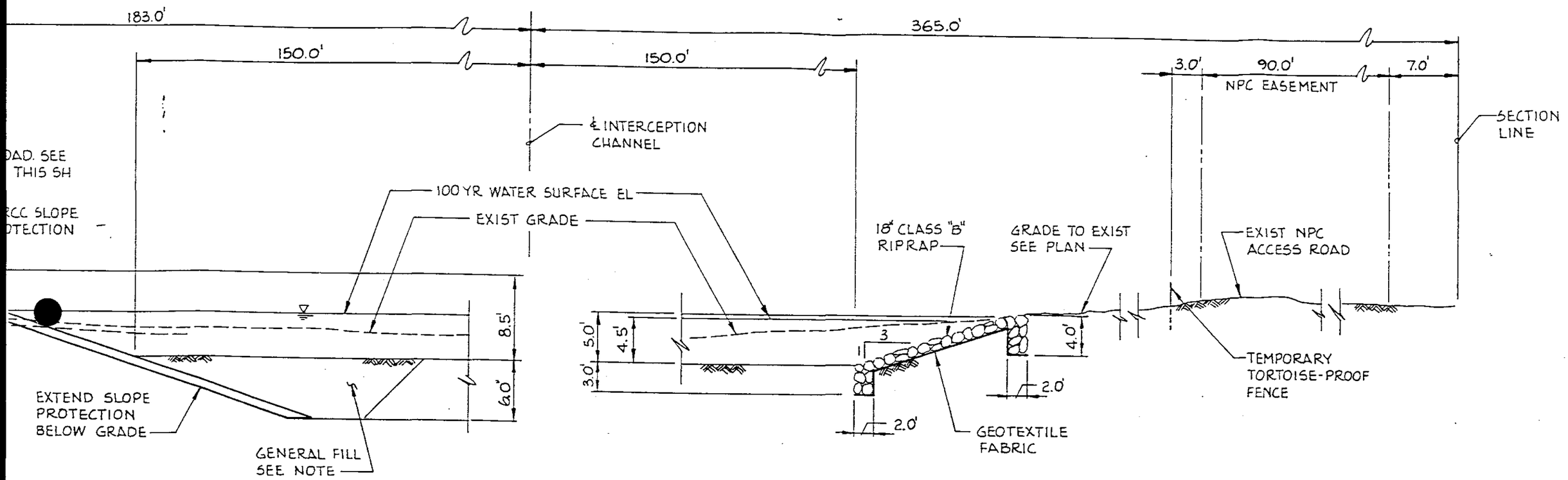
NOTE:
CONTRACTOR SHALL EXCAVATE AND BACKFILL TRENCH AT TOE OF BERM AS REQ'D TO EXTEND SLOPE PROTECTION BELOW GRADE.

INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1" = 10'

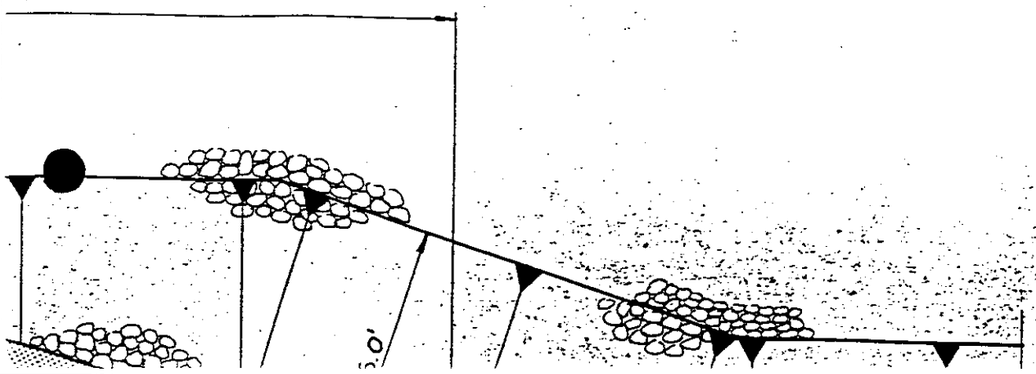


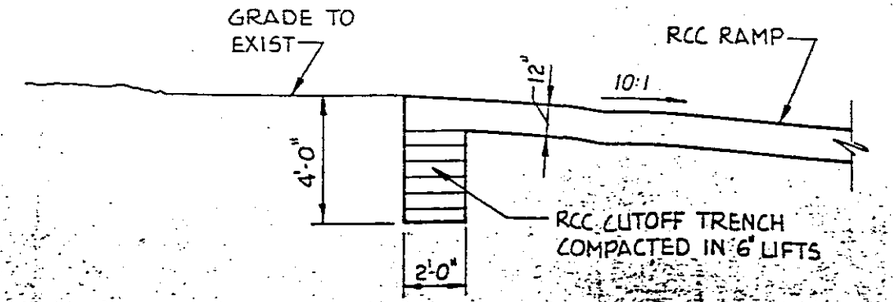
Upper Las Vegas Det Basin



INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1"=10'

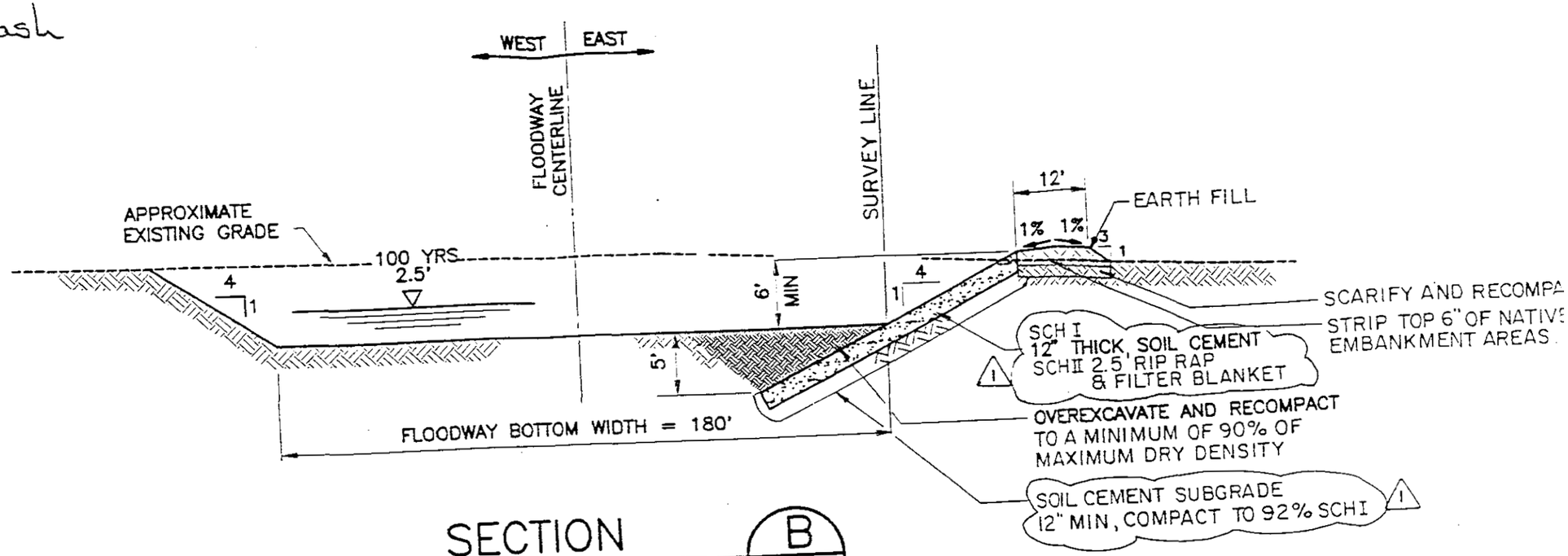




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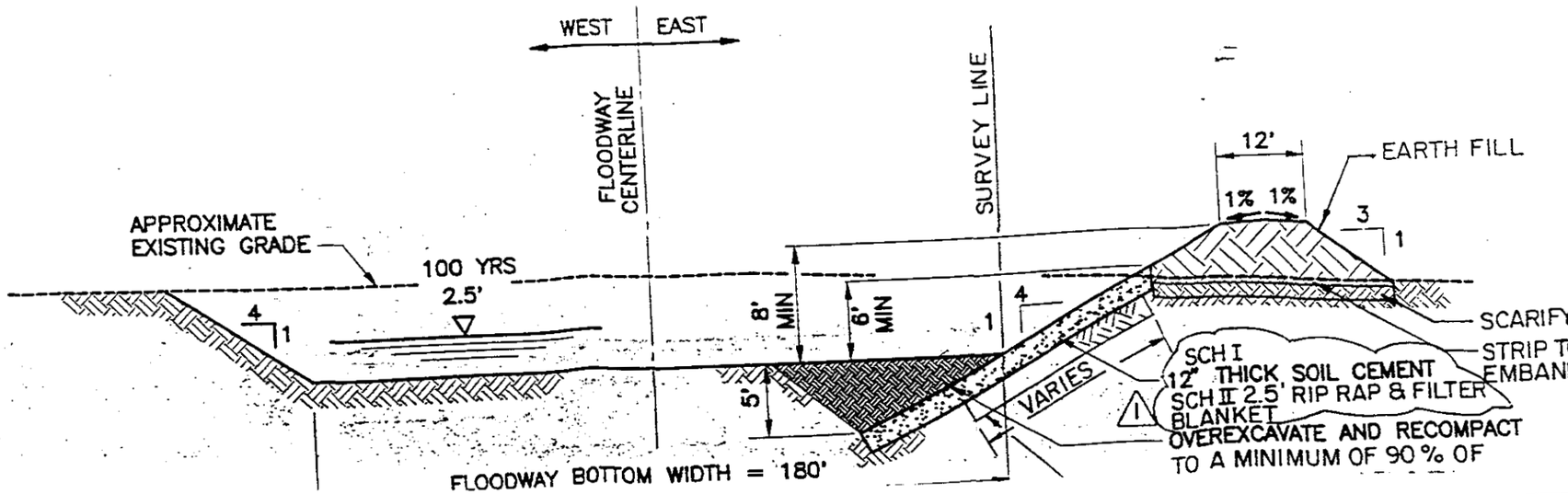
West Range Wash



SECTION B

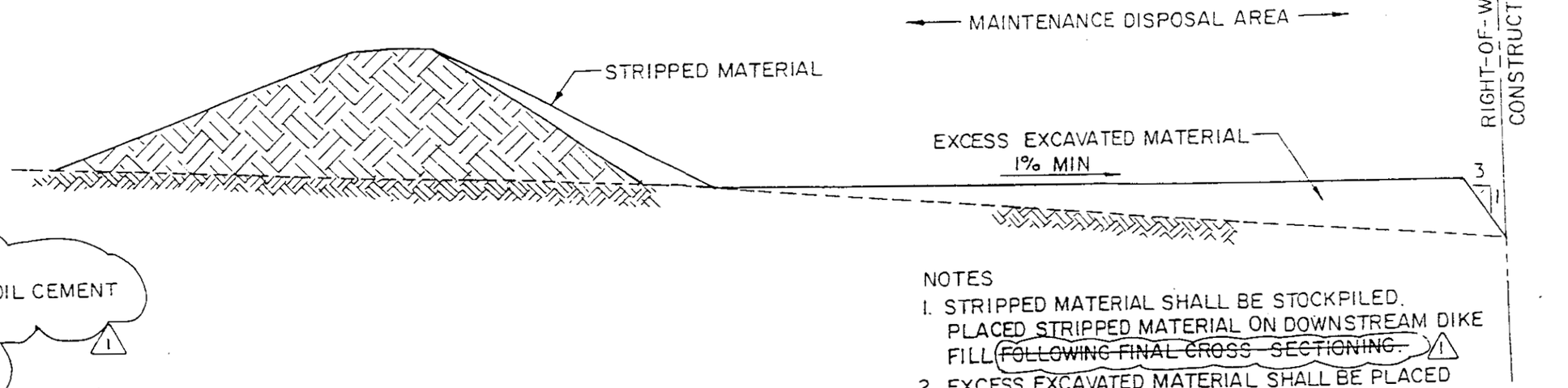
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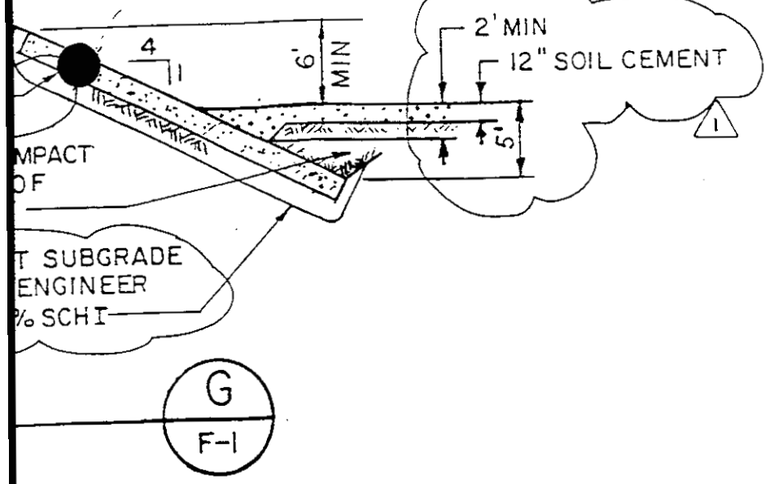
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NOTES

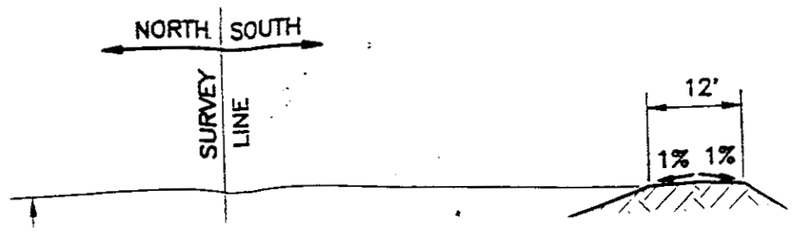
1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING.~~ 1
2. EXCESS EXCAVATED MATERIAL SHALL BE PLACED IN MAINTENANCE DISPOSAL AREA. COMPACT TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY.



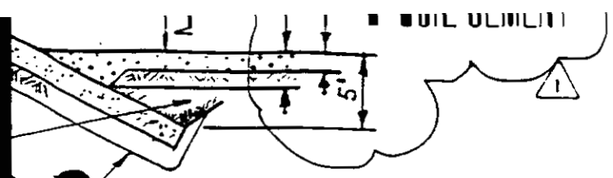
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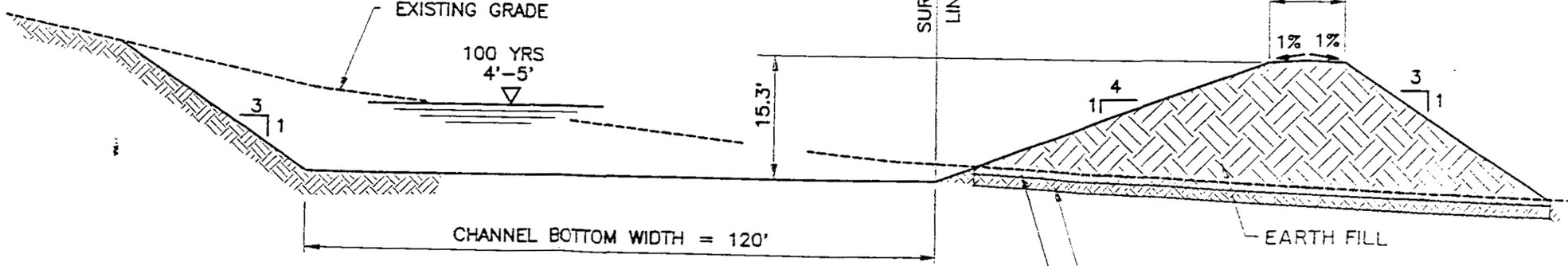
West Range Wash

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NOTES

1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING.~~ (1)
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northwest hydraulic consultants inc.

3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 8, 1998

SUBJECT: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

Northwest Hydraulic Consultants' (NHC) analysis of the diversion dike at the North Las Vegas Detention Basin indicates that overflow of the diversion dike would occur during the base flood event. This overflow was computed to occur without considering effects such as sediment deposition, bar and bedform roughness, roll waves, and water surface fluctuations arising from flow transitions from critical and supercritical flow upstream of the diversion dike to subcritical flow at the diversion dike. In NHC's opinion, all of these effects may occur during a major flood event. The stability and resistance to failure of the diversion dike during sustained overtopping events is questionable as well. During the conduct of the flood insurance restudy for Upper Las Vegas Wash, NHC was unable to conclude that the structure met FEMA performance standards during the base flood event. These issues were raised in our letter to FEMA Region IX dated April 28, 1997.

In response to these concerns, a report was prepared by Montgomery Watson (MW) and Chen Engineering Technology (CET) to further evaluate the integrity of the dike during the base flood event. The report was provided to the City of North Las Vegas in February 1998. We have had the opportunity to review the information provided in this report, and still have the concerns expressed in our April 28, 1997 letter. We understand that FEMA and the TEC will review the MW and CET report, and may also review other backup information not presented in the report. NHC offers the following suggestions and special concerns for FEMA and the TEC for use in their review of the diversion dike.

1. If the diversion structure is to perform as a levee, then the structure should meet FEMA's minimum requirements for levee integrity. Central to certifying a levee for providing flood protection, FEMA's requirements state that the structure must have a minimum of 3 feet of freeboard over the computed base-flood water surface elevation. Both NHC's and MW's analysis of water surface elevations through the diversion

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structure reach indicate that the freeboard requirement is not met.

2. Alternatively, if the structure is to perform as a spillway, then the structure must be designed to maintain stability during overtopping. Toe scour protection, energy dissipation, and foundation support during overtopping events are critical for maintaining spillway structure stability. The cutoff wall must be sufficiently deep to protect the spillway from toe scour along the entire length of the spillway. The diversion dike record drawing included as an attachment to the MW report was used to develop the profile elevations of the diversion weir crest, ground elevation of the downstream spillway face, and the footing elevation supporting the spillway face. This information is provided on the attached Figure 1. The figure indicates that the existing channel invert elevation is below the footing elevation for the central portion of the spillway structure. A possible erosion scenario during an overtopping event includes rapid headcutting and lateral migration of existing channels downstream of the spillway face. Since the invert elevation of these channels is below the elevation of the footing in the central portion of the spillway, the lateral migration could undermine the footing in the central portion of the spillway and lead to failure of the structure.

3. Flow curvature and flow state transitions from supercritical or critical flow to subcritical flow through the diversion dike reach greatly complicates the hydraulic analysis and determination of water surface elevation and velocity distribution through the reach. Superelevation effects alone would increase water surface elevations on the order of 1 foot at the transition. Flow instabilities resulting from the transition from super- to subcritical flow and the curvature effects would lead to further water surface instabilities. These instabilities are not computed or accounted for in the 1-dimensional HEC-2 or HEC-RAS modeling procedures. The statement made in the cover letter of the MW report that

   "...the computed 100-year water surface elevation is approximately 2 inches below the top of the armored portion of the diversion structure. In other words, no overtopping occurs."

   should be tempered with an analysis of the uncertainties in computing water surface elevations under the complex conditions that exist at the diversion dike. Within the limits of accuracy of 1-dimensional hydraulic modeling, the MW report thus appears to confirm NHC's results that the structure does not meet FEMA freeboard requirements and that overtopping (given the uncertainties involved) is likely. The analysis presented still fails to account for the very real effects of flow curvature and flow state transition on water surface elevations.

4. In the cross-sections plotted for the HEC-6 and HEC-RAS models presented in the MW report, no discussion of effective conveyance width is presented. Several of the cross-sections are cut through both the main channel section and small tributary arroyo sections. The flow area in the tributary sections would be ineffective in providing conveyance to flow during floods arising from the Upper Las Vegas Wash.

5. The report does not provide adequate information to evaluate several sedimentation issues. HEC-6 is a 1-dimensional model, and must be carefully applied to situations such as this one with complicated hydraulic conditions. HEC-6 is a useful tool for evaluating sediment dynamics. The model can provide insight in identifying channel reaches subject to sediment deposition and erosion, and the feedback of bed profile changes on the flow hydraulics. However, direct application to situations such as this one, with little if any hydraulic and sediment transport calibration and verification data, should be used to address sedimentation and hydraulic response in a more qualitative rather than quantitative sense. HEC-6 is probably useful in this case in identifying uncertainties and testing computational sensitivities, but a single, explicit result from HEC-6 can not be realistically expected. Several specific comments on this application of HEC-6 follow:

   - All of the hydrodynamic issues discussed previously (superelevation, super- to subcritical flow transitions, flow curvature) are applicable to the analysis using HEC-6 for bed profile stability through the reach.

   - No discussion of the development of the inflowing bed and bank material sediment rating curve was provided. Sedimentation study results require an accurate assessment, through field measurement or sensitivity analysis, of the boundary conditions at the inflow to the study reach.

   - The results also indicate substantial deposition through the upper cross sections of the study reach. This may not be reasonable, as this portion of the study reach is flowing at critical or supercritical conditions. Substantial deposition would more likely be expected after the flow transitions to subcritical flow. The HEC-6 results indicate, however, that relatively little sediment deposition occurs through this reach.

   - The study results indicate incision through and downstream of the choke control section of the reach. This reach is lined with soil cement. Soil cement is not immune to erosion, however we question the applicability of the Tofalletti and Meyer-Peter Mueller sediment transport functions for computing scour in soil cement. The conclusions stated that the channel steepens due to sediment

deposition in a supercritical flow section and erosion through a section lined with soil cement should be reconsidered. In addition, if the results are implying that scour of the soil-cement channel is likely during the base flood event, then the stability and performance of the entire diversion channel during the base flood event are questionable.

NHC completed flood hazard mapping for the conditions of (1) the base flood routed through the North Las Vegas Detention Basin and (2) with the failure of the diversion dike during the base flood event. The appropriate condition may be applied after technical review of the performance of the diversion dike. We hope these comments are useful in FEMA's review of the structure.

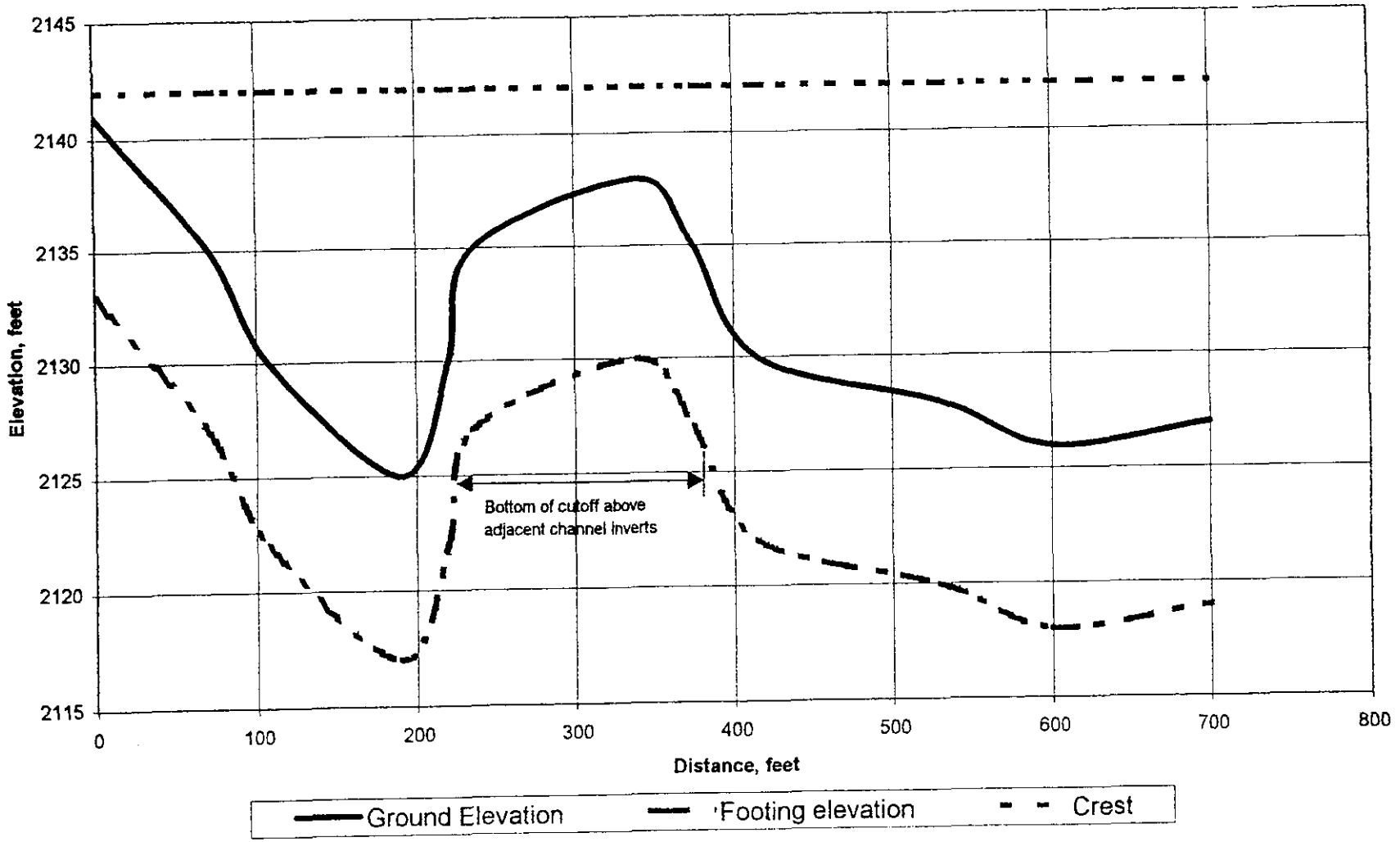
Sincerely,
Northwest Hydraulic Consultants, Inc.

Edward E. Wallace, P.E.
Principal

projects/50010/mwrev.wpd

North Las Vegas Diversion Dike

Figure 1. Profile Comparison of Weir Crest, Ground, and Footing Elevations



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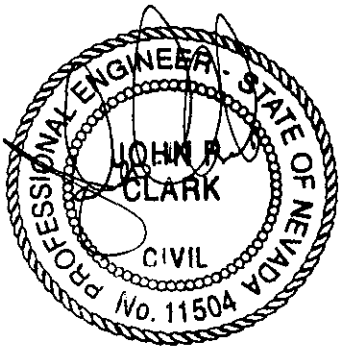
- -CORRCD- -

City of North Las Vegas

Report for

North Las Vegas Detention Basin Diversion Structure Evaluation

February 1998



2/25/98

MONTGOMERY WATSON

February 25, 1998

Mr. James A. Bell, P.E.
City of North Las Vegas
2266 Civic Center Drive
North Las Vegas, Nevada 89030-6316

Subject: North Las Vegas Detention Basin Diversion Structure Evaluation

Dear Mr. Bell:

At the request of the City of North Las Vegas (CNLV), Montgomery Watson has evaluated the effectiveness of the North Las Vegas Detention Basin diversion weir. This analysis was conducted in response to a letter from the Federal Emergency Management Agency (FEMA) to the Clark County Regional Flood Control District (CCRFCD) dated May 5, 1997. Along with their letter, FEMA transmitted a correspondence from Northwest Hydraulic Consultants, Inc. (NHC) questioning whether the subject facility meets FEMA levee criteria and recommending that FEMA not credit this regional flood control facility. A copy of the May 1997 FEMA letter is attached as Appendix A.

On September 29, 1997, Montgomery Watson received the notice-to-proceed on a project to analyze the effectiveness of the North Las Vegas Detention Basin diversion weir and its compliance with regulations of the Federal Emergency Management Agency (FEMA). This report summarizes the findings of the analysis and is divided into four sections. These sections include descriptions of the hydrologic analysis, the channel hydraulic analysis, the sediment transport analysis, and a summary of the findings.

The North Las Vegas Detention Basin is an off-channel, regional facility (LVUP0405 in the 1996 Clark County Regional Flood Control District Las Vegas Valley Master Plan Update). The diversion structure in question was designed to divert flows up to the 100-year event from Las Vegas Wash into the basin. Flows of a higher magnitude overtop the 115-foot long concrete-lined control structure portion of the diversion berm and continue downstream in Las Vegas Wash. The detention basin has a storage volume of approximately 1,650 acre-feet. This design minimizes the cost of the PMF spillway protecting the detention basin embankment by limiting the PMF inflow while ensuring proper function during the design event (100-year).

Hydrologic Analysis

On November 5, 1997, HEC-1 hydrologic models in support of NHC's analysis were supplied to the project team through Kevin Eubanks at CCRFCD. A review of the

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modeling did not result in any differences in modeling approach. Components of the NHC HEC-1 model which were reviewed include:

- storm distribution (SDN5) for a watershed greater than 10 square miles in area
- storm centering (hydrologic subareas receiving precipitation from the Interbasin Storm)
- routing and combining of hydrographs in the schematic diagram
- adjusted precipitation depths for 100-year, 6-hour design storm (with the 1.43 NOAA correction factor)
- depth-area reduction factor (0.66) for the 54 square mile watershed area
- curve numbers
- lag times

The NHC HEC-1 model for the Interbasin Storm yields a 100-year, 6-hour peak discharge of 8,540 cfs at the diversion dike. Of this inflow, their model shows that approximately 190 cfs overtops the diversion dike and continues downstream in Las Vegas Wash while the remaining 8,340 cfs enters the detention basin. Several storm centerings have been investigated in past efforts (Black & Veatch, 1990; CCRFCD, 1986, 1991, and 1996). NHC used the 54 square mile Interbasin Storm centered over the watershed between the Upper Las Vegas Wash Detention Basin and the North Las Vegas Wash Detention Basin. This storm is considered critical for this analysis, as it yields the highest peak discharge to the diversion structure.

A copy of the NHC HEC-1 output is included in Appendix B.

Channel Hydraulic Analysis

To evaluate the performance of the diversion dike in conveying the design discharge to the North Las Vegas Detention Basin, Montgomery Watson assembled a HEC-RAS model of the diversion structure using cross sectional data extracted from topographic mapping flown in 1996 and supplied to Montgomery Watson by CNLV. This mapping is referenced to the NAVD 1988 datum. Conservatively, the full design discharge of 8,540 cfs was used in this analysis (see previous section). A roughness coefficient of 0.025 was used to simulate the concrete and soil cement lined structure. Where cross sections extend beyond the concrete lining to undisturbed desert areas, a roughness coefficient of 0.040 was used. The starting condition for the model was assumed to be critical depth which is appropriate for the constricted portion of the channel immediately downstream of the control (overflow) section. The results of the HEC-RAS model indicate that the 100-year computed water surface elevation is approximately 2 inches below the top of the armored portion of the diversion structure. In other words, no overtopping occurs.

This is in contrast to the NHC analysis which indicated 200 cfs would overtop using the typical section from the 1983 construction drawings to develop cross sectional data. The sheet of the as-built plans used by NHC did not have contours on it. The NHC cross sections did not model the actual constructed diversion structure as accurately as the ones taken directly from the 1996 aerial topography. According to the NHC HEC-2 analysis, their cross sections are all parallel to one another, where Montgomery Watson's cross sections follow the actual channel alignment. Figure 1 presents Montgomery Watson's HEC-RAS cross sections on the 1996 topographic basemap. It is noted that the topography on the 1983 drawings is referenced to the NGVD29 datum whereas the 1996 mapping is referenced to the NAVD88 datum.

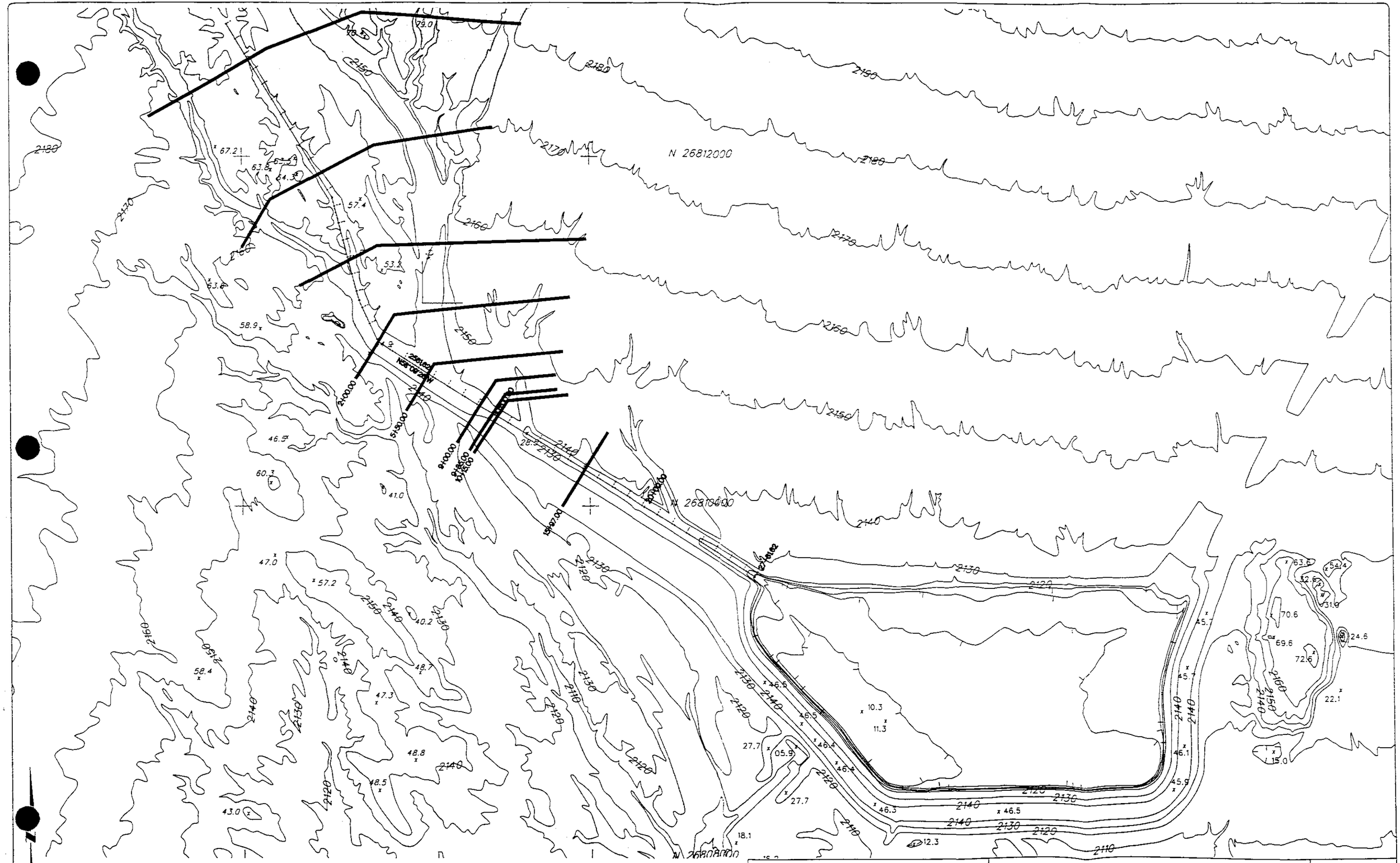
According to the NHC HEC-2 model, a very small amount of overtopping of the diversion structure is anticipated during the 100-year design event (200 cfs), Montgomery Watson reviewed the design integrity of the structure in the event that a higher discharge were to occur. The diversion structure is armored on both sides and along the top with 6-inch thick concrete slope protection with #4 bars at 18-inch C.C. E.W. This armoring continues across the bottom of the 75-foot wide diversion channel. To further ensure the structural integrity of the structure, there is a 5-foot deep, 8-inch thick concrete cutoff wall with #4 bars at 12-inch E.W. and a 2-foot wide concrete footing at the upstream side of the channel lining. Similarly, there is an 8-foot deep, 8-inch thick concrete cutoff wall with #4 bars at 12-inch E.W. and a 2-foot wide concrete footing at the toe of the diversion structure's downstream slope where flows in excess of the diversion structure capacity would be discharged back to Las Vegas Wash.

A copy of the NHC HEC-2 output and the Montgomery Watson HEC-RAS output, along with cross section plots are included in Appendix C. A copy of the selected sheets of the 1983 as-built plans are included in the back pocket of this report (including sheets with and without contour information).

Sediment Transport Analysis

A sediment transport analysis was performed for the North Las Vegas Detention Basin site by Chen Engineering Technology (CET). CET's evaluation consisted of an estimation of sediment inflow from the watersheds tributary to the North Las Vegas Detention Basin diversion structure site based on the Interbasin Storm centering, an analysis of the effects of erosion and sedimentation on flood conditions, a determination of the need for sediment traps to control sedimentation at the detention basin, and a determination of whether sediment deposition causes a larger amount of flow over the diversion berm.

The total sediment inflow to the basin was computed using a combination of two analyses -- the Modified Universal Soil Loss Equation (MUSLE) for sediment supplied from upland areas and the U.S. Army Corps of Engineers' HEC-6 (Scour and Deposition in Rivers and Reservoirs) for stream bank and bed erosion for watershed basins with defined channels.



MONTGOMERY WATSON

HEC-RAS CROSS-SECTIONS

FIGURE 1

For the 100-year flood event (using the full 8,540 cfs), upland and stream sediment yields were estimated to be 48,040 tons and 9,030 tons, respectively, for a total of 57,070 tons.

CET's analysis of the effects of sedimentation during various flood events concluded that, during the 100-year event, up to 1.4 ft of sediment would deposit near the side spillway section, where channel slopes become milder compared to upstream slopes. Further downstream, the sediment hungry flow would erode the diversion channel bed in the lower reach approaching the detention basin itself.

HEC-6 was also used to assess the effect of erosion and sediment deposition on flood conditions in the channel. Both fixed- and movable-bed conditions were considered. A comparison of the results of these models indicates that the flood stage in the channel reach at the side spillway would be decreased from that indicated by the HEC-RAS model even though there was sediment deposited in this reach. This decrease in water-surface elevation is due to an increase in channel slope caused by the deposition of sediment at the side spillway and the erosion of the channel downstream of it. Therefore, no overtopping is expected to occur during the base flood when considering the effects of sediment on the diversion.

Since the channel reach near the side spillway serves as a natural trap for coarser sediments, sediment deposition in the detention basin resulting from the 100-year flood event is expected to be insignificant (less than 1.0 ft). No additional sedimentation traps are required in the tributary watershed. Sediment deposited in the channel and detention basin should be removed, particularly after flood events, to maintain the effectiveness of the system.

A copy of the CET report on sediment transport is included in Appendix D.

Summary and Conclusions

Montgomery Watson has reviewed the NHC hydrologic and hydraulic analyses and has performed separate hydraulic analyses of the diversion structure. Based on this review and analyses, we feel confident that the diversion berm and control structure will operate as designed during the 100-year design event. The NHC hydrologic analysis appears appropriate and we concur with the revised 100-year, 6-hour peak discharge of 8,540 cfs at the diversion structure. However, we feel that using the 1996 topographic mapping to develop cross sectional data for the channel hydraulic model is more appropriate than using the typical section from the 1983 plans without contours.

The HEC-RAS hydraulic analysis performed for this review indicates that virtually all of the 100-year design discharge is intercepted by the diversion structure and conveyed into the North Las Vegas Detention Basin. With the full 8,540 cfs design discharge, the computed water surface elevation is within inches of the crest of the concrete-armored control structure portion of the diversion structure. By design, this control structure portion of the

diversion structure cannot be allowed to divert additional flows during events in excess of the design storm and, therefore, cannot have freeboard, or too much runoff could be diverted into the basin during these events. Such excess diversion would change the design parameters for the detention basin PMF spillway.

The results of the sedimentation analysis do not indicate that the clear-water design flow requires bulking, as the undetained portion of the watershed tributary to the North Las Vegas Detention basin will not generate a significant amount of sediment load. No overtopping of the diversion structure is expected, even with sediment loading. However, periodic maintenance to remove accumulated sediment (particularly after flood events) should be performed to ensure the proper operation of the channel and detention basin.

References used in performing this analysis are listed in Appendix E. We are available to discuss the results of this analysis with you at your convenience. Following your review of this report, we should discuss how you want to proceed in submitting the results to FEMA Region IX.

Sincerely,

John P. Clark, P.E.
Project Manager

File: 1327080.010101

cc: Lenny Badger, CNLV
Kevin Eubanks, CCRFCD
Chip Paulson, Montgomery Watson
Steve Mano, Montgomery Watson
Yung Hai Chen, CET

53010.14

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



Gale Wm. Fraser, II, P.E.
General Manager / Chief Engineer

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Clark County

June 26, 1997

Les Sakumoto
FEMA Region IX, Bldg. 105
Presidio
San Francisco, CA 94129

Las Vegas Wash, Change in Flow Rates

Dear Mr Sakumoto:

I am writing in response to your letter dated May 5, 1997 regarding the effectiveness of the North Las Vegas Detention Basin (NLVDB) to reduce flow rates downstream therefrom. I have since met with representatives of the City of North Las Vegas, the City of Las Vegas and Clark County (Entities) to discuss your concerns. Your letter included preliminary calculations and analysis prepared by Northwest Consultants which indicated that the structure which directs flow to the NLVDB would be marginally overtopped if subjected to a 100-Year runoff with no consideration for the effects of sediment. In fact, the intended function of the diversion structure was to direct no more than the 100-year flow to the basin thus reducing emergency spillway costs at the NLVDB. This fact was previously acknowledged by FEMA in a letter to the City of North Las Vegas, dated July 11, 1985. Therefore, the results of Northwest Consultant's preliminary work came as no surprise. Additionally, questions were raised regarding the stability of the structure if overtopped and what impacts sediment would have on the capacity of the structure to deliver flow to the NLVDB. These are valid concerns which, we agree, warrant consideration.

First, I would like to assure you that it is the District's and the entities' desire to have the NLVDB recognized by FEMA as being effective in reducing flow rates to downstream areas. Anything less would be unacceptable. Secondly, we offer to achieve this by preparing additional analyses for the NLVDB which demonstrate its effectiveness and conformity to NFIP regulations or propose remedial measure which, once implemented, would meet NFIP requirements.

It is our intention to complete the necessary work in the most expeditious manner possible at no cost to FEMA. Although there are many variables involved at this point which can affect the schedule for this effort, the goal is to be successful within 6 months

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to one year. This should allow you to proceed with the study of the Upper Las Vegas Wash without further delay under the assumption that the NLVDB is effective. The effective date of map revisions for areas downstream of the NLVDB (Upper Las Vegas Wash Study and the Las Vegas Wash LMMP) would then follow FEMA's acceptance of the District's work.

Close coordination with your agency will be valuable to our timely completion of this work. We will be contacting you, once we have retained the services of an engineering consultant, to discuss our approach and your specific requirements. Thank you for the opportunity to address your concerns regarding this important project. Should you need further information or have questions, feel free to contact me at (702)-455-3139.

Sincerely,

Kevin Eubanks, P.E.
Assistant General Manager

CC: Karl Mohr, FEMA
Ed Wallace, Northwest Consultants
Kelly Chuma, North Las Vegas
Randy Fultz, Las Vegas
Steve Parrish, Clark County

KLE:csm

File: LMMP

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

To: Kevin Eubanks, P.E.
Clark County Regional Flood Control District

From: Les Sakumoto, P.E.
Civil Engineer

Date: May 5, 1997

Re: Las Vegas Wash, Change in Flow Rates

Kevin:

This letter is keep you informed of an unexpected development that occurred during our mapping of the Las Vegas Wash in the area between the Upper Las Vegas (ULV) and the North Las Vegas (NLV) detention basins. I am enclosing a copy of the recommendations by our Study Contractor (SC) Northwest Hydraulics. FEMA concurs with their recommendations but we would like your confirmation on our hydrologic assumptions. We respectfully request that you get back to us, either by telephone or letter, on or before May 23, 1997. If there are data which we may have overlooked, please bring this to our attention in the telephone call or letter. If you would like additional clarification, we could arrange a conference call between FEMA, the Study Contractor and your office. As stated in the enclosures, because of the large differences between the old and new assumptions (2800 cfs vs 8500 cfs) we will need to expand the scope of our mapping and make some schedule changes in the review of the downstream studies. The Region will request that the Technical Evaluation Contractor (TEC) temporarily suspend the review of the LMMP study by Ensign & Buckley (E&B) that extended from Interstate 15 to Charleston Boulevard until we can quantify the new floodplains and judge what the effects will be downstream of Interstate 15. At this point in time, we can no longer say that the work maps from the Ensign & Buckley LMMP study represent the "best available data". No matter what the outcome of the new mapping, the community always has the option of submitting a LOMR if revisions are made to lessen the Special Flood Hazard Areas. As we would like to keep this study moving forward, we trust that you will give this matter your utmost priority.

Thank you for your attention in this matter.

cc: Baker Engineers-E. Mifflin/T. Smith/Perneille BP
City of Las Vegas-Fultz/Moyer
City of North Las Vegas-Gary Holler/Kelly Chuma
Clark County- Robert Thompson/Phu Simpson
FEMA HQ-Mohr/Magnotti
FEMA RIX-Chau/Puziss/Crawford

northwest hydraulic consultants inc.

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west sacramento, california 95691-3430
(916) 371-7475 - fax
(916) 371-7400

sacramento
vancouver
edmonton
seattle

Les Sakumoto
FEMA Region IX
Building 105
Presidio of San Francisco
San Francisco, CA 94129

April 28, 1997

Subject: North Las Vegas Detention Basin Diversion Dike

Dear Mr. Sakumoto:

This letter provides an update on the status of our study of Upper Las Vegas Wash in Clark County, Nevada, and suggests an approach for completion of the study. In August, 1996 Northwest Hydraulic Consultants (NHC) submitted notes summarizing our preliminary review of three diversion structures in the Upper Las Vegas Wash Study Area for FEMA's review. The purpose of this summary was to identify uncertainties in the flood control performance of these structures and to request assistance from the Technical Evaluation Contractor (TEC) in clarifying the methods to be used in evaluation of the structures for study purposes. After initial conversations with the TEC, work on the study was suspended pending their receipt of additional data from Clark County Regional Flood Control District.

The Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike have now both been reviewed by the TEC as part of other studies. For the purposes of our study, we will assume that they remain in place at all discharges. Based on telephone conversations with the TEC in March and April, we understand that the North Las Vegas Detention Basin Diversion Dike has not been reviewed. Failure of this structure would significantly influence peak flows in and downstream of our study area. Our preliminary analysis of this structure and suggested approach for its evaluation in the study are described below.

Hydrology

NHC submitted draft hydrology for the Upper Las Vegas Wash in May, 1996 (copy attached). The draft hydrology report describes modifications made to existing HEC-1 models to develop recommended FIS discharges. NHC updated models developed by James M. Montgomery (1991) and Black & Veatch (1993) to represent existing flood control facilities, and extended the models where necessary to include the full range of flood frequencies required for the FIS. NHC made no changes to previously defined model input parameters for rainfall, runoff, or channel routing, all of which appear to be consistent with the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

The Spring Mountain Storm is used to estimate peak flows into the ULVDB. The estimated 100-year peak inflow to the ULVDB is approximately 14,700 cubic feet per second (cfs) and the 100-year outflow is 5,020 cfs.

The peak inflow to the North Las Vegas Detention Basin is produced by the Interbasin Storm. This storm is modeled as a 54 square mile storm covering the North Las Vegas Wash Tributary Area between the Upper and North Las Vegas detention basins. A single Interbasin Storm model had been previously developed by Black & Veatch (1993) to represent 100-year storm conditions. This model was extended to other flood frequencies by NHC. The 100-year peak discharge from this model is approximately 8,500 cfs.

The Spring Mountain Storm produces the highest peak discharges downstream of the North Las Vegas Detention Basin due to larger total volume than the Interbasin Storm. The 100-year peak discharge downstream of the North Las Vegas Detention Basin is approximately 2,800 cfs.

The discharges from both the Spring Mountain and Interbasin storms are consistent with the Corps of Engineers regional analysis curve. The results of the modified HEC-1 models have been used by NHC for preliminary hydraulic analysis in the study area.

NLVDB Diversion Dike Description

The diversion structure is 700 feet long, and intercepts flow in the wash at approximately a 45 degree angle. A trapezoidal channel along the dike has a bottom width of 75 feet. A control structure (115 feet long) is located at the downstream end of the dike, where the trapezoidal channel is narrowed to a bottom width of 35 feet. The invert slope changes from approximately 1 percent in the wash to 0.2 percent in the 75 foot wide trapezoidal channel, and steepens to 0.76 percent in the 35 foot wide trapezoidal channel. The narrower channel continues for approximately 1750 feet into the NLVDB. The diversion dike and channels are shown in the attached construction drawings.

The channel along the diversion dike and the control structure have a 6-inch thick concrete lining with 4:1 side slopes. The concrete lining extends over the top of the right bank and down the opposite side of the embankment at a 2.5:1 slope. An 8-foot deep cutoff wall is located at the toe of the embankment. The top of the diversion dike has a constant elevation of 2142. At the upstream end, the channel has a depth of 12.5 feet below the top of the diversion dike and gradually deepens to 14 feet at the control structure.

Hydraulics

NHC used HEC-2 to develop a preliminary water surface profile at the diversion dike structure. Cross sections for the HEC-2 model were obtained from the record drawings. A Manning's 'n' of 0.025 was used for the channel roughness. HEC-2 results for the 100-year peak discharge indicate that supercritical flow would occur downstream of the control structure. Computed velocities, assuming minimum specific energy in this channel, are 15 feet per second (fps) with depths around 10 feet. Upstream of the control structure, flow is subcritical at a depth of

approximately 14 feet and a velocity of 5 fps. The computed water surface profile is shown in Figure 1. This water surface is at or above the diversion dike top for its entire length. Based on this preliminary analysis, the dike does not meet FEMA freeboard criteria for levees, and does not appear to be designed to withstand sustained overflows.

The preliminary analysis does not include other factors that would increase the potential for overflow of the dike. These factors include the effect of momentum of the flow towards the structure, and the potential for sediment deposition at the change in flow direction and velocity on the upstream face of the dike. Our preliminary evaluation did not include quantification of these influences on the water surface profile.

Study Approach

Based on the information available, we are unable to confirm that the dike would withstand overflow without failure. Assuming that the dike is not in place would produce 100-year peak discharges in the downstream portion of the wash of 8,500 cfs, compared to approximately 2,800 cfs with the dike in place. This assumption would therefore substantially increase the areas within flood hazard areas downstream of the structure.

NHC recommends the following approach to completion of the Upper Las Vegas Wash study:

1) Contact the Clark County Regional Flood Control District and the City of North Las Vegas to review the draft hydrology and the results of preliminary analysis of the diversion dike. Confirm that the District concurs with the preliminary hydrology and hydraulic analysis.

2) Proceed with flood plain mapping based on water surface profiles computed with and without the diversion dike in place, as described in Chapter 7 of *Guidelines and Specifications for Study Contractors*.

This approach will require hydrologic and hydraulic analysis beyond the original scope of our study, and may require additional mapping to cover the larger flood plain boundaries. If you concur with the approach suggested above, we will continue the hydraulic analysis for the study, and will estimate the costs of required additional services.

Please call with any questions regarding our preliminary analysis or proposed study approach.

Sincerely,
Northwest Hydraulic Consultants, Inc.



Edward E. Wallace, P.E.
Principal

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable James K. Seastrand
Mayor, City of North Las Vegas
P.O. Box 4086
North Las Vegas, Nevada 89036

IN REPLY REFER TO:
Case No.: 96-09-483P

Community: City of North Las Vegas, Nevada
Community No.: 320007
Panels Affected: 32003C1790 D,
32003C2176 D, and
32003C2180 D
Effective Date of
This Revision: JAN 28 1997

102-I-C

Dear Mayor Seastrand:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 20, 1996, Mr. Kevin L. Eubanks, P.E., Assistant General Manager, Clark County Regional Flood Control District, requested that FEMA revise the FIRM to show the effects of the construction of the Range Wash Diversion Dike, channel improvements, hydrologic and hydraulic analyses, and updated topographic information along Range Wash.

All data required to complete our review of this request were submitted with letters from Mr. Eubanks. Because this Letter of Map Revision (LOMR) shows the effects of a publicly sponsored flood-control project that reduces flooding to existing development, fees were not assessed for the review.

We have completed our review of the submitted data and the flood data shown on the effective FIRM. We have revised the FIRM to modify the floodplain boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Range Wash from just downstream of East Craig Road to approximately 1,500 feet upstream of East Ann Road. As a result of the modifications, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, for Range Wash increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copies of FIRM Panels 32003C1790 D, 32003C2176 D, and 32003C2180 D. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

The modifications are effective as of the date of this letter. The map panels as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

A review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

Because this project also affects the unincorporated areas of Clark County, a separate LOMR was issued for that community on the same date as this LOMR.

We will not physically revise and republish the FIRM and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications made by this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. Karl Mohr of our staff in Washington, DC, either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosures

cc: Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District

Mr. Randall S. Tarr, P.E.
Development and Flood Control Coordinator
Department of Public Works
City of North Las Vegas

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of
Public Works

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-483P

The Honorable Yvonne Atkinson Gates
Chairperson, Clark County Board
of Commissioners
225 East Bridger Avenue, Sixth Floor
Las Vegas, Nevada 89155

Community: Clark County, Nevada
Community No.: 320003
Panel Affected: 32003C2180 D
Effective Date of
This Revision: JAN 28 1997

102-I-C

Dear Ms. Gates:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 20, 1996, Mr. Kevin L. Eubanks, P.E., Assistant General Manager, Clark County Regional Flood Control District, requested that FEMA revise the FIRM to show the effects of the construction of the Range Wash Diversion Dike, channel improvements, hydrologic and hydraulic analyses, and updated topographic information along Range Wash.

All data required to complete our review of this request were submitted with letters from Mr. Eubanks. Because this Letter of Map Revision (LOMR) shows the effects of a publicly sponsored flood-control project that reduces flooding to existing development, fees were not assessed for the review.

We have completed our review of the submitted data and the flood data shown on the effective FIRM. We have revised the FIRM to modify the floodplain boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Range Wash from just upstream of North Las Vegas Boulevard to just downstream of East Craig Road. As a result of the modifications, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, for Range Wash increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copy of FIRM Panel 32003C2180 D. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

The modifications are effective as of the date of this letter. The map panel as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

A review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

Because this project also affects the City of North Las Vegas, a separate LOMR was issued for that community on the same date as this LOMR.

We will not physically revise and republish the FIRM and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. *Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended,* communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications made by this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. Karl Mohr of our staff in Washington, DC, either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

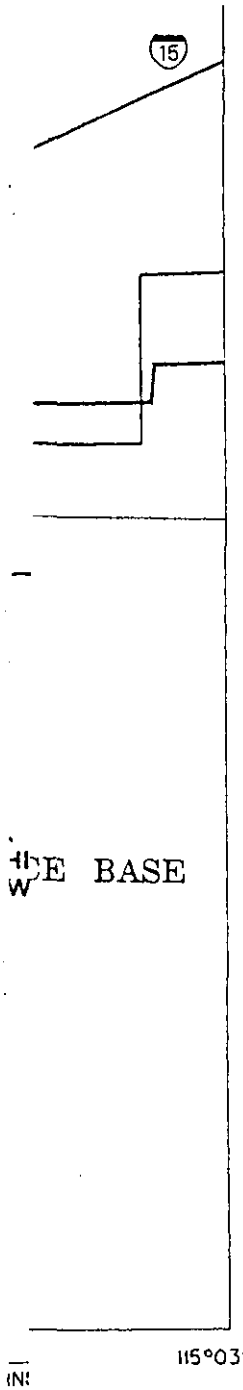
Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure

cc: Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of Public Works

Mr. Randall S. Tarr, P.E.
Development and Flood Control
Coordinator
Department of Public Works
City of North Las Vegas



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1790 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

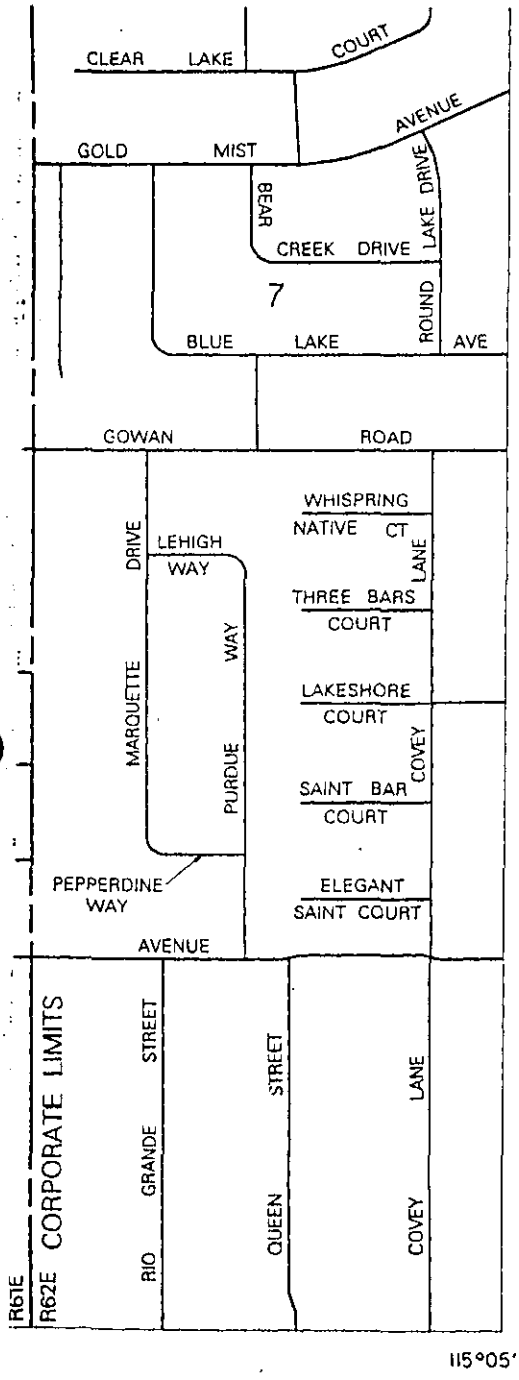
COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	1790	D
NORTH LAS VEGAS, CITY OF	320007	1790	D

REVISED TO REFLECT LOMR DATED JAN 28 [illegible]

MAP NUMBER 32003C1790 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2176 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

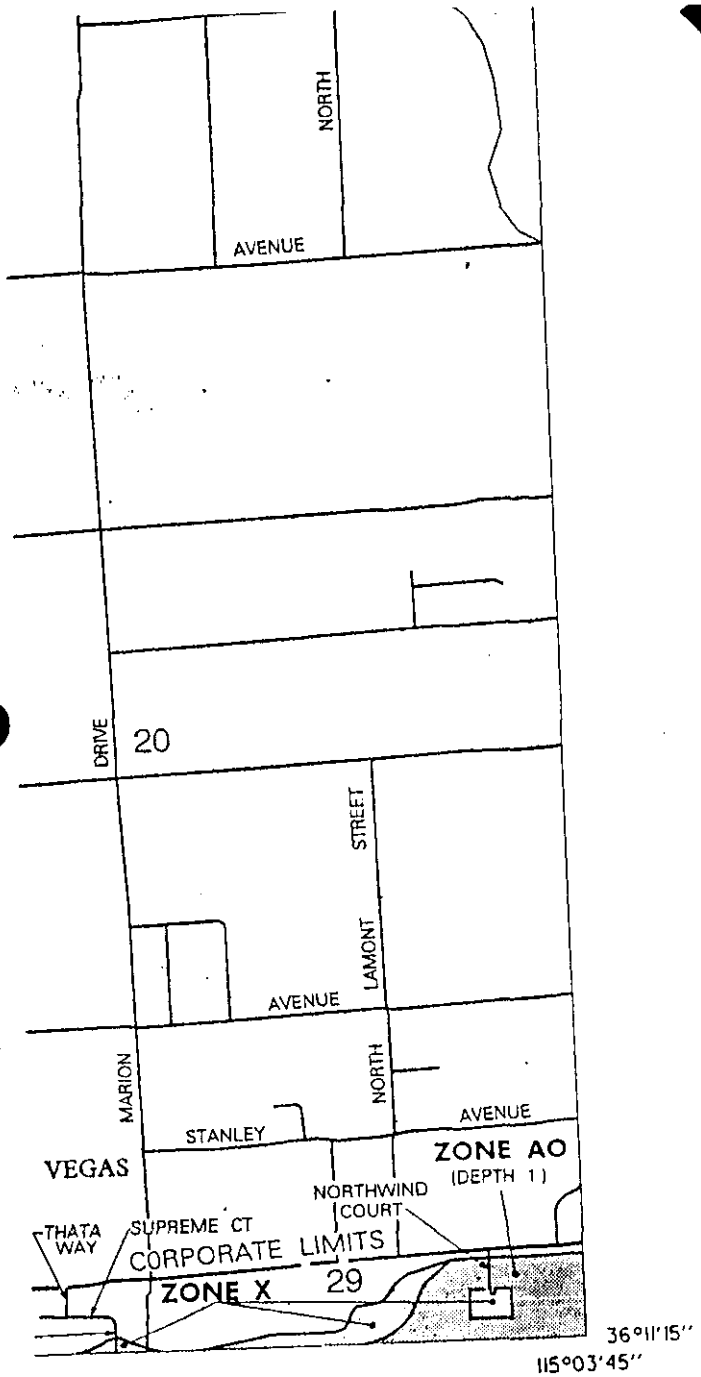
COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2176	D
NORTH LAS VEGAS, CITY OF	320007	2176	D

REVISED TO REFLECT LOMR DATED JAN 28 1997

MAP NUMBER
32003C2176 D

EFFECTIVE DATE:
AUGUST 16,1995

Federal Emergency Management Agency



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2180 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2180	D
LAS VEGAS, CITY OF	325276	2180	D
NORTH LAS VEGAS, CITY OF	320007	2180	D

REVISED TO REFLECT LOMR DATED JAN 28 1997

MAP NUMBER 32003C2180 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IX - Mitigation Division - Presidio of San Francisco, Building 105 - San Francisco, California 94129

Date: 17 November 1996

To: Kevin Eubanks, P.E.
Clark County Regional Flood Control District

From: Les Sakumoto, P.E.,
Civil Engineer, Region IX

Kevin:

This letter is to inform you that we have temporarily stopped work on the restudy for the upper Las Vegas Wash. This is the work being done for FEMA by Northwest Hydraulics. The restudy will be resumed after the CLOMR for the Range Wash diversion levee is resolved. Also, because the LMMP for Las Vegas Wash between Interstate 15 and Charleston was predicated on accreditation of all upstream structures, we will postpone the Preliminary FIRMs for this area until the CLOMR is resolved. If you have any questions about this matter, please give me a call at 415-923-7183.

File Copy

cc: Tom Smith & Pernil B.

File: CCFCD001

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 05 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:

Mr. Kevin L. Eubanks
Assistant General Manager
Clark County Regional Flood Control District
301 East Clark Avenue, Suite 301
Las Vegas, Nevada 89101

Case No.: 96-09-483P
Communities: City of North Las Vegas and Clark County, Nevada
Community Nos.: 320007 and 320003

316-AD

Dear Mr. Eubanks:

This is in reference to your February 20, 1996, request for a Letter of Map Revision (LOMR) to the Flood Insurance Rate Map (FIRM) for the above-referenced communities. You requested that the Federal Emergency Management Agency revise the effective FIRM for Clark County, Nevada and Incorporated Areas to show the effects of the construction of the West Range Wash Diversion Dike (WRWDD), updated topography, hydrologic and hydraulic analyses, and channel modifications along the eastern and western branches of Range Wash from just upstream of Las Vegas Boulevard to approximately 800 feet upstream of the Union Pacific Railroad. We are also reviewing a request for a Conditional Letter of Map Revision for the Range Wash Confluence Detention Basin and a request for a Letter of Map Revision Based on Fill for Magnolia Estates west of Sloan Channel and south of Stewart Avenue.

We have reviewed the submitted information and determined that a revision to the effective FIRM may be warranted. The WRWDD is located in an area subject to alluvial fan flooding, which is characterized by high-velocity flows, erosion, sediment transport and deposition, and unpredictable flow paths. The WRWDD is intended to intercept and divert flows from the western tributary of Range Wash and direct them to the North Las Vegas Detention Basin (NLVDB). Data requirements for map revision requests involving structural flood-control measures in areas subject to alluvial fan flooding are described in Section 65.13 of the National Flood Insurance Program regulations.

Boyle Engineering Corporation (BEC) used the HEC-6 scour and deposition computer model to estimate the sediment load that may be deposited along the diversion dike. BEC estimated the volume of that deposit to be approximately 32.1 acre-feet, 37 percent of which occurs at the peak flow. Thus, a total of 11.8 acre-feet of sediment was assumed to accumulate at the dike during the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for a discharge of 7,028 cubic feet per second.

BEC modeled the flows from the apex of the fan to just upstream of the dike as conveyed in a single channel approximately 330 feet wide. A trapezoidal channel along the upstream face of the diversion dike conveys the base flood westward into the NLVDB. To model the transition from the single channel along the alluvial fan to the channel along the upstream face of the dike, an average of both channel widths (approximately 232 feet) was used in the computations. The results from the HEC-6 model, the alluvial fan model, and procedures for determining scour geometry below dam outlet structures were used to estimate the height of sediment deposition. According to BEC's calculations, the sediment deposition at the diversion dike is approximately 5.6 feet high. This was based on the total area of the sediment deposit (determined from the volume of deposition and the average channel width) and the change in slope between the alluvial fan and the grade along the upstream face of the dike. Post, Buckley, Schuh and Jernigan, Inc., prepared the hydrologic analysis for this LOMR request based on the results of BEC's analyses.

We believe BEC's approach is reasonable but are concerned that because the flow is intercepted by a flood-control structure located perpendicular to the direction of flow, velocities at the structure are approximately zero and the accompanying sediment load will be deposited where the flow changes direction. In this case the sediment load will not deposit continuously along the upstream face of the dike, as indicated by BEC's one-dimensional analysis.

We are concerned that the sediment deposition at the dike may be high enough to prevent the structure from operating properly. If the dike is overtopped by flows during the base flood, the submitted hydrologic analyses will not be valid for areas downstream of the dike. Unless we receive information that verifies that the facility will operate properly, that the sediment deposition approaching the dike in a perpendicular direction will not jeopardize the function of the dike and that the flow is diverted to NLVDB, we cannot credit this structure as providing protection for the base flood. The information must also demonstrate that there will be 3 feet of freeboard at any given time during the base flood.

We are also concerned that the left bank (looking downstream) of the diversion channel located along the WRWDD between stations 58+00 and 62+00, as shown on the construction plans entitled "West Range Wash Diversion Dike" prepared by BEC, dated January 1993, may erode as a result of increased flow velocity, change in channel width, and channel alignment. Please submit information on the erosion protection provided along this reach of the channel.

Before a final determination on revising the effective FIRM can be made, we must receive the information stated above. Please send the required data directly to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Attention: Ms. Pernille Buch-Pedersen
(703) 317-6224

For identification purposes, you must include the case number referenced above on all correspondence.

If you have any questions regarding this matter, please contact Mr. Karl Mohr of our staff in Washington, DC either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

Michael Buckley

Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

cc: The Honorable Yvonne Atkinson Gates
Chairperson
Clark County Board of Commissioners

The Honorable James K. Seastrand
Mayor, City of North Las Vegas

Mr. Randall S. Tarr, P.E.
Administrator of Development and Flood Control
City of North Las Vegas

Mr. Robert B. Thompson, P.E.
Civil Engineer III
Clark County Department of Public Works

Mr. Donald W. Davis, P.E.
Project Manager
Post, Buckley, Schuh & Jernigan, Inc.

bcc: Regional Director R9-MT
MT-HZ-ID Chron MT-HZ-ID
MBJ Case File/PBP/HSS
MBJ Project File

Concurrences: MT-HZ-ID De Coca MT-HZ-ID Mohr

DRAFT
Not for Distribution

MEMORANDUM

TO: Les Sakumoto, FEMA Region IX

FROM: Ed Wallace, NHC

DATE: August 29, 1996

SUBJECT: Review of flood control diversion structures, Las Vegas Wash Study Area

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The attached notes summarize our preliminary review of three diversion structures in the Upper Las Vegas Wash study area. The notes are based on site reconnaissance and review of design information provided by the local agencies, the Technical Evaluation Contractor (TEC) and other sources. This information is provided for the purpose of facilitating discussion of anticipated performance of the structures between you, appropriate TEC staff, and NHC. We strongly recommend that its distribution be limited to these individuals.

Please note that the attached notes are not intended to be a complete design review or performance evaluation. Rather, they summarize our thought regarding the performance of the structures based on the information we have reviewed. Although we believe that we have conducted a through information search, additional relevant information could be available. We have not, for example, directly contacted design engineers to request design information.

The field reconnaissance, information search, and review of available information have been accomplished according to the budget allocated to these tasks in our scope of work. After completion of our review, we are unable to conclude with certainty that the structures will preform adequately during major flood events. Failure of two of these structures would not affect peak discharges downstream in our study area. However, we recommend that uncertainties in the performance of all three structures, and their effects on regional flood hazards, be discussed with the TEC.

We are available for a telephone conference to discuss these topics on September 12, as you suggested in our August 13 meeting. If necessary for effieicent review of plans and site maps, we would also be available for a personal meeting with you and the TEC on that date or other date by arrangement.

cc Tom Smith, Michael Baker Jr., Inc.
Will Thomas, Michael Baker Jr., Inc.

c:\5001_\50010\8-29les.fax

DRAFT
Not for Distribution

Clark County FIS
Review Notes
Diversion Structures on Alluvial Fans

1. General Description

A. Upper Las Vegas Wash Interception Berm

- 300' bottom width
- bottom slope 0.0067 ft/ft; 0.01ft/ft at downstream end
- drop structure used to control gradient
- 12" RCC slope protection on right bank, 6' toe down protection, 12" nominal riprap on the left bank
- flow enters at 45 degree angle to channel
- inflowing wash surface slope approximately 0.015 ft/ft, distributed flow in wash between fans

B. North Las Vegas Detention Basin Diversion Dike

- located on Las Vegas Wash channel approximately 2000 feet upstream of detention basin
- flow makes a 45 degree bend to the right at diversion dike; bed slope of influent wash channel is approximately 0.01 ft/ft; width is 140 feet
- transition to constructed channel is made in control structure; channel bed slope at diversion dike is 0.002 ft/ft, increases to 0.0076 ft/ft downstream of control structure; channel decreases from 70 feet width along the diversion to 35 feet downstream of the control structure
- diversion dike and control structure have 6" thick concrete slope protection with 5' and 8' deep cutoff walls on upstream and downstream sides; channel downstream has soil cement lining to 300' upstream of basin
- top elevation of diversion dike is 2142; top of embankment at detention basin is 2144; spillway crest is 2134
- The control structure forces a transition to supercritical flow, and controls the water surface elevations upstream at the diversion dike.

C. Range Wash Diversion Dike

- 120' bottom width
- bottom slope approximately 0.01 ft/ft in collection channel; 0.02 ft/ft at

downstream end
- dike slope unprotected in collection section; 12" - 24" soil cement in downstream section at higher gradient
- flow enters at 90 degree angle
- inflowing fan slope approximately 0.04

2. Available Information

A. Upper Las Vegas Wash Interception Berm

1. Black & Veatch Pre-Design Report, 1989 (No Design Report Available)
2. Supplement to CLOMR prepared by Black & Veatch, 1991
   - used computed 100-year flow depth (4.5') plus 3 feet plus 0.75 feet inflowing velocity head to determine height of berm above channel bed
   - gabion protection on left bank, mentioned in CLOMR, not constructed, replaced with riprap
   - channel velocities 10-11 fps
   - compared sediment transport on the fan to transport in the channel to evaluate potential for deposition and erosion - used Meyer, Peter and Muller (MPM) and Toffaleti
   - MPM at fan apex for 100-year hydrograph gives 9.46 af ; in interception channel gives 8.11 af - - 1.35 af of deposition, assumed to occur over 1,000 feet of channel area - gives 2 to 3 inches of deposition
   - Toffaleti at fan apex gives 49 af and in channel gives 61 af ; degradation of 12 af. Used USBR 3-slope method to estimate degradation of 3.9 feet
   - Estimated degradation volume using MPM and Toffaleti (in channel only) and applied USBR 3-slope method to estimate degradation depths of 3.2 and 8.7 feet over 970 and 2,700 foot reaches - assumed conservative because no contribution used from fan. Averaged two methods to get 6.0 feet of degradation.
   - Used four methods from USBR to estimate scour, averaged results to get 4.7 feet of scour
   - Used degradation and scour estimates to set toe down protection depth of 6 feet on right bank

B. North Las Vegas Detention Basin Diversion Dike

1. Design flows into the NLVDB are available from HEC-1 modeling by Black & Veatch. The 100-year design flow was 14,900 cfs; generated by the Sheep Mountain Storm. This flow has been reduced by construction of the Upper Las Vegas Detention Basin.

2. The Interbasin storm produces the highest peak discharge in the channel between the two basins under existing conditions, as shown in draft hydrology by NHC. The 100-year peak flow is approximately 8,500 cfs.

3. No design report is available for the NLVDB, and no information has beenreceived by NHC regarding hydraulic or sediment transport design of the diversion dike, control structure and inflow channel.

C. West Range Wash Diversion Dike

1. Flood Insurance Restudy for West Range Wash, Post, Buckley, Schuh, & Jernigan, 1996, TSDN (Contains Boyle Engineering design documentation)

- PSIA method used to estimate sediment yield, multiplied by a factor of 7 to obtain 100-year event yield. Average annual yield in the range of 0.3 to 0.5 af/sq mi
- Used Dawdy equation to estimate channel geometry on fan surface for the purpose of computing transport capacity. Computed channel is 330' wide.
- Used HEC-6 to develop inflowing load based on equilibrium conditions
- Compared hand computations using Yang equation to HEC-6 result
- Also computed average annual sediment yield by integrating event yields based on transport relationships
- Computed deposition in channel by comparing fan transport and dike transport - 65,000 tons - used time of peak as critical point - 36.8% of total event transport
- Used USBR method for estimating degradation below dams to estimate depth of deposition - result is 5.64 feet
- Sized dike by adding deposition depth, energy head and 3 feet of freeboard
- Scour not explicitly addressed in FIS TSDN

3. Evaluation of Available Information

A. Consequences of Failure

1. For both the Upper Las Vegas Wash Interception Berm and the West Range Wash Diversion Dike, failures would result in flooding outside the study area. The most conservative assumption for the purpose of computing flows in Las Vegas Wash is that the dikes remain in place.

2. Failure of the diversion dike at the North Las Vegas Detention Basin would significantly increase peak discharges downstream due to loss of control from the detention basin. 100-year peak flows could be more than tripled.

B. Upper Las Vegas Wash Interception Berm

1. Performance questions relate to unsteady flow and local sediment transport conditions as flows enter the interception channel. Comparison of sediment transport at the apex of the fan and in the channel at steady state does not address the question of whether deposition that affects capacity or stability will occur as flow enters the channel.

2. The two methods used yield opposite results - MPM predicts deposition while Toffaleti predicts scour. Confidence in either result should be very low based on the opposite trends indicated.

3. The USBR 3-slope method applies to degradation below dams, and is intended for use in predicting long term degradation based on bankfull channel flows. It is not applicable to this situation where flows are infrequent, vary rapidly, and inflowing sediment loads may be very high.

4. Four USBR methods for estimating scour were averaged to design the toe-down protection (calculation not reviewed). Calculations may have been based on the constructed channel geometry, rather than the channel configuration likely to occur in a flood. Local deposition along the north bank could train the flow along the south bank, increasing scour potential.

5. The orientation of the interception channel at 45 degrees to the entering flow will reduce the chance of local deposition that would completely block the channel or result in ramping over the south bank. The ground adjacent to the channel along the north bank is 2-4 feet lower than the top of the berm on the

south bank. If deposition occurs locally, flows could go around deposited sediments across adjacent ground. The general ground slopes to the southeast at 45 degrees to the channel alignment.

6. Flow reaching the interception berm has already turned to parallel fan contours in the wash between coalescing and opposing fans. It is unlikely that flow would enter the channel at a single point, but would more likely be distributed among several inlet channels.

7. Based on geomorphic inspection, the structure appears likely to function adequately to divert the 100-year design storm to the basin. This is based on the orientation of the channel, width of the channel, likelihood of distributed inlet flows, relatively small change in bed slope between the wash and constructed channel, and presence of bank and toe protection on the southern bank. However, the methodology used for estimated deposition and scour in the channel may not accurately predict its performance. The lack of performance history and/or more detailed assessment of unsteady flows with high sediment/debris loads leads to considerable uncertainty in expected performance.

B. North Las Vegas Detention Basin Diversion Dike

1. HEC-2 modeling results using the Interbasin storm show critical depth at some sections upstream of the diversion dike. The computed energy grade line for the 100-year flow in the channel just upstream of the diversion dike exceeds the top of the dike by 0.3 feet, and the computed water surface elevation at the dike is 2141.9. The top of the dike is elevation 2142.

2. The diversion dike is protected by a 6" thick concrete facing, but has no structure for energy dissipation or apron on its downstream side. Flow over the dike has the potential to undermine the 8 foot cutoff wall. In some areas the bottom of the cutoff wall is at elevation 2131, approximately 5 feet above the wash invert elevation of 2126. The design of the structure is not typical of hydraulic structures such as spillways or diversion weirs associated with dams.

3. The change in flow direction, channel dimensions, and slope that occur at the dike make its performance difficult to predict. However, there is potential for deposition of sediments as the transition occurs from flow in the natural wash to the constructed channel. Deposition would increase the likelihood for the dike to be overtopped.

4. Computed velocities in the constructed channel downstream of the control structure for the 100-year Interbasin storm are up to 20 fps. The integrity of the soil cement channel lining to withstand these velocities is questionable.

5. Performance of the dike under the 100-year Interbasin storm is uncertain. If considered a levee, FEMA standards for freeboard are not met. If considered a hydraulic structure, the design does not appear to conform to typical standards. Failure of the dike would significantly increase peak discharges downstream, from approximately 2,300 cfs to as high as 8,500 cfs.

C. West Range Wash Diversion Dike

1. Event sediment yield was estimated using the PSIA method, adjusted by a factor; and by computing transport in theoretical channel on the fan. Results agree reasonably well, but considerable uncertainty still exists in the event estimate on this steep fan surface (4%).

2. Deposition volume in the channel was computed by comparing HEC-6 results for a theoretical channel on the fan and the constructed channel. This analysis assumes a quasi-steady state sediment transport equilibrium. Actual flood conditions would be unsteady, and local hydraulic conditions at the junction of the fan channel and constructed channel can not be adequately analyzed using HEC-6.

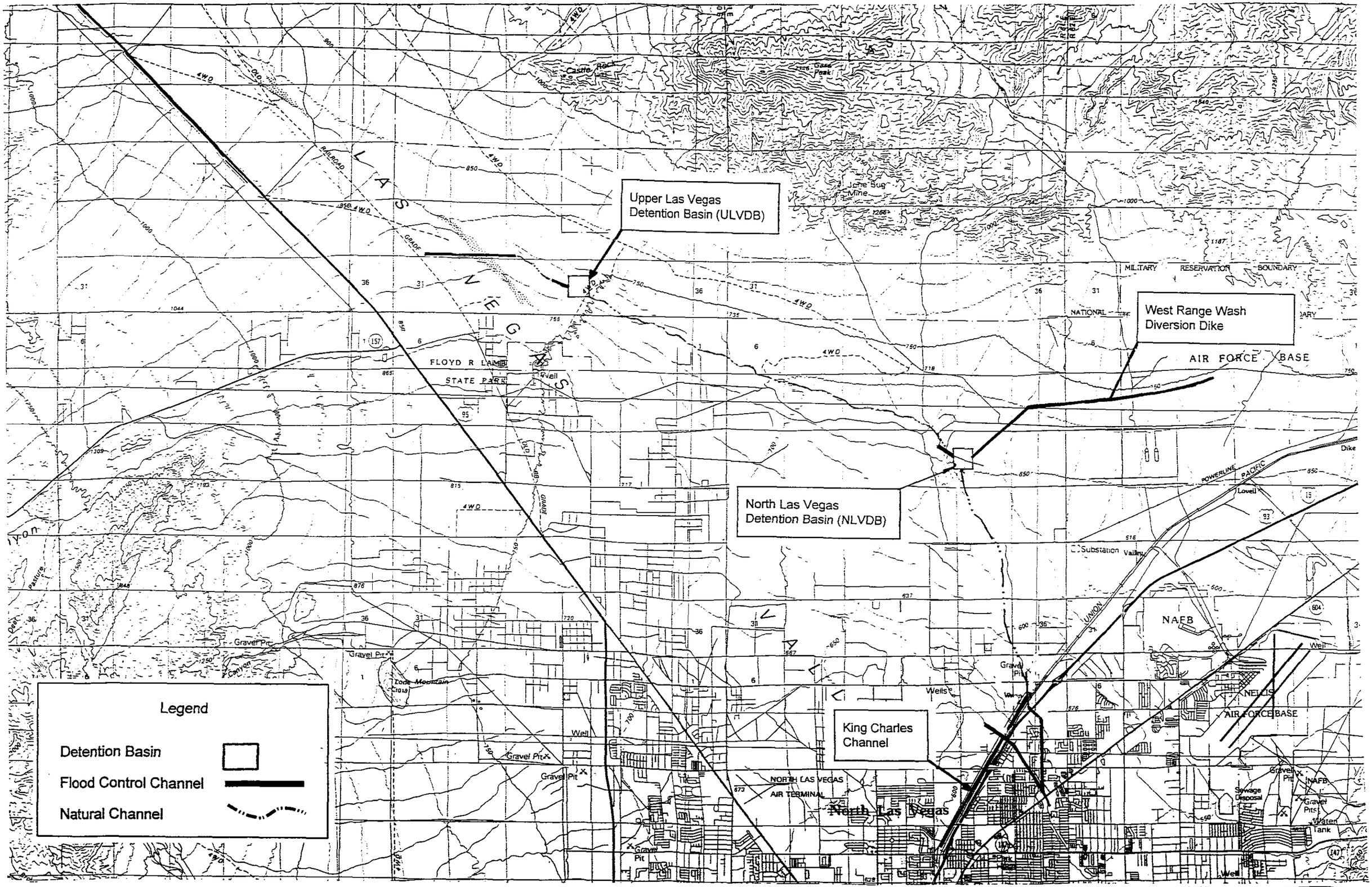
3. HEC-6 computed 36.8% of the total deposition occurs at the peak discharge of 7050 cfs. However, within 1 hour of the peak discharge 72% of the total deposition occurs at a discharge of 5900 cfs. Therefore, the greatest combined depth of deposits and flow may occur following the peak of the hydrograph.

4. The energy grade line of the incoming channel is near the top of the diversion dike, and the intersection occurs at 90 degrees. An alternative method for computing theoretical channel dimensions (Edwards & Thielmann, 1982) yields a higher energy grade line, exceeding the top of the dike.

5. Deposition is likely to occur locally near the north bank of the channel, causing the flow to split and potentially to be trained against the south bank of the channel. This channel slope is unlined and could erode rapidly where local turbulence or channel migration occurs.

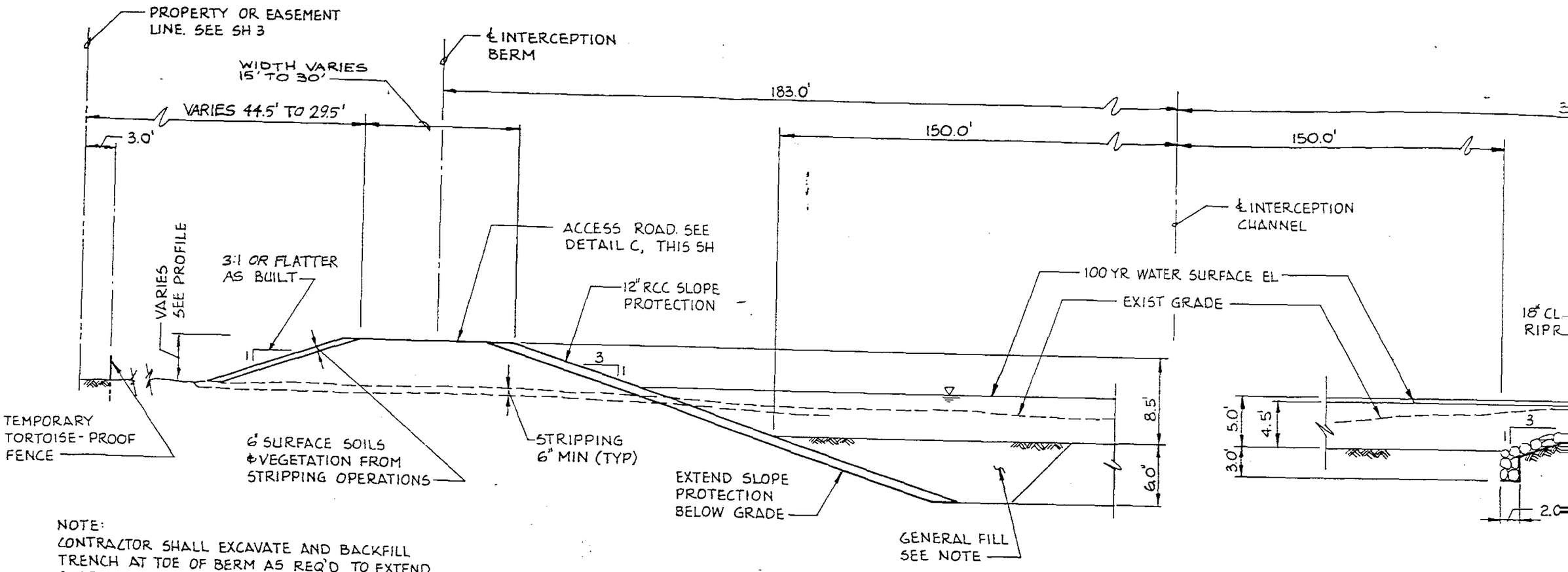
6. In some areas, the flow entering the diversion channel is deflected to the east (or upstream direction) by remnant gunnery berms upstream of the diversion channel. This change in direction will likely cause deposition at the confluence of the diversion channel and the incoming channel. Scour will likely occur downstream of the confluence as the flow gains energy.

7. The design estimates for the amount of deposition at the confluence of the fan and the diversion channel may be low. More conservative assumptions indicate flow could ramp over the berm. High energy flows will likely result in significant scour of the unlined diversion channel. The combined effects of local deposition and scour make performance of the dike uncertain.



Location Map

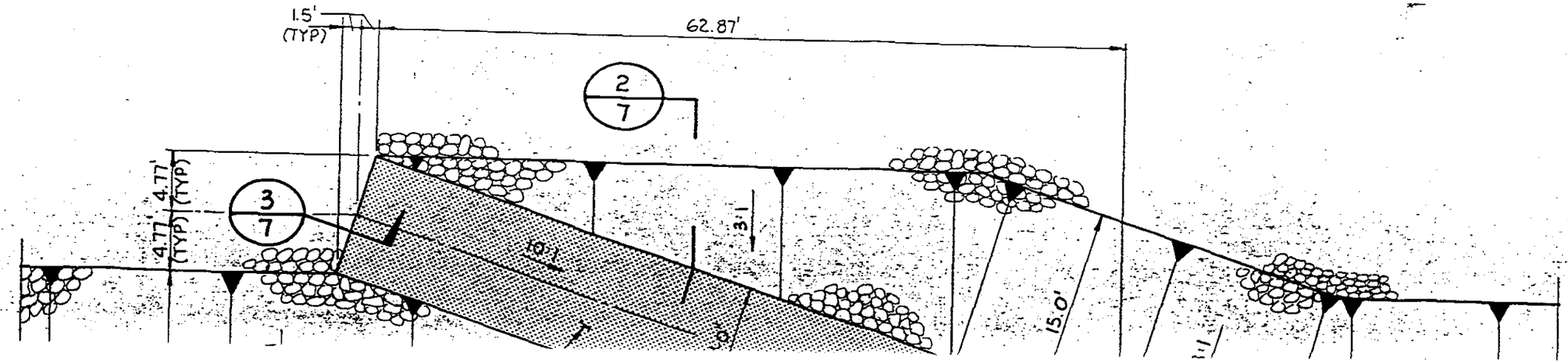
Upper Las Vegas Det. Basin



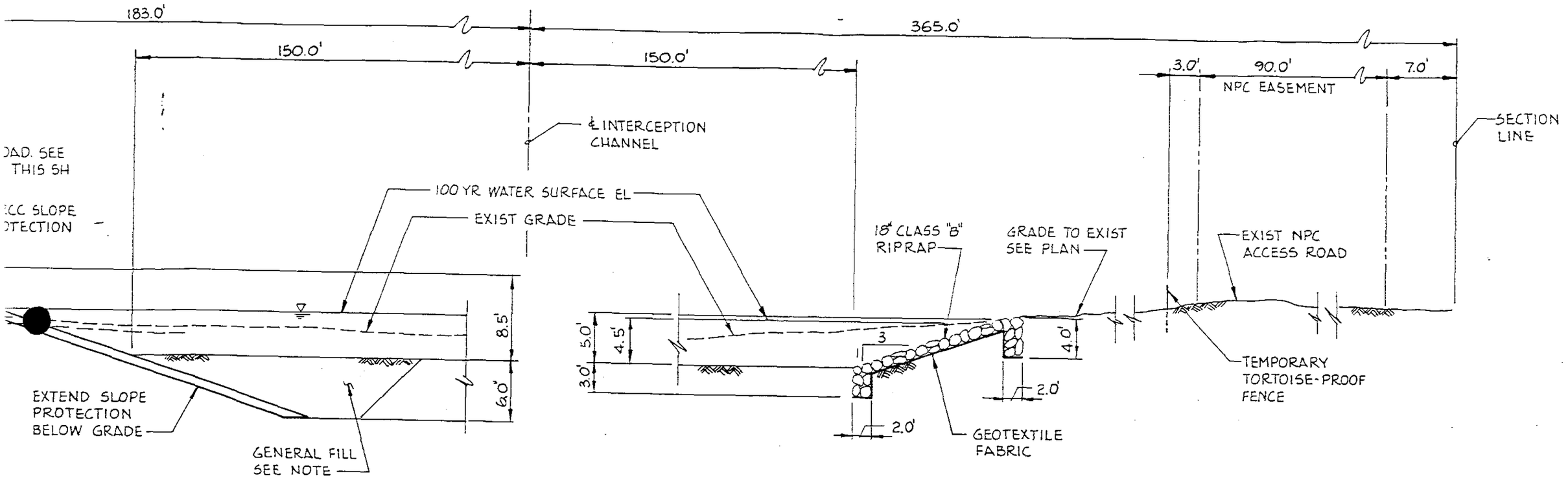
NOTE:
CONTRACTOR SHALL EXCAVATE AND BACKFILL TRENCH AT TOE OF BERM AS REQ'D TO EXTEND SLOPE PROTECTION BELOW GRADE.

INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1" = 10'

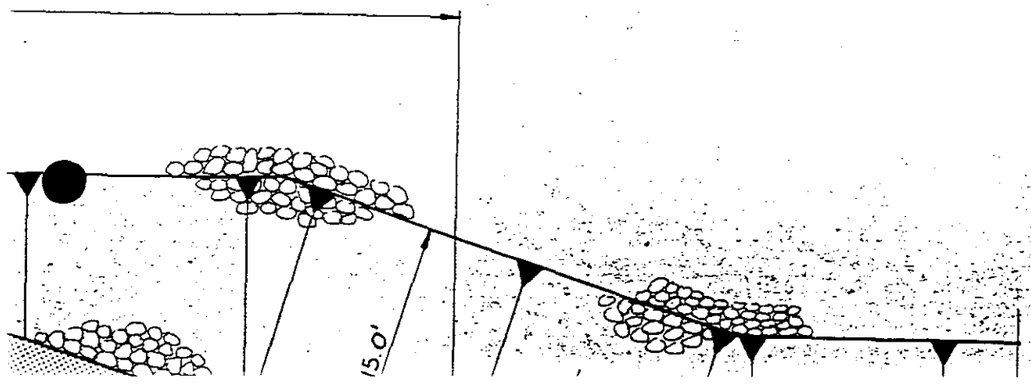


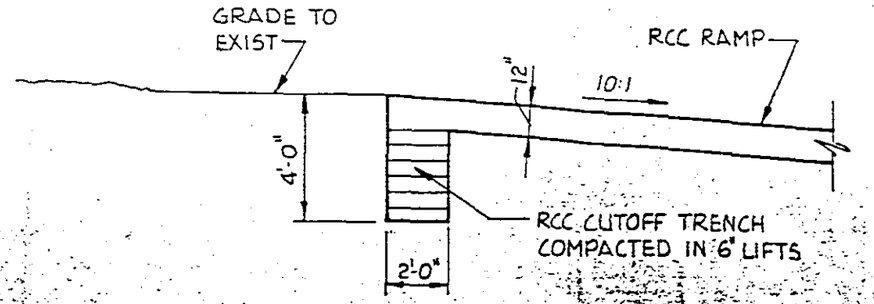
Upper Las Vegas Det Basin



INTERCEPTION BERM/CHANNEL CROSS SECTION (1 / 4,5,6)

1" = 10'

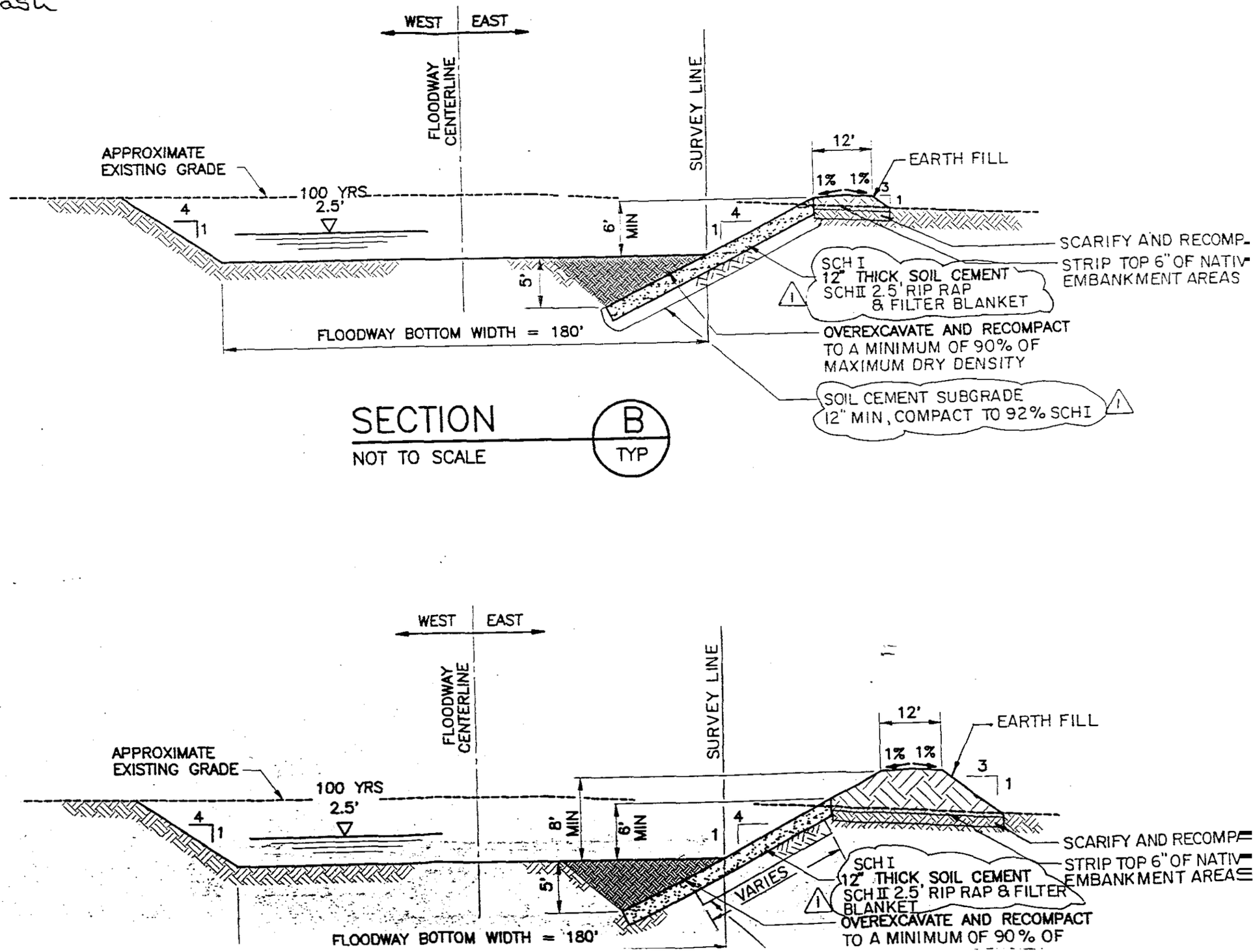




RCC CUTOFF T
COMPACTED I

Sht DT-1

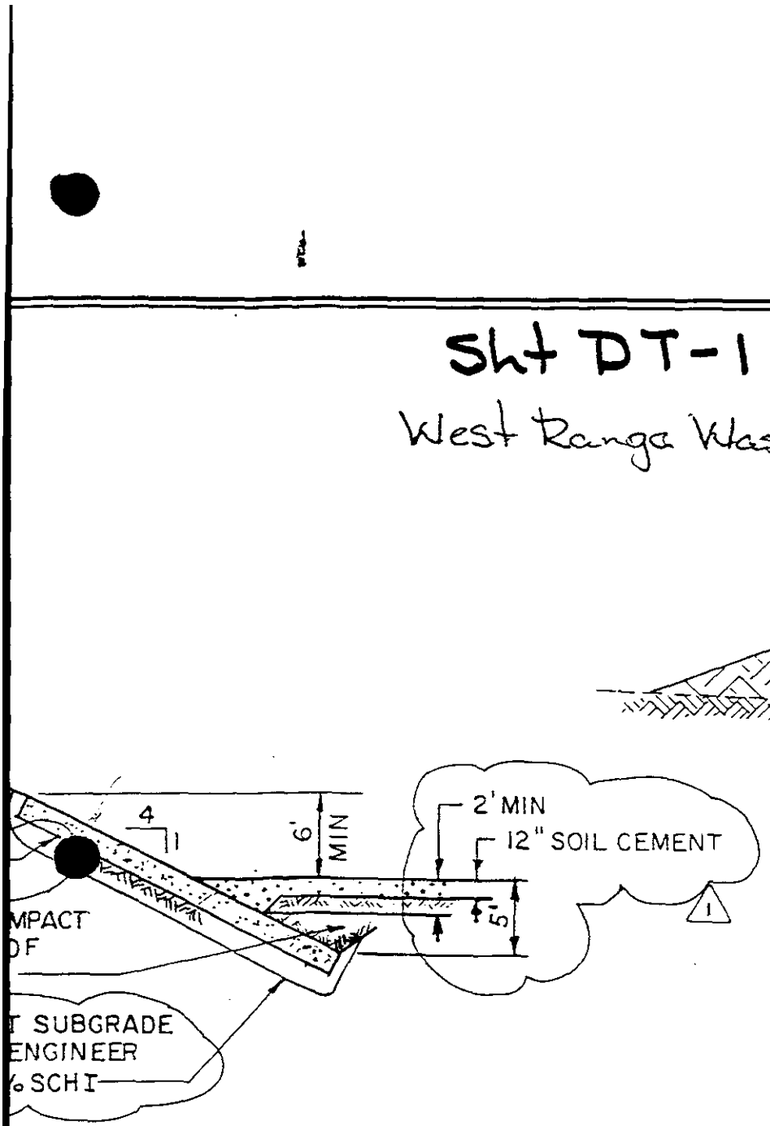
West Range Wash



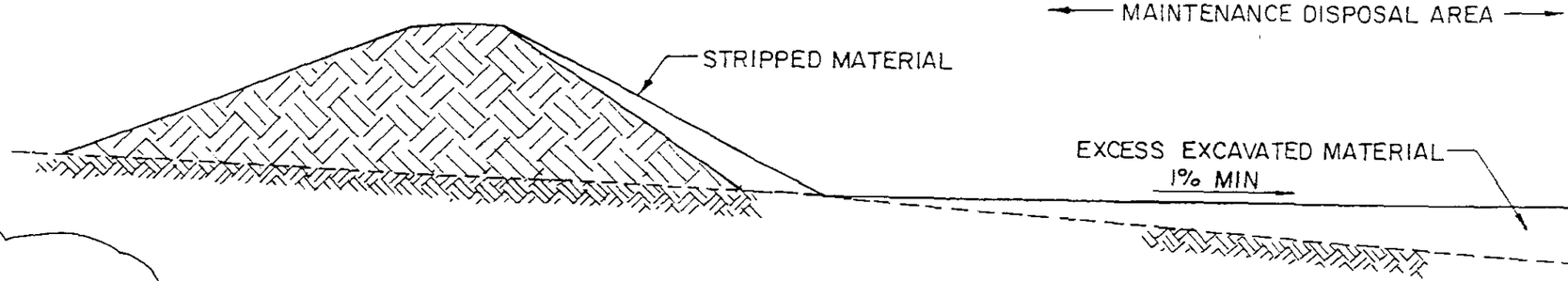
SECTION B
NOT TO SCALE TYP

Sht DT-1

West Ranga Wash



G
F-1



NOTES

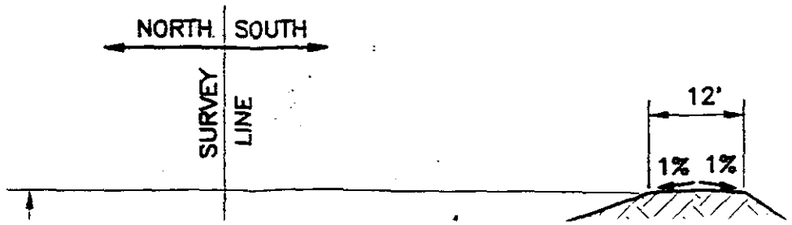
1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING.~~ (1)
2. EXCESS EXCAVATED MATERIAL SHALL BE PLACED IN MAINTENANCE DISPOSAL AREA. COMPACT TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY.

SECTION

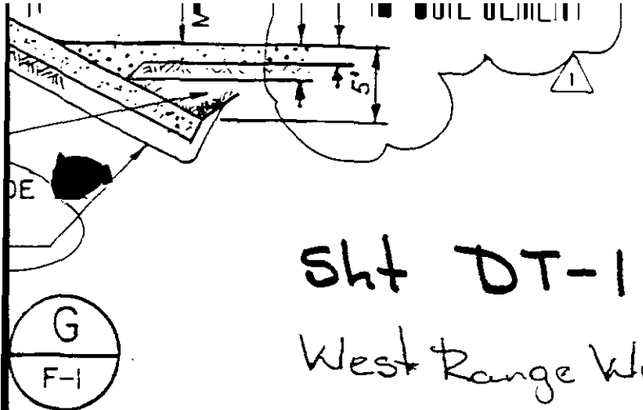
NOT TO SCALE

D
—





3



Sht DT-1

West Range Wash

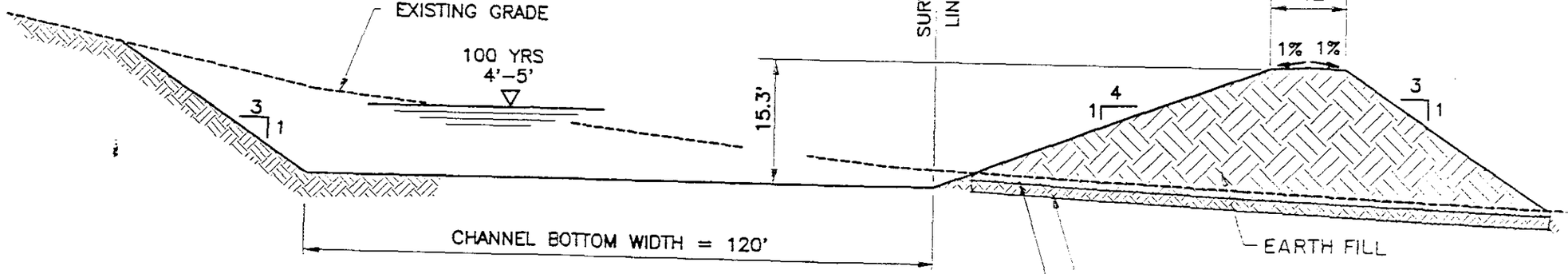
G
F-1

NOTES

1. STRIPPED MATERIAL SHALL BE STOCKPILED. PLACED STRIPPED MATERIAL ON DOWNSTREAM DIKE FILL ~~FOLLOWING FINAL CROSS SECTIONING~~ 1
2. EXCESS EXCAVATED MATERIAL SHALL BE PLACED IN MAINTENANCE DISPOSAL AREA. COMPACT TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY.

SECTION
NOT TO SCALE
D
—

RECOMPACT 9" MIN DEPTH
OF NATIVE SOILS BENEATH
AREAS.



SECTION
NOT TO SCALE
E
TYP

WEST
EAST



```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    22APR98    TIME   06:25:11 *
 *****************************************
```


```
**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*        (916) 756-1104              *
**************************************
```


```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX  XXXXX              XXXXXXX
```

1
22APR98 06:25:11 PAGE 1

THIS RUN EXECUTED 22APR98 06:25:11

```
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC
        DRAFT
T1      FEMA - CLARK COUNTY
T2      NORTH LAS VEGAS DETENTION BASIN DIVERSION CHANNEL
T3      FILE: NLVDET1.DAT        DATE : 5-10-96

      - THE CROSS SECTION GEOMETRY IS FROM THE MONTGOMERY ENGINEERS, 1983
        LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL DRAWINGS.  REFERENCE
        SHEET 7.

      - CRITICAL DEPTH WAS USED AS THE STARTING WATER SURFACE ELEVATION
        FOR EACH PROFILE INSTEAD OF THE MAXIMUM BASIN WATER SURFACE ELEVATION
        THE WATER SURFACE UPSTREAM OF THE CONTROL STRUCTURE IS CONTROLLED
        BY THE CONTROL STRUCTURE AND IS INDEPENDENT OF THE STARTING WATER
        SURFACE


J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                              -1                .1              2117.9


NC      .04       .04       .025       .1        .3

QT        4      2939      6751       8537     17855

    LINE "A" STA 27+61.6
X1        0         8      1000     1117.1
GR     2145      1000    2128.6       1030    2114.6      1058    2114.4    1075.5    2114.6      1093
GR   2126.6      1117    2126.6     1117.1      2144    1186.7


X1    582.2                                    582.2     582.2     582.2                4.42


X1   1164.4                                    582.2     582.2     582.2                4.42
    LINE "A" STA 10+15
    D/S FACE OF CONTROL STRUCTURE
1
   22APR98      06:25:11                                                                  PAGE    2


X1   1746.6         6       1015     1114.4     582.2     582.2     582.2
GR     2145      1000       2145       1015    2127.7    1047.2    2127.5    1064.7    2127.7    1082.2
GR     2145    1114.4


NC                                      .3        .5
    LINE "A" STA 9+85
    U/S FACE OF CONTROL STRUCTURE
    D/S FACE OF TRANSITION
X1    1776.6                                    30        30        30                 .23
    LINE "A" STA 9+00
    U/S FACE OF TRANSITION
    D/S END OF DIVERSION DIKE

X1   1861.6         6       1015     1192.8       85        85        85
GR     2142      1000       2142       1015    2128.5    1068.9    2127.9    1103.9    2128.5    1138.9
GR     2142    1192.8
```

```
 NC                                        .1          .5
     LINE "A" STA 6+35.6
     NEAR INTERSECTION OF LINE "C" (LAS VEGAS WASH) AND LINE "A"
 X1     2211          6       1000     1193.7      349.4      349.4      349.4
 GR     2145       1000     2129.1     1063.6     2128.6     1098.6     2129.1     1133.6     2141.5     1183.2
 GR     2142    1193.7
     LINE "A" STA 2+00
     U/S END OF DIVERSION DIKE

 X1   2561.6          6       1000     1187.3      350.6      350.6      350.6
 GR     2145       1000     2129.9     1060.4     2129.4     1095.4     2129.9     1130.4     2141.5     1176.8
 GR     2142    1187.3



 X1     3000                                        438.4      438.4      438.4                    .88

 X1     3500                                          500        500        500                      1

 X1     4000                                          500        500        500                      1

 X1     4500                                          500        500        500                      1

 X1     5000                                          500        500        500                      1
1
    22APR98      06:25:11                                                                          PAGE    3


 X1     5500                                          500        500        500                      1

 X1     6000                                          500        500        500                      1

 X1     6500                                          500        500        500                      1

 X1     7000                                          500        500        500                      1

 X1     7500                                          500        500        500                      1



1
    22APR98      06:25:11                                                                          PAGE    4

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *PROF 1
0

 CCHV=     .100 CEHV=     .300
 *SECNO   .000
 3720 CRITICAL DEPTH ASSUMED
       .000       5.52    2119.92    2119.92    2117.90    2122.13       2.21        .00        .00    2145.00
     2939.0         .0     2939.0         .0         .0      246.2         .0         .0         .0     2126.60
        .00        .00      11.94        .00       .000       .025       .000       .000    2114.40    1047.37
    .005982         0.         0.         0.          0         13          0        .00      56.26    1103.63


 *SECNO 582.200

 1645 INT SEC ADDED BY RAISING SEC    582.20,  -3.315 FT AND MULTIPLYING BY   1.000

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      1.010       5.52    2121.02    2121.02        .00    2123.24       2.21        .87        .00    2146.10
     2939.0         .0     2939.0         .0         .0      246.2         .0         .8         .2     2127.71
        .00        .00      11.94        .00       .000       .025       .000       .000    2115.50    1047.36
    .005971       146.       146.       146.          3          5          0        .00      56.28    1103.64


 1645 INT SEC ADDED BY RAISING SEC      1.01,   1.105 FT AND MULTIPLYING BY   1.000

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      1.020       5.52    2122.13    2122.13        .00    2124.34       2.21        .87        .00    2147.21
     2939.0         .0     2939.0         .0         .0      246.3         .0        1.6         .4     2128.81
        .01        .00      11.93        .00       .000       .025       .000       .000    2116.61    1047.36
    .005964       146.       146.       146.          3          5          0        .00      56.28    1103.64


 1645 INT SEC ADDED BY RAISING SEC      1.02,   1.105 FT AND MULTIPLYING BY   1.000
```

7185 MINIMUM SPECIFIC ENERGY
3720 *CRITICAL DEPTH ASSUMED*

1.030	5.52	2123.24	2123.24	.00	2125.45	2.21	.87	.00	2148.31
2939.0	.0	2939.0	.0	.0	246.3	.0	2.5	.6	2129.92
.01	.00	11.93	.00	.000	.025	.000	.000	2117.71	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	*VLOB*	*VCH*	*VROB*	*XNL*	*XNCH*	*XNR*	*WTN*	*ELMIN*	*SSTA*
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1645 INT SEC ADDED BY RAISING SEC 1.03, 1.105 FT AND MULTIPLYING BY 1.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

582.200	5.52	2124.34	2124.34	.00	2126.55	2.21	.87	.00	2149.42
2939.0	.0	2939.0	.0	.0	246.3	.0	3.3	.8	2131.02
.01	.00	11.93	.00	.000	.025	.000	.000	2118.82	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

*SECNO 1164.400

1645 INT SEC ADDED BY RAISING SEC 1164.40, -3.315 FT AND MULTIPLYING BY 1.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.010	5.52	2125.45	2125.45	.00	2127.66	2.21	.87	.00	2150.52
2939.0	.0	2939.0	.0	.0	246.3	.0	4.1	.9	2132.13
.02	.00	11.93	.00	.000	.025	.000	.000	2119.92	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

1645 INT SEC ADDED BY RAISING SEC 1.01, 1.105 FT AND MULTIPLYING BY 1.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.020	5.52	2126.55	2126.55	.00	2128.76	2.21	.87	.00	2151.63
2939.0	.0	2939.0	.0	.0	246.3	.0	4.9	1.1	2133.23
.02	.00	11.93	.00	.000	.025	.000	.000	2121.03	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

1645 INT SEC ADDED BY RAISING SEC 1.02, 1.105 FT AND MULTIPLYING BY 1.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.030	5.52	2127.66	2127.66	.00	2129.87	2.21	.87	.00	2152.73
2939.0	.0	2939.0	.0	.0	246.3	.0	5.8	1.3	2134.33
.02	.00	11.93	.00	.000	.025	.000	.000	2122.13	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1645 INT SEC ADDED BY RAISING SEC 1.03, 1.105 FT AND MULTIPLYING BY 1.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1164.400	5.52	2128.76	2128.76	.00	2130.97	2.21	.87	.00	2153.84
2939.0	.0	2939.0	.0	.0	246.3	.0	6.6	1.5	2135.44
.03	.00	11.93	.00	.000	.025	.000	.000	2123.24	1047.36
.005964	146.	146.	146.	3	5	0	.00	56.28	1103.64

*SECNO 1746.600

1645 INT SEC ADDED BY RAISING SEC 1746.60, -3.195 FT AND MULTIPLYING BY 1.012

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.010	5.52	2129.82	2129.82	.00	2132.05	2.23	.87	.01	2141.80
2939.0	.0	2939.0	.0	.0	245.1	.0	7.4	1.7	2141.80
.03	.00	11.99	.00	.000	.025	.000	.000	2124.30	1037.76
.005970	146.	146.	146.	3	5	0	.00	55.45	1093.21

1645 INT SEC ADDED BY RAISING SEC 1.01, 1.065 FT AND MULTIPLYING BY .996

```
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      1.020       5.53    2130.90    2130.90        .00    2133.14       2.24        .87        .00    2142.87
   2939.0          .0     2939.0        .0          .0      245.0          .0        8.2        1.9    2142.87
       .03         .00      12.00        .00        .000        .025        .000        .000    2125.37    1037.58
   .005962       146.       146.       146.          3           5           0         .00      55.29    1092.87


 1645 INT SEC ADDED BY RAISING SEC      1.02,    1.065 FT AND MULTIPLYING BY     .996

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      1.030       5.55    2131.98    2131.98        .00    2134.22       2.24        .87        .00    2143.93
   2939.0          .0     2939.0        .0          .0      244.7          .0        9.0        2.1    2143.93
       .04         .00      12.01        .00        .000        .025        .000        .000    2126.43    1037.40
   .005958       146.       146.       146.          3           5           0         .00      55.12    1092.52


1
    22APR98       06:25:11                                                                                  PAGE     7

     SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          HL          OLOSS       L-BANK ELEV
     Q           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA         R-BANK ELEV
     TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
     SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST


 1645 INT SEC ADDED BY RAISING SEC      1.03,    1.065 FT AND MULTIPLYING BY     .996

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   1746.600       5.56    2133.06    2133.06        .00    2135.30       2.24        .87        .00    2145.00
   2939.0          .0     2939.0        .0          .0      244.6          .0        9.9        2.2    2145.00
       .04         .00      12.02        .00        .000        .025        .000        .000    2127.50    1037.22
   .005951       146.       146.       146.          3           5           0         .00      54.95    1092.18


 CCHV=      .300 CEHV=      .500
 *SECNO 1776.600
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   1776.600       5.56    2133.29    2133.29        .00    2135.53       2.25        .18        .00    2145.23
   2939.0          .0     2939.0        .0          .0      244.4          .0       10.0        2.3    2145.23
       .04         .00      12.03        .00        .000        .025        .000        .000    2127.73    1037.23
   .005965        30.        30.        30.          2           5           0         .00      54.94    1092.17


 *SECNO 1861.600

 1645 INT SEC ADDED BY RAISING SEC   1861.60,    -.128 FT AND MULTIPLYING BY     .643

 3301 HV CHANGED MORE THAN HVINS

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.23

      1.010       7.66    2135.43        .00        .00    2136.06        .64        .05        .48    2141.87
   2939.0          .0     2939.0        .0          .0      459.1          .0       10.2        2.3    2141.87
       .04         .00       6.40        .00        .000        .025        .000        .000    2127.77    1026.20
   .001204        21.        21.        21.          5           0           0         .00      81.27    1107.47


 1645 INT SEC ADDED BY RAISING SEC      1.01,     .043 FT AND MULTIPLYING BY   1.185

 3301 HV CHANGED MORE THAN HVINS

1
    22APR98       06:25:11                                                                                  PAGE     8

     SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          HL          OLOSS       L-BANK ELEV
     Q           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA         R-BANK ELEV
     TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
     SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST


      1.020       7.92    2135.74        .00        .00    2136.15        .41        .02        .07    2141.91
   2939.0          .0     2939.0        .0          .0      570.0          .0       10.5        2.4    2141.91
       .04         .00       5.16        .00        .000        .025        .000        .000    2127.81    1030.23
   .000742        21.        21.        21.          2           0           0         .00      97.93    1128.16


 1645 INT SEC ADDED BY RAISING SEC      1.02,     .043 FT AND MULTIPLYING BY   1.156

 3301 HV CHANGED MORE THAN HVINS

      1.030       8.05    2135.90        .00        .00    2136.20        .30        .01        .03    2141.96
   2939.0          .0     2939.0        .0          .0      672.7          .0       10.8        2.4    2141.96
       .04         .00       4.37        .00        .000        .025        .000        .000    2127.86    1034.52
   .000519        21.        21.        21.          2           0           0         .00      114.06    1148.58
```

1645 INT SEC ADDED BY RAISING SEC 1.03, .043 FT AND MULTIPLYING BY 1.135

1861.600	8.10	2136.00	.00	.00	2136.23	.23	.01	.02	2142.00
2939.0	.0	2939.0	.0	.0	771.1	.0	11.1	2.5	2142.00
.05	.00	3.81	.00	.000	.025	.000	.000	2127.90	1038.94
.000390	21.	21.	21.	2	0	0	.00	129.92	1168.86

CCHV= .100 CEHV= .500

*SECNO 2211.000

2211.000	7.54	2136.14	.00	.00	2136.40	.27	.15	.02	2145.00
2939.0	.0	2939.0	.0	.0	707.7	.0	17.0	3.5	2142.00
.07	.00	4.15	.00	.000	.025	.000	.000	2128.60	1035.47
.000499	349.	349.	349.	2	0	0	.00	126.27	1161.73

*SECNO 2561.600

2561.600	6.91	2136.31	.00	.00	2136.64	.34	.21	.03	2145.00
2939.0	.0	2939.0	.0	.0	630.2	.0	22.4	4.5	2142.00
.09	.00	4.66	.00	.000	.025	.000	.000	2129.40	1034.77
.000696	351.	351.	351.	2	0	0	.00	121.26	1156.03

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3000.000

3000.000	6.34	2136.62	.00	.00	2137.04	.42	.36	.04	2145.88
2939.0	.0	2939.0	.0	.0	562.8	.0	28.4	5.7	2142.88
.11	.00	5.22	.00	.000	.025	.000	.000	2130.28	1037.04
.000963	438.	438.	438.	2	0	0	.00	116.73	1153.76

*SECNO 3500.000

3500.000	5.85	2137.13	.00	.00	2137.65	.52	.56	.05	2146.88
2939.0	.0	2939.0	.0	.0	506.3	.0	34.6	7.0	2143.88
.14	.00	5.80	.00	.000	.025	.000	.000	2131.28	1039.01
.001308	500.	500.	500.	2	0	0	.00	112.79	1151.79

*SECNO 4000.000

4000.000	5.53	2137.81	.00	.00	2138.42	.60	.72	.04	2147.88
2939.0	.0	2939.0	.0	.0	471.0	.0	40.2	8.3	2144.88
.16	.00	6.24	.00	.000	.025	.000	.000	2132.28	1040.27
.001614	500.	500.	500.	2	0	0	.00	110.26	1150.53

*SECNO 4500.000

4500.000	5.36	2138.64	.00	.00	2139.30	.66	.86	.03	2148.88
2939.0	.0	2939.0	.0	.0	452.3	.0	45.5	9.5	2145.88
.18	.00	6.50	.00	.000	.025	.000	.000	2133.28	1040.96
.001816	500.	500.	500.	2	0	0	.00	108.89	1149.84

*SECNO 5000.000

5000.000	5.28	2139.56	.00	.00	2140.24	.68	.93	.01	2149.88
2939.0	.0	2939.0	.0	.0	443.7	.0	50.6	10.8	2146.88
.20	.00	6.62	.00	.000	.025	.000	.000	2134.28	1041.27
.001921	500.	500.	500.	2	0	0	.00	108.26	1149.53

*SECNO 5500.000

5500.000	5.25	2140.53	.00	.00	2141.22	.69	.97	.01	2150.88
2939.0	.0	2939.0	.0	.0	440.1	.0	55.7	12.0	2147.88
.22	.00	6.68	.00	.000	.025	.000	.000	2135.28	1041.41
.001967	500.	500.	500.	2	0	0	.00	107.99	1149.39

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6000.000

6000.000	5.23	2141.51	.00	.00	2142.21	.70	.99	.00	2151.88
2939.0	.0	2939.0	.0	.0	439.2	.0	60.7	13.3	2148.88
.24	.00	6.69	.00	.000	.025	.000	.000	2136.28	1041.44
.001979	500.	500.	500.	1	0	0	.00	107.92	1149.36

*SECNO 6500.000

6500.000	5.22	2142.50	.00	.00	2143.20	.70	.99	.00	2152.88
2939.0	.0	2939.0	.0	.0	438.5	.0	65.8	14.5	2149.88
.26	.00	6.70	.00	.000	.025	.000	.000	2137.28	1041.47
.001988	500.	500.	500.	0	0	0	.00	107.87	1149.33

```
*SECNO 7000.000
  7000.000      5.22   2143.50      .00      .00   2144.20      .70     1.00      .00   2153.88
  2939.0          .0    2939.0       .0       .0     437.5       .0     70.8     15.7   2150.88
      .29        .00      6.72      .00     .000      .025     .000     .000  2138.28   1041.50
  .002002       500.      500.      500.        0         0        0      .00   107.79   1149.30


*SECNO 7500.000
  7500.000      5.22   2144.50      .00      .00   2145.20      .70     1.00      .00   2154.88
  2939.0          .0    2939.0       .0       .0     437.0       .0     75.8     17.0   2151.88
      .31        .00      6.72      .00     .000      .025     .000     .000  2139.28   1041.52
  .002008       500.      500.      500.        0         0        0      .00   107.76   1149.28
```

1

PROFILE FOR STREAM FILE: NLVDET1.DAT

PLOTTED POINTS (BY PRIORITY) E-ENERGY, W-WATER SURFACE, I-INVERT, C-CRITICAL W.S., L-LEFT BANK, R-RIGHT BANK, M-LOWER END STA

```
ELEVATION  2114.     2119.     2124.     2129.     2134.     2139.     2144.     2149.     2154.     2159.
    SECNO  CUMDIS

      .00      0.  I         .W   E     .   R     .         .         .         M.L       .         .         .
              50.   .I       . W   E     .    R    .         .         .         M L       .         .         .
             100.   . I      .  W   E     .    R    .         .         .         .M L      .         .         .
    1.01     150.   . I      .  W    E    .     R   .         .         .         .M L      .         .         .
             200.   .  I     .   W   E     .     R   .         .         .         . M L     .         .         .
             250.   .   I    .    W   E.     .    R  .         .         .         .  M L    .         .         .
    1.02     300.   .   I    .    W    R     .    R. .         .         .         .   M L   .         .         .
             350.   .    I   .     W   .E     .     R .         .         .         .   M L   .         .         .
             400.   .     I  .      W  .E     .     R .         .         .         .    M L  .         .         .
    1.03     450.   .      I .       W . E     .    .R .         .         .         .     M L .         .         .
             500.   .      I .       W .  E     .   . R         .         .         .     M L.        .         .
             550.   .       I.       W.   E     .   . R         .         .         .     M L.        .         .
  582.20     600.   .       I.        W   E     .   . R         .         .         .      M L        .         .
             650.   .        I        .W   E     .   .  R       .         .         .       M.L       .         .
             700.   .        I        .W    E    .   .  R       .         .         .        M L      .         .
    1.01     750.   .        .I       . W   E    .   .  R      .         .         .        M L      .         .
             800.   .        . I      .  W   E    .   .   R     .         .         .        .M L     .         .
             850.   .        .  I     .   W   E    .   .   R    .         .         .        . M L    .         .
    1.02     900.   .        .  I     .   W    E.    .    R   .         .         .        . M L    .         .
             950.   .        .   I    .    W   E.    .    R   .         .         .        .  M L   .         .
            1000.   .        .    I   .     W  E     .     R. .         .         .        .   M L  .         .
    1.03    1050.   .        .    I   .      W .E     .      R .         .         .        .    M L .         .
            1100.   .        .     I  .      W  . E    .      .R         .         .        .    M L .         .
            1150.   .        .      I .       W . E    .      .R         .         .        .     M L .         .
  1164.40   1200.   .        .       I.       W.  E    .      . R        .         .        .      M L.        .
            1250.   .        .       I.       W.   E   .        .  R     .         .        .       M.L       .
            1300.   .        .        I.       W    E   .        .   .R   .         .        .        L        .
    1.01    1350.   .        .        I        .W   E   .        .   .    L         .        .         .       .
            1400.   .        .        .I       . W  E   .        .   .    L         .        .         .       .
            1450.   .        .        .I       . W  E   .        .   .    L         .        .         .       .
    1.02    1500.   .        .        . I      .  W  E   .        .   .    L         .        .         .       .
            1550.   .        .        .  I     .   W  E   .        .   .    L         .        .         .       .
            1600.   .        .        .  I     .   W   E. .        .   .    L         .        .         .       .
    1.03    1650.   .        .        .   I    .    W  E  .        .   .    L.        .        .         .       .
            1700.   .        .        .    I   .     W  E  .        .   .     L        .        .         .       .
  1746.60   1750.   .        .        .     I  .      W . E .        .   .     .L       .        .         .       .
  1776.60   1800.   .        .        .      I .       W . E .        .   .      . L     .        .         .       .
    1.01    1850.   C        .        .      I .         . WE .       .   L      .       .        .         .       .
    1.02    1900.   C        .        .      I .         .  WE .      .   L      .       .        .         .       .
    1.03    1950.   C        .        .      I .         .  WE .      .   L      .       .        .         .       .
  1861.60   2000.   C        .        .      I .         .  WE .      .   L      .       .        .         .       .
            2050.   C        .        .      I .         .  WE .      .   RL     .       .        .         .       .
            2100.   C        .        .      I .         .  WE .      .   R L    .       .        .         .       .
            2150.   C        .        .       I .        .  WE .      .   R  L   .       .        .         .       .
            2200.   C        .        .       I .        .  WE .      .   R   L. .       .        .         .       .
  2211.00   2250.   C        .        .       I .        .  WE .      .   R    .L       .        .         .       .
            2300.   C        .        .        I.        .   E .      .   R    .L       .        .         .       .
            2350.   C        .        .        I.        .   E .      .   R    .L       .        .         .       .
            2400.   C        .        .        I.        .   E .      .   R    .L       .        .         .       .
            2450.   C        .        .        I.        .   E .      .   R    .L       .        .         .       .
            2500.   C        .        .         I        .   E .      .   R    .L       .        .         .       .
            2550.   C        .        .         I        .   E .      .   R    .L       .        .         .       .
  2561.60   2600.   C        .        .         I        .   E .      .   R    .L       .        .         .       .
            2650.   C        .        .         I        .   WE .     .   R    .L       .        .         .       .
            2700.   C        .        .         I        .   WE .     .   R     . L     .        .         .       .
            2750.   C        .        .         .I       .   WE .     .   R     . L     .        .         .       .
            2800.   C        .        .         .I       .   WE .     .   R     . L     .        .         .       .
            2850.   C        .        .         .I       .   WE .     .   R     . L     .        .         .       .
            2900.   C        .        .         .I       .   WE .     .   R     . L     .        .         .       .
            2950.   C        .        .         .I       .   WE .     .   R    .  L     .        .         .       .
  3000.00   3000.   C        .        .         . I      .   WE .     .   R    .  L     .        .         .       .
            3050.   C        .        .         . I      .   E  .     .   R    .  L     .        .         .       .
            3100.   C        .        .         . I      .   WE .     .   R    .  L     .        .         .       .
            3150.   C        .        .         . I      .   WE .     .   R     .  L    .        .         .       .
            3200.   C        .        .         .  I     .   WE .     .   R     .  L    .        .         .       .
            3250.   C        .        .         .  I     .   WE .     .   R     .  L    .        .         .       .
            3300.   C        .        .         .  I     .   WE .     .   R     .  L    .        .         .       .
            3350.   C        .        .         .  I     .   WE .     .   R     .  L    .        .         .       .
            3400.   C        .        .         .  I     .   WE .     .   R.    .  L    .        .         .       .
            3450.   C        .        .         .   I    .   WE .     .   R.    .  L    .        .         .       .
  3500.00   3500.   C        .        .         .   I    .   W E .     .   R.    .  L    .        .         .       .
            3550.   C        .        .         .   I    .    WE .     .   R.    .  L    .        .         .       .
            3600.   C        .        .         .   I    .    WE .     .   R.    .  L    .        .         .       .
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            3650.  C  .  .  .  I  .  WE  .  R  L  .  .  .  .
            3700.  C  .  .  .  I  .  WE  .  R  L  .  .  .  .
            3750.  C  .  .  .  I  .  WE  .  R  L  .  .  .  .
            3800.  C  .  .  .  I  .  WE  .  R  L  .  .  .  .
            3850.  C  .  .  .  I  .  W E .  R  L  .  .  .  .
            3900.  C  .  .  .  I  .  WE  .  .R  L  .  .  .  .
            3950.  C  .  .  .  I  .  WE  .  .R  L  .  .  .  .
 4000.00    4000.  C  .  .  .  I  .  WE  .  .R  L  .  .  .  .
            4050.  C  .  .  .  I  .  WE  .  .R  L  .  .  .  .
            4100.  C  .  .  .  I  .  WE  .  .R  L  .  .  .  .
            4150.  C  .  .  .  I  .  W E  .  . R  L  .  .  .  .
            4200.  C  .  .  .  I  .  W E  .  . R  L  .  .  .  .
            4250.  C  .  .  .  I  .  WE.  .  . R  L  .  .  .  .
            4300.  C  .  .  .  I  .  WE.  .  . R  L  .  .  .  .
            4350.  C  .  .  .  I  .  WE.  .  . R  L  .  .  .  .
            4400.  C  .  .  .  I  .  WE.  .  . R  L.  .  .  .  .
            4450.  C  .  .  .  I  .  W E  .  . R  L.  .  .  .  .
 4500.00    4500.  C  .  .  .  I  .  W E  .  . R  L.  .  .  .  .
            4550.  C  .  .  .  I  .  WE   .  . R  L.  .  .  .  .
            4600.  C  .  .  .  I  .  WE   .  . R  L.  .  .  .  .
            4650.  C  .  .  .  I  .  WE   .  .  R  L  .  .  .  .
            4700.  C  .  .  .  .I.  W.E   .  .  R  L  .  .  .  .
            4750.  C  .  .  .  .I.  W.E   .  .  R  L  .  .  .  .
            4800.  C  .  .  .  .I.  WE    .  .  R  L  .  .  .  .
            4850.  C  .  .  .  .I.  WE    .  .  R  L  .  .  .  .
            4900.  C  .  .  .  .I.  WE    .  .  R  .L  .  .  .  .
            4950.  C  .  .  .  .  I  WE   .  .  R  .L  .  .  .  .
 5000.00    5000.  C  .  .  .  .  I  W E  .  .  R  .L  .  .  .  .
            5050.  C  .  .  .  .  I  .WE  .  .  R  .L  .  .  .  .
            5100.  C  .  .  .  .  I  .WE  .  .  R  .L  .  .  .  .
            5150.  C  .  .  .  .  I  .WE  .  .  R  . L  .  .  .  .
            5200.  C  .  .  .  .I .  .WE  .  .  R  . L  .  .  .  .
            5250.  C  .  .  .  .I .  .W E .  .  R  . L  .  .  .  .
            5300.  C  .  .  .  .I .  .W E .  .  R  . L  .  .  .  .
            5350.  C  .  .  .  .I .  . WE .  .  R  . L  .  .  .  .
            5400.  C  .  .  .  .I .  . WE .  .  R  .  L  .  .  .  .
            5450.  C  .  .  .  . I .  . WE .  .  R  .  L  .  .  .  .
 5500.00    5500.  C  .  .  .  . I .  . W E .  .  R  .  L  .  .  .  .
            5550.  C  .  .  .  . I .  . W E .  .  R  .  L  .  .  .  .
            5600.  C  .  .  .  . I .  .  WE .  .  R  .  L  .  .  .  .
            5650.  C  .  .  .  . I .  .  WE .  .  R  .  L  .  .  .  .
            5700.  C  .  .  .  .  I .  .  WE .  .  R  .  L  .  .  .  .
            5750.  C  .  .  .  .  I .  .  W E .  .  R  .  L  .  .  .  .
            5800.  C  .  .  .  .  I .  .  W E .  .  R  .  L  .  .  .  .
            5850.  C  .  .  .  .  I .  .  WE  .  .  R  .  L  .  .  .  .
            5900.  C  .  .  .  .  I .  .  WE  .  .  R.  .  L  .  .  .  .
            5950.  C  .  .  .  .  . I .  .  WE  .  .  R.  .  L  .  .  .  .
 6000.00    6000.  C  .  .  .  .  . I .  .  W E  .  .  R.  .  L  .  .  .  .
            6050.  C  .  .  .  .  . I .  .  W E  .  .  R.  .  L  .  .  .  .
            6100.  C  .  .  .  .  . I .  .  WE   .  .  R.  .  L  .  .  .  .
            6150.  C  .  .  .  .  . I .  .  WE   .  .  .  R  .  L  .  .  .  .
            6200.  C  .  .  .  .  .  I .  .  WE  .  .  .  R  .  L  .  .  .  .
            6250.  C  .  .  .  .  .  I .  .  W E .  .  .  R  .  L  .  .  .  .
            6300.  C  .  .  .  .  .  I .  .  W E .  .  .  R  .  L  .  .  .  .
            6350.  C  .  .  .  .  .  I .  .  WE  .  .  .  R  .  L  .  .  .  .
            6400.  C  .  .  .  .  .  I .  .  WE  .  .  .R  .  L  .  .  .  .
            6450.  C  .  .  .  .  .  .  I .  WE  .  .  .R  .  L  .  .  .  .
 6500.00    6500.  C  .  .  .  .  .  .  I .  W E .  .  .R  .  L  .  .  .  .
            6550.  C  .  .  .  .  .  .  I .  W E .  .  .R  .  L  .  .  .  .
            6600.  C  .  .  .  .  .  .  I .  WE  .  .  .R  .  L  .  .  .  .
            6650.  C  .  .  .  .  .  .  I .  WE  .  .  . R  .  L  .  .  .  .
            6700.  C  .  .  .  .  .  .  .I .  WE  .  .  . R  .  L  .  .  .  .
            6750.  C  .  .  .  .  .  .  .I .  W E.  .  .  R  .  L  .  .  .  .
            6800.  C  .  .  .  .  .  .  .I .  W E.  .  .  R  .  L  .  .  .  .
            6850.  C  .  .  .  .  .  .  .I .  WE.  .  .  R  .  L  .  .  .  .
            6900.  C  .  .  .  .  .  .  .I .  WE.  .  .  . R  .  L.  .  .  .
            6950.  C  .  .  .  .  .  .  . I .  WE.  .  .  . R  .  L.  .  .  .
 7000.00    7000.  C  .  .  .  .  .  .  . I .  W E  .  .  . R  .  L.  .  .  .
            7050.  C  .  .  .  .  .  .  . I .  W E  .  .  . R  .  L.  .  .  .
            7100.  C  .  .  .  .  .  .  . I .  WE   .  .  . R  .  L.  .  .  .
            7150.  C  .  .  .  .  .  .  . I .  WE   .  .  .  R  .  L  .  .  .
            7200.  C  .  .  .  .  .  .  .  I.  WE   .  .  .  R  .  L  .  .  .
            7250.  C  .  .  .  .  .  .  .  I.  W.E  .  .  .  R  .  L  .  .  .
            7300.  C  .  .  .  .  .  .  .  I.  W.E  .  .  .  R  .  L  .  .  .
            7350.  C  .  .  .  .  .  .  .  I.  WE   .  .  .  R  .  L  .  .  .
            7400.  C  .  .  .  .  .  .  .  I.  WE   .  .  .  R  .  .L  .  .  .
            7450.  C  .  .  .  .  .  .  .  .  I  WE   .  .  .  R  .  .L  .  .  .
 7500.00    7500.  C  .  .  .  .  .  .  .  .  I  W E  .  .  .  R  .  .L  .  .  .
1
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 T1      FEMA - CLARK COUNTY
 T2      50-YEAR STORM
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                  3                           -1                                  2130.5
 MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       2


1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROP 2
0

CCHV= .100 CEHV= .300
*SECNO .000
3720 CRITICAL DEPTH ASSUMED

.000	8.92	2123.32	2123.32	2130.50	2126.65	3.33	.00	.00	2145.00
6751.0	.0	6751.0	.0	.0	461.1	.0	.0	.0	2126.60
.00	.00	14.64	.00	.000	.025	.000	.000	2114.40	1040.55
.005294	0.	0.	0.	0	10	0	.00	69.90	1110.45

*SECNO 582.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

582.200	8.92	2127.74	2127.74	.00	2131.07	3.33	3.09	.00	2149.42
6751.0	.0	6751.0	.0	.0	460.8	.0	6.2	.9	2131.02
.01	.00	14.65	.00	.000	.025	.000	.000	2118.82	1040.56
.005304	582.	582.	582.	3	5	0	.00	69.88	1110.44

*SECNO 1164.400
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1164.400	8.92	2132.16	2132.16	.00	2135.49	3.33	3.09	.00	2153.84
6751.0	.0	6751.0	.0	.0	460.8	.0	12.3	1.9	2135.44
.02	.00	14.65	.00	.000	.025	.000	.000	2123.24	1040.56
.005302	582.	582.	582.	3	5	0	.00	69.88	1110.44

*SECNO 1746.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1746.600	9.02	2136.52	2136.52	.00	2139.91	3.39	3.08	.02	2145.00
6751.0	.0	6751.0	.0	.0	457.2	.0	18.5	2.8	2145.00
.03	.00	14.77	.00	.000	.025	.000	.000	2127.50	1030.78
.005274	582.	582.	582.	3	5	0	.00	67.85	1098.62

CCHV= .300 CEHV= .500
*SECNO 1776.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1776.600	9.01	2136.74	2136.74	.00	2140.14	3.40	.16	.01	2145.23
6751.0	.0	6751.0	.0	.0	456.1	.0	18.8	2.8	2145.23
.03	.00	14.80	.00	.000	.025	.000	.000	2127.73	1030.81
.005312	30.	30.	30.	2	5	0	.00	67.78	1098.59

*SECNO 1861.600

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.03

1861.600	12.91	2140.81	.00	.00	2141.13	.32	.07	.92	2142.00
6751.0	.0	6751.0	.0	.0	1487.2	.0	20.7	3.1	2142.00
.04	.00	4.54	.00	.000	.025	.000	.000	2127.90	1019.76
.000327	85.	85.	85.	3	0	0	.00	168.27	1188.04

CCHV= .100 CEHV= .500
*SECNO 2211.000

2211.000	12.32	2140.92	.00	.00	2141.28	.36	.12	.02	2145.00
6751.0	.0	6751.0	.0	.0	1403.6	.0	32.3	4.4	2142.00
.06	.00	4.81	.00	.000	.025	.000	.000	2128.60	1016.32
.000385	349.	349.	349.	3	0	0	.00	164.55	1180.88

*SECNO 2561.600

2561.600	11.64	2141.04	.00	.00	2141.46	.42	.15	.03	2145.00
6751.0	.0	6751.0	.0	.0	1294.3	.0	43.1	5.7	2142.00
.08	.00	5.22	.00	.000	.025	.000	.000	2129.40	1015.83
.000482	351.	351.	351.	0	0	0	.00	159.15	1174.97

*SECNO 3000.000

3000.000	10.96	2141.23	.00	.00	2141.74	.50	.24	.04	2145.88
6751.0	.0	6751.0	.0	.0	1185.5	.0	55.6	7.3	2142.88
.10	.00	5.69	.00	.000	.025	.000	.000	2130.28	1018.61
.000615	438.	438.	438.	0	0	0	.00	153.58	1172.19

*SECNO 3500.000

3500.000	10.25	2141.53	.00	.00	2142.14	.61	.35	.05	2146.88
6751.0	.0	6751.0	.0	.0	1080.6	.0	68.6	9.0	2143.88
.12	.00	6.25	.00	.000	.025	.000	.000	2131.28	1021.39
.000797	500.	500.	500.	2	0	0	.00	148.02	1169.41

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4000.000

4000.000	9.64	2141.92	.00	.00	2142.64	.72	.45	.06	2147.88
6751.0	.0	6751.0	.0	.0	992.0	.0	80.5	10.7	2144.88
.14	.00	6.81	.00	.000	.025	.000	.000	2132.28	1023.83
.001013	500.	500.	500.	2	0	0	.00	143.15	1166.97

*SECNO 4500.000

4500.000	9.15	2142.43	.00	.00	2143.26	.83	.56	.06	2148.88
6751.0	.0	6751.0	.0	.0	921.8	.0	91.5	12.3	2145.88
.16	.00	7.32	.00	.000	.025	.000	.000	2133.28	1025.81
.001245	500.	500.	500.	2	0	0	.00	139.17	1164.99

*SECNO 5000.000

5000.000	8.77	2143.05	.00	.00	2143.98	.93	.67	.05	2149.88
6751.0	.0	6751.0	.0	.0	870.0	.0	101.8	13.9	2146.88
.18	.00	7.76	.00	.000	.025	.000	.000	2134.28	1027.32
.001466	500.	500.	500.	2	0	0	.00	136.16	1163.48

*SECNO 5500.000

5500.000	8.51	2143.79	.00	.00	2144.80	1.02	.78	.04	2150.88
6751.0	.0	6751.0	.0	.0	834.3	.0	111.5	15.4	2147.88
.20	.00	8.09	.00	.000	.025	.000	.000	2135.28	1028.37
.001650	500.	500.	500.	2	0	0	.00	134.05	1162.43

*SECNO 6000.000

6000.000	8.33	2144.61	.00	.00	2145.69	1.07	.86	.03	2151.88
6751.0	.0	6751.0	.0	.0	811.5	.0	121.0	17.0	2148.88
.21	.00	8.32	.00	.000	.025	.000	.000	2136.28	1029.06
.001785	500.	500.	500.	2	0	0	.00	132.68	1161.74

*SECNO 6500.000

6500.000	8.23	2145.51	.00	.00	2146.62	1.11	.91	.02	2152.88
6751.0	.0	6751.0	.0	.0	797.7	.0	130.2	18.5	2149.88
.23	.00	8.46	.00	.000	.025	.000	.000	2137.28	1029.48
.001874	500.	500.	500.	2	0	0	.00	131.85	1161.32

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 7000.000

7000.000	8.17	2146.45	.00	.00	2147.58	1.13	.95	.01	2153.88
6751.0	.0	6751.0	.0	.0	789.7	.0	139.3	20.0	2150.88
.25	.00	8.55	.00	.000	.025	.000	.000	2138.28	1029.72
.001928	500.	500.	500.	2	0	0	.00	131.36	1161.08

*SECNO 7500.000

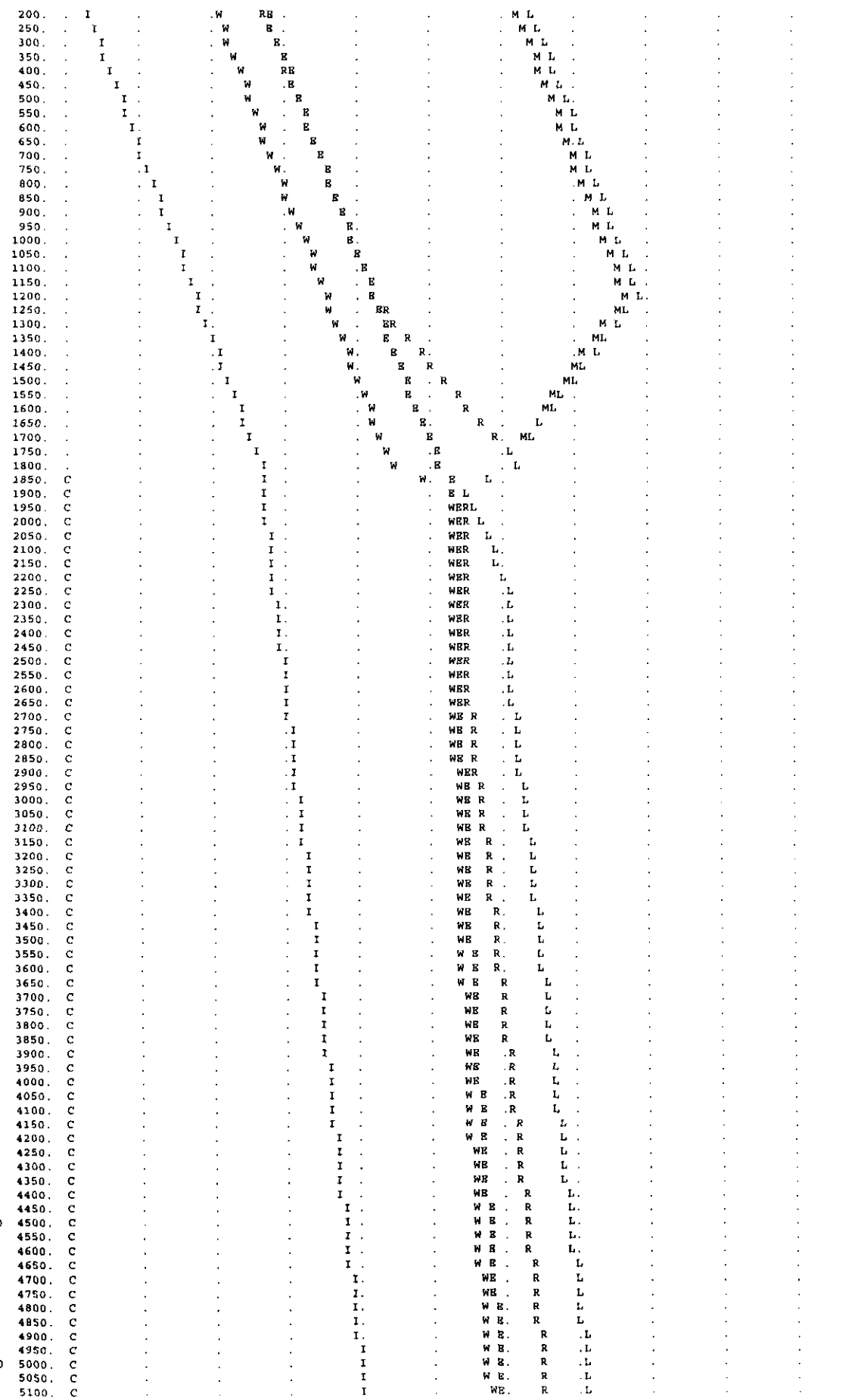
7500.000	8.14	2147.42	.00	.00	2148.57	1.15	.97	.01	2154.88
6751.0	.0	6751.0	.0	.0	784.2	.0	148.4	21.5	2151.88
.26	.00	8.61	.00	.000	.025	.000	.000	2139.28	1029.89
.001967	500.	500.	500.	1	0	0	.00	131.02	1160.91

1

PROFILE FOR STREAM

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION	2114.	2119.	2124.	2129.	2134.	2139.	2144.	2149.	2154.	2159.
SECNO CUMDIS										
.00 0.	I .	.	W .	RE .	.	.	.	M.L	.	.	.	.
50.	.I .	.	W.	E .	.	.	.	M L	.	.	.	.
100.	. I .	.	W.	E .	.	.	.	.M L	.	.	.	.
150.	. I .	.	W	E .	.	.	.	.M L	.	.	.	.


582.20
1164.40
1746.60
1776.60
1861.60
2211.00
2561.60
3000.00
3500.00
4000.00
4500.00
5000.00

```
            5150.  C  .  .  .  I  .  W E  R  . L  .  .  .
            5200.  C  .  .  . .I  .  W E  R  . L  .  .  .
            5250.  C  .  .  . .I  .  W E  R  . L  .  .  .
            5300.  C  .  .  . .I  .  W E  R  . L  .  .  .
            5350.  C  .  .  . .I  .  W E  R  . L  .  .  .
            5400.  C  .  .  . .I  .  W E  R  . L  .  .  .
            5450.  C  .  .  . . I  .  W.E  R  . L  .  .  .
  5500.00   5500.  C  .  .  . . I  .  W.E  R  . L  .  .  .
            5550.  C  .  .  . . I  .  W.E  R  . L  .  .  .
            5600.  C  .  .  . . I  .  W.E  R  . L  .  .  .
            5650.  C  .  .  . . I  .  W.E  R  . L  .  .  .
            5700.  C  .  .  . .  I  .  W. E  R  . L  .  .  .
            5750.  C  .  .  . .  I  .  W E  R  . L  .  .  .
            5800.  C  .  .  . .  I  .  W E  R  . L  .  .  .
            5850.  C  .  .  . .  I  .  W E  R  . L  .  .  .
            5900.  C  .  .  . .  I  .  W E  R  . L  .  .  .
            5950.  C  .  .  . .  I  .  W E  R  . L  .  .  .
  6000.00   6000.  C  .  .  . .  I  .  W  E  R  . L  .  .  .
            6050.  C  .  .  . .  I  .  .W E  R  . L  .  .  .
            6100.  C  .  .  . .  I  .  .W E  R  . L  .  .  .
            6150.  C  .  .  . .  I  .  .W E  R  . L  .  .  .
            6200.  C  .  .  . .  I  .  .W E  R  . L  .  .  .
            6250.  C  .  .  . .  I  .  .W  E  R  . L  .  .  .
            6300.  C  .  .  . .  I  .  . W E  R  . L  .  .  .
            6350.  C  .  .  . .  I  .  . W E  R  . L  .  .  .
            6400.  C  .  .  . .  I  .  . W E  R  . L  .  .  .
            6450.  C  .  .  . .  I  .  . W E  R  . L  .  .  .
  6500.00   6500.  C  .  .  . .  I  .  . W E  R  . L  .  .  .
            6550.  C  .  .  . .  I  .  . W  E  R  . L  .  .  .
            6600.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6650.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6700.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6750.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6800.  C  .  .  . .  I  .  .  W  E  R  . L  .  .  .
            6850.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6900.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            6950.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
  7000.00   7000.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            7050.  C  .  .  . .  I  .  .  W  E  R  . L  .  .  .
            7100.  C  .  .  . .  I  .  .  W  E  R  . L  .  .  .
            7150.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            7200.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            7250.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            7300.  C  .  .  . .  I  .  .  W  E  R  . L  .  .  .
            7350.  C  .  .  . .  I  .  .  W  E  R  . L  .  .  .
            7400.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
            7450.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
  7500.00   7500.  C  .  .  . .  I  .  .  W E  R  . L  .  .  .
1
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 T1      FEMA - CLARK COUNTY
 T2      100-YEAR STORM    MAX. BASIN STAGE FOR 100-YR 2135.4
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      PQ

                 4                             -1                  .1              2130.4
 MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       3


1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 3
0

 CCHV=      .100 CEHV=      .300
 *SECNO  .000
 3720 CRITICAL DEPTH ASSUMED
        .000     10.16   2124.56   2124.56   2130.40   2128.29      3.73       .00       .00   2145.00
      8537.0        .0    8537.0        .0        .0     550.6        .0        .0        .0   2126.60
         .00       .00     15.51       .00      .000      .025      .000      .000   2114.40   1038.08
     .005158        0.        0.        0.         0        13         0       .00     74.84   1112.92


 *SECNO 582.200
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    582.200     10.17   2128.99   2128.99       .00   2132.71      3.72      3.00       .00   2149.42
     8537.0        .0    8537.0        .0        .0     551.5        .0       7.4       1.0   2131.02
        .01       .00     15.48       .00      .000      .025      .000      .000   2118.82   1038.05
     .005134      582.      582.      582.        20         5         0       .00     74.89   1112.95


 *SECNO 1164.400
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3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1164.400	10.17	2133.41	2133.41	.00	2137.13	3.72	2.99	.00	2153.84
8537.0	.0	8537.0	.0	.0	551.5	.0	14.7	2.0	2135.44
.02	.00	15.48	.00	.000	.025	.000	.000	2123.24	1038.05
.005135	582.	582.	582.	20	5	0	.00	74.89	1112.95

*SECNO 1746.600
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1746.600	10.30	2137.80	2137.80	.00	2141.58	3.78	2.98	.02	2145.00
8537.0	.0	8537.0	.0	.0	547.1	.0	22.1	3.0	2145.00
.03	.00	15.60	.00	.000	.025	.000	.000	2127.50	1028.39
.005105	582.	582.	582.	20	5	0	.00	72.61	1101.01

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 1776.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1776.600	10.28	2138.01	2138.01	.00	2141.81	3.81	.15	.01	2145.23
8537.0	.0	8537.0	.0	.0	545.1	.0	22.5	3.0	2145.23
.03	.00	15.66	.00	.000	.025	.000	.000	2127.73	1028.45
.005158	30.	30.	30.	2	5	0	.00	72.51	1100.95

*SECNO 1861.600

1645 INT SEC ADDED BY RAISING SEC 1861.60, -.127 FT AND MULTIPLYING BY .631

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.26

1.010	13.88	2141.65	.00	.00	2142.69	1.04	.04	.83	2141.87
8537.0	.0	8537.0	.0	.0	1044.5	.0	22.8	3.1	2141.87
.03	.00	8.17	.00	.000	.025	.000	.000	2127.77	1010.03
.001012	21.	21.	21.	5	0	0	.00	111.13	1121.16

1645 INT SEC ADDED BY RAISING SEC 1.01, .042 FT AND MULTIPLYING BY 1.195

3280 CROSS SECTION 1.02 EXTENDED .25 FEET

3301 HV CHANGED MORE THAN HVINS

1.020	14.34	2142.16	.00	.00	2142.82	.66	.02	.11	2141.92
8537.0	1.0	8536.0	.0	2.8	1310.5	.0	23.4	3.1	2141.92
.03	.35	6.51	.00	.040	.025	.000	.000	2127.81	1000.00
.000601	21.	21.	21.	2	0	0	.00	145.42	1145.42

1645 INT SEC ADDED BY RAISING SEC 1.02, .042 FT AND MULTIPLYING BY 1.163

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 1.03 EXTENDED .46 FEET

3301 HV CHANGED MORE THAN HVINS

1.030	14.56	2142.42	.00	.00	2142.89	.47	.01	.06	2141.96
8537.0	2.7	8534.3	.0	6.1	1557.6	.0	24.1	3.2	2141.96
.03	.44	5.48	.00	.040	.025	.000	.000	2127.86	1000.00
.000409	21.	21.	21.	2	0	0	.00	169.11	1169.11

1645 INT SEC ADDED BY RAISING SEC 1.03, .042 FT AND MULTIPLYING BY 1.140

3280 CROSS SECTION 1861.60 EXTENDED .58 FEET

3301 HV CHANGED MORE THAN HVINS

1861.600	14.68	2142.58	.00	.00	2142.93	.35	.01	.03	2142.00
8537.0	3.8	8533.2	.0	8.7	1796.3	.0	24.9	3.3	2142.00
.04	.44	4.75	.00	.040	.025	.000	.000	2127.90	1000.00
.000301	21.	21.	21.	2	0	0	.00	192.80	1192.80

CCHV= .100 CEHV= .500
*SECNO 2211.000
3280 CROSS SECTION 2211.00 EXTENDED .67 FEET

2211.000	14.08	2142.68	.00	.00	2143.06	.39	.12	.02	2145.00
8537.0	.0	8537.0	.0	.0	1710.9	.0	39.0	4.8	2142.00
.06	.00	4.99	.00	.000	.025	.000	.000	2128.60	1009.32
.000372	349.	349.	349.	2	0	0	.00	184.38	1193.70

*SECNO 2561.600
3280 CROSS SECTION 2561.60 EXTENDED .79 FEET

2561.600	13.39	2142.79	.00	.00	2143.24	.45	.14	.03	2145.00
8537.0	.0	8537.0	.0	.0	1591.8	.0	52.3	6.3	2142.00
.07	.00	5.36	.00	.000	.025	.000	.000	2129.40	1008.84
.000453	351.	351.	351.	2	0	0	.00	178.46	1187.30

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3000.000
3280 CROSS SECTION 3000.00 EXTENDED .09 FEET

3000.000	12.69	2142.97	.00	.00	2143.50	.52	.22	.04	2145.88
8537.0	.0	8537.0	.0	.0	1468.9	.0	67.7	8.1	2142.88
.09	.00	5.81	.00	.000	.025	.000	.000	2130.28	1011.62
.000576	438.	438.	438.	2	0	0	.00	175.68	1187.30

*SECNO 3500.000

1645 INT SEC ADDED BY RAISING SEC 3500.00, -.500 FT AND MULTIPLYING BY 1.000

1.010	12.32	2143.10	.00	.00	2143.67	.57	.15	.02	2146.38
8537.0	.0	8537.0	.0	.0	1404.5	.0	76.0	9.1	2143.38
.11	.00	6.08	.00	.000	.025	.000	.000	2130.78	1013.12
.000632	250.	250.	250.	2	0	0	.00	168.34	1181.46

1645 INT SEC ADDED BY RAISING SEC 1.01, .500 FT AND MULTIPLYING BY 1.000

3500.000	11.96	2143.24	.00	.00	2143.86	.63	.17	.03	2146.88
8537.0	.0	8537.0	.0	.0	1344.7	.0	83.9	10.0	2143.88
.12	.00	6.35	.00	.000	.025	.000	.000	2131.28	1014.57
.000693	250.	250.	250.	2	0	0	.00	161.66	1176.23

*SECNO 4000.000

1645 INT SEC ADDED BY RAISING SEC 4000.00, -.500 FT AND MULTIPLYING BY 1.000

1.010	11.61	2143.39	.00	.00	2144.07	.68	.18	.03	2147.38
8537.0	.0	8537.0	.0	.0	1289.7	.0	91.4	10.9	2144.38
.13	.00	6.62	.00	.000	.025	.000	.000	2131.78	1015.94
.000778	250.	250.	250.	2	0	0	.00	158.91	1174.85

1645 INT SEC ADDED BY RAISING SEC 1.01, .500 FT AND MULTIPLYING BY 1.000

4000.000	11.29	2143.57	.00	.00	2144.31	.74	.21	.03	2147.88
8537.0	.0	8537.0	.0	.0	1238.8	.0	98.7	11.8	2144.88
.14	.00	6.89	.00	.000	.025	.000	.000	2132.28	1017.23
.000870	250.	250.	250.	2	0	0	.00	156.34	1173.57

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4500.000

1645 INT SEC ADDED BY RAISING SEC 4500.00, -.500 FT AND MULTIPLYING BY 1.000

1.010	10.99	2143.77	.00	.00	2144.57	.80	.23	.03	2148.38

8537.0	.0	8537.0	.0	.0	1192.4	.0	105.7	12.7	2145.38
.15	.00	7.16	.00	.000	.025	.000	.000	2132.78	1018.43
.000968	250.	250.	250.	2	0	0	.00	153.94	1172.37

1645 INT SEC ADDED BY RAISING SEC 1.01, .500 FT AND MULTIPLYING BY 1.000

4500.000	10.72	2144.00	.00	.00	2144.85	.86	.25	.03	2148.88
8537.0	.0	8537.0	.0	.0	1150.2	.0	112.4	13.6	2145.88
.16	.00	7.42	.00	.000	.025	.000	.000	2133.28	1019.53
.001070	250.	250.	250.	2	0	0	.00	151.73	1171.27

*SECNO 5000.000

1645 INT SEC ADDED BY RAISING SEC 5000.00, -.500 FT AND MULTIPLYING BY 1.000

1.010	10.47	2144.25	.00	.00	2145.16	.91	.28	.03	2149.38
8537.0	.0	8537.0	.0	.0	1112.7	.0	118.9	14.5	2146.38
.17	.00	7.67	.00	.000	.025	.000	.000	2133.78	1020.53
.001174	250.	250.	250.	2	0	0	.00	149.74	1170.28

1645 INT SEC ADDED BY RAISING SEC 1.01, .500 FT AND MULTIPLYING BY 1.000

5000.000	10.24	2144.52	.00	.00	2145.50	.97	.31	.03	2149.88
8537.0	.0	8537.0	.0	.0	1079.5	.0	125.2	15.3	2146.88
.17	.00	7.91	.00	.000	.025	.000	.000	2134.28	1021.42
.001278	250.	250.	250.	2	0	0	.00	147.96	1169.38

*SECNO 5500.000

1645 INT SEC ADDED BY RAISING SEC 5500.00, -.500 FT AND MULTIPLYING BY 1.000

1.010	10.05	2144.83	.00	.00	2145.85	1.02	.33	.03	2150.38
8537.0	.0	8537.0	.0	.0	1050.8	.0	131.3	16.2	2147.38
.18	.00	8.12	.00	.000	.025	.000	.000	2134.78	1022.20
.001378	250.	250.	250.	2	0	0	.00	146.41	1168.61

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1645 INT SEC ADDED BY RAISING SEC 1.01, .500 FT AND MULTIPLYING BY 1.000

5500.000	9.88	2145.16	.00	.00	2146.23	1.07	.36	.02	2150.88
8537.0	.0	8537.0	.0	.0	1026.2	.0	137.2	17.0	2147.88
.19	.00	8.32	.00	.000	.025	.000	.000	2135.28	1022.88
.001473	250.	250.	250.	2	0	0	.00	145.05	1167.92

*SECNO 6000.000

6000.000	9.61	2145.89	.00	.00	2147.05	1.16	.78	.04	2151.88
8537.0	.0	8537.0	.0	.0	987.8	.0	148.8	18.6	2148.88
.21	.00	8.64	.00	.000	.025	.000	.000	2136.28	1023.94
.001639	500.	500.	500.	2	0	0	.00	142.92	1166.86

*SECNO 6500.000

6500.000	9.43	2146.71	.00	.00	2147.94	1.22	.85	.03	2152.88
8537.0	.0	8537.0	.0	.0	962.1	.0	160.0	20.3	2149.88
.22	.00	8.87	.00	.000	.025	.000	.000	2137.28	1024.67
.001766	500.	500.	500.	2	0	0	.00	141.47	1166.13

*SECNO 7000.000

7000.000	9.32	2147.60	.00	.00	2148.86	1.27	.90	.02	2153.88
8537.0	.0	8537.0	.0	.0	945.5	.0	170.9	21.9	2150.88
.24	.00	9.03	.00	.000	.025	.000	.000	2138.28	1025.14
.001854	500.	500.	500.	2	0	0	.00	140.53	1165.66

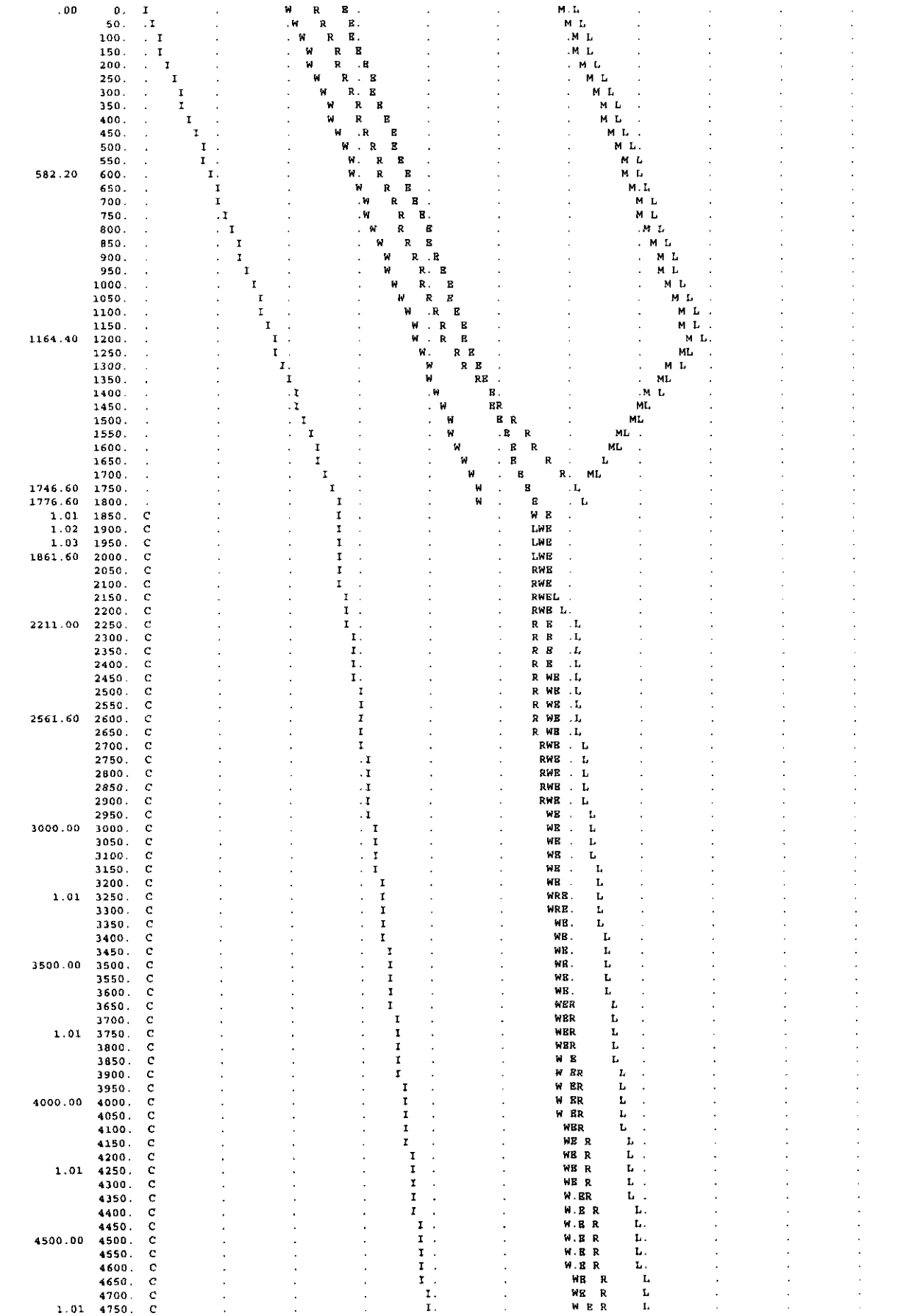
*SECNO 7500.000

7500.000	9.24	2148.52	.00	.00	2149.82	1.29	.94	.01	2154.88
8537.0	.0	8537.0	.0	.0	935.3	.0	181.7	23.5	2151.88
.25	.00	9.13	.00	.000	.025	.000	.000	2139.28	1025.43
.001911	500.	500.	500.	2	0	0	.00	139.95	1165.37

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PROFILE FOR STRRAM

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


ELEVATION
SECNO
2114.
CUMDIS
2119.
2124.
2129.
2134.
2139.
2144.
2149.
2154.
2159.
.00
582.20
1164.40
1746.60
1776.60
1.01
1.02
1.03
1861.60
2211.00
2561.60
3000.00
3500.00
4000.00
4500.00

```
            4800.  C          .         .         .        I.         .        W E R     L          .         .         .
            4850.  C          .         .         .        I.         .        W E R     L          .         .         .
            4900.  C          .         .         .        I.         .        W E  R    .L         .         .         .
            4950.  C          .         .         .         I         .        W E  R    .L         .         .         .
  5000.00   5000.  C          .         .         .         I         .        W E  R    .L         .         .         .
            5050.  C          .         .         .         I         .        W E  R    .L         .         .         .
            5100.  C          .         .         .         I         .        W E  R    .L         .         .         .
            5150.  C          .         .         .         I         .        .W E  R   . L         .         .         .
            5200.  C          .         .         .        .I         .        .W E  R   . L         .         .         .
     1.01   5250.  C          .         .         .        .I         .        .W E  R   . L         .         .         .
            5300.  C          .         .         .        .I         .        .W E  R   . L         .         .         .
            5350.  C          .         .         .        .I         .        .W E  R   . L         .         .         .
            5400.  C          .         .         .        .I         .        .W E   R  .  L        .         .         .
            5450.  C          .         .         .       . I         .        .W  E  R  .  L        .         .         .
  5500.00   5500.  C          .         .         .       . I         .        . W E  R  .  L        .         .         .
            5550.  C          .         .         .       . I         .        . W E  R  .  L        .         .         .
            5600.  C          .         .         .       . I         .        . W E  R  .  L        .         .         .
            5650.  C          .         .         .       . I         .        . W E   R .   L       .         .         .
            5700.  C          .         .         .       .  I        .        . W E   R .   L       .         .         .
            5750.  C          .         .         .       .  I        .        . W E   R .   L       .         .         .
            5800.  C          .         .         .       .  I        .        . W  E  R .   L       .         .         .
            5850.  C          .         .         .       .  I        .        .  W E  R .   L       .         .         .
            5900.  C          .         .         .       .  I        .        .  W E   R.    L      .         .         .
            5950.  C          .         .         .       .   I       .        .  W E   R.    L      .         .         .
  6000.00   6000.  C          .         .         .       .   I       .        .  W E   R.    L      .         .         .
            6050.  C          .         .         .       .  I        .        .  W E   R.    L      .         .         .
            6100.  C          .         .         .       .  I        .        .  W  E  R.    L      .         .         .
            6150.  C          .         .         .       .  I        .        .  W  E   R     L      .         .         .
            6200.  C          .         .         .       .   I       .        .   W E   R     L      .         .         .
            6250.  C          .         .         .       .  I        .        .   W E   R     L      .         .         .
            6300.  C          .         .         .       .  I        .        .   W E   R     L      .         .         .
            6350.  C          .         .         .       .  I        .        .   W  E  R     L      .         .         .
            6400.  C          .         .         .       .  I        .        .   W  E  .R    L      .         .         .
            6450.  C          .         .         .       .   I       .        .   W  E  .R    L      .         .         .
  6500.00   6500.  C          .         .         .       .  I        .        .    W E  .R    L      .         .         .
            6550.  C          .         .         .       .  I        .        .    W E  .R    L      .         .         .
            6600.  C          .         .         .       .  I        .        .    W E  .R    L      .         .         .
            6650.  C          .         .         .       .  I        .        .    W  E . R     L    .         .         .
            6700.  C          .         .         .       .   I       .        .    W  E . R     L    .         .         .
            6750.  C          .         .         .       .  I        .        .     W E . R     L    .         .         .
            6800.  C          .         .         .       .  I        .        .     W E . R     L    .         .         .
            6850.  C          .         .         .       .  I        .        .     W E . R     L    .         .         .
            6900.  C          .         .         .       .  I        .        .     W  E.  R     L.   .         .         .
            6950.  C          .         .         .       .   I       .        .     W  E.  R     L.   .         .         .
  7000.00   7000.  C          .         .         .       .  I        .        .     W  E.  R     L.   .         .         .
            7050.  C          .         .         .       .  I        .        .      W E.  R     L.   .         .         .
            7100.  C          .         .         .       .  I        .        .      W E.  R     L.   .         .         .
            7150.  C          .         .         .       .  I        .        .      W E.   R     L   .         .         .
            7200.  C          .         .         .       .   I       .        .      W  E   R     L   .         .         .
            7250.  C          .         .         .       .   I       .        .      W  E   R     L   .         .         .
            7300.  C          .         .         .       .   I       .        .       W E   R     L   .         .         .
            7350.  C          .         .         .       .   I       .        .       W E   R     L   .         .         .
            7400.  C          .         .         .       .   I       .        .       W E    R    .L  .         .         .
            7450.  C          .         .         .       .    I      .        .       W .E   R    .L  .         .         .
  7500.00   7500.  C          .         .         .       .    I      .        .       W .E   R    .L  .         .         .
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 T1       FEMA - CLARK COUNTY
 T2       500-YEAR STORM
 T3

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  5                                -1                                    2139.4
 MULTIPLE PROFILE RUN WITH INTERPOLATED CROSS SECTIONS

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       4


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     BNDST


 *PROF 4
0

 CCHV=      .100 CEHV=      .300
 *SECNO  .000
 3720 CRITICAL DEPTH ASSUMED
       .000      15.11    2129.51    2129.51    2139.40    2134.82       5.31        .00        .00    2145.00
    17855.0         .0    17802.4       52.6         .0      961.3       16.9         .0         .0    2126.60
       .00        .00      18.52       3.11       .000       .025       .040       .000    2114.40    1028.34
    .004442         0.         0.         0.          0         13          0        .00     100.38    1128.72


 *SECNO 582.200
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
   582.200     15.13   2133.95   2133.95      .00   2139.24     5.29     2.58      .00   2149.42
   17855.0        .0   17801.5      53.5       .0     963.5     17.2     13.1      1.3   2131.02
       .01       .00     18.48      3.12     .000      .025     .040     .000   2118.82   1028.30
   .004412      582.      582.      582.       20         5        0      .00    100.52   1128.82


*SECNO 1164.400
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1164.400     15.12   2138.36   2138.36      .00   2143.66     5.30     2.57      .00   2153.84
   17855.0        .0   17801.9      53.1       .0     962.5     17.0     26.2       .7   2135.44
       .02       .00     18.49      3.12     .000      .025     .040     .000   2123.24   1028.32
   .004425      582.      582.      582.       20         5        0      .00    100.46   1128.78


*SECNO 1746.600
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1746.600     15.43   2142.93   2142.93      .00   2148.21     5.28     2.63      .00   2145.00
   17855.0        .0   17855.0        .0       .0     968.3       .0     39.2      4.0   2145.00
       .03       .00     18.44       .00     .000      .025     .000     .000   2127.50   1018.85
   .004623      582.      582.      582.       20         5        0      .00     91.69   1110.55


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 1776.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1776.600     15.37   2143.10   2143.10      .00   2148.44     5.34      .14      .03   2145.23
   17855.0        .0   17855.0        .0       .0     962.8       .0     39.9      4.0   2145.23
       .03       .00     18.55       .00     .000      .025     .000     .000   2127.73   1018.97
   .004696       30.       30.       30.        2         5        0      .00     91.47   1110.43


*SECNO 1861.600
3280 CROSS SECTION   1861.60 EXTENDED      7.41 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.52

  1861.600     21.51   2149.41       .00       .00   2149.94      .53      .05     1.44   2142.00
   17855.0     182.0    17673.0        .0     111.1    3010.4        .0     43.9      4.3   2142.00
       .03      1.64       5.87       .00      .040      .025     .000     .000   2127.90   1000.00
   .000230       85.       85.       85.         4         0        0      .00    192.80   1192.80


CCHV=      .100 CEHV=      .500
*SECNO 2211.000
3280 CROSS SECTION   2211.00 EXTENDED      7.48 FEET

  2211.000     20.89   2149.49       .00       .00   2150.03      .54      .09      .01   2145.00
   17855.0        .0   17855.0        .0        .0    3019.2        .0     68.5      5.9   2142.00
       .05       .00      5.91       .00      .000      .025     .000     .000   2128.60   1000.00
   .000268      349.      349.      349.         2         0        0      .00    193.70   1193.70


*SECNO 2561.600
3280 CROSS SECTION   2561.60 EXTENDED      7.55 FEET

  2561.600     20.15   2149.55       .00       .00   2150.16      .61      .10      .03   2145.00
   17855.0        .0   17855.0        .0        .0    2849.0        .0     92.1      7.4   2142.00
       .06       .00      6.27       .00      .000      .025     .000     .000   2129.40   1000.00
   .000312      351.      351.      351.         2         0        0      .00    187.30   1187.30


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 3000.000
3280 CROSS SECTION   3000.00 EXTENDED      6.79 FEET

  3000.000     19.39   2149.67       .00       .00   2150.34      .68      .15      .03   2145.88
   17855.0        .0   17855.0        .0        .0    2707.0        .0     120.1      9.3   2142.88
       .08       .00      6.60       .00      .000      .025     .000     .000   2130.28   1000.00
   .000368      438.      438.      438.         1         0        0      .00    187.30   1187.30
```

*SECNO 3500.000
3280 CROSS SECTION 3500.00 EXTENDED 5.95 FEET

3500.000	18.55	2149.83	.00	.00	2150.59	.76	.20	.04	2146.88
17855.0	.0	17855.0	.0	.0	2549.4	.0	150.2	11.4	2143.88
.10	.00	7.00	.00	.000	.025	.000	.000	2131.28	1000.00
.000446	500.	500.	500.	1	0	0	.00	187.30	1187.30

*SECNO 4000.000
3280 CROSS SECTION 4000.00 EXTENDED 5.15 FEET

4000.000	17.74	2150.02	.00	.00	2150.88	.86	.25	.05	2147.88
17855.0	.0	17855.0	.0	.0	2399.1	.0	178.6	13.6	2144.88
.12	.00	7.44	.00	.000	.025	.000	.000	2132.28	1000.00
.000543	500.	500.	500.	0	0	0	.00	187.30	1187.30

*SECNO 4500.000
3280 CROSS SECTION 4500.00 EXTENDED 4.39 FEET

4500.000	16.99	2150.27	.00	.00	2151.24	.97	.30	.06	2148.88
17855.0	.0	17855.0	.0	.0	2256.9	.0	205.3	15.7	2145.88
.14	.00	7.91	.00	.000	.025	.000	.000	2133.28	1000.00
.000663	500.	500.	500.	0	0	0	.00	187.30	1187.30

*SECNO 5000.000
3280 CROSS SECTION 5000.00 EXTENDED 3.69 FEET

5000.000	16.29	2150.57	.00	.00	2151.67	1.10	.36	.06	2149.88
17855.0	.0	17855.0	.0	.0	2125.3	.0	230.5	17.9	2146.88
.15	.00	8.40	.00	.000	.025	.000	.000	2134.28	1000.00
.000806	500.	500.	500.	0	0	0	.00	187.30	1187.30

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5500.000
3280 CROSS SECTION 5500.00 EXTENDED 3.06 FEET

5500.000	15.67	2150.95	.00	.00	2152.18	1.23	.45	.07	2150.88
17855.0	.0	17855.0	.0	.0	2008.1	.0	254.2	20.0	2147.88
.17	.00	8.89	.00	.000	.025	.000	.000	2135.28	1000.00
.000990	500.	500.	500.	1	0	0	.00	187.30	1187.30

*SECNO 6000.000
3280 CROSS SECTION 6000.00 EXTENDED 2.53 FEET

6000.000	15.14	2151.42	.00	.00	2152.78	1.36	.53	.07	2151.88
17855.0	.0	17855.0	.0	.0	1908.2	.0	276.7	22.2	2148.88
.18	.00	9.36	.00	.000	.025	.000	.000	2136.28	1001.89
.001153	500.	500.	500.	1	0	0	.00	185.41	1187.30

*SECNO 6500.000
3280 CROSS SECTION 6500.00 EXTENDED 2.08 FEET

6500.000	14.69	2151.97	.00	.00	2153.45	1.49	.61	.06	2152.88
17855.0	.0	17855.0	.0	.0	1825.7	.0	298.1	24.3	2149.88
.20	.00	9.78	.00	.000	.025	.000	.000	2137.28	1003.68
.001315	500.	500.	500.	1	0	0	.00	183.62	1187.30

*SECNO 7000.000
3280 CROSS SECTION 7000.00 EXTENDED 1.73 FEET

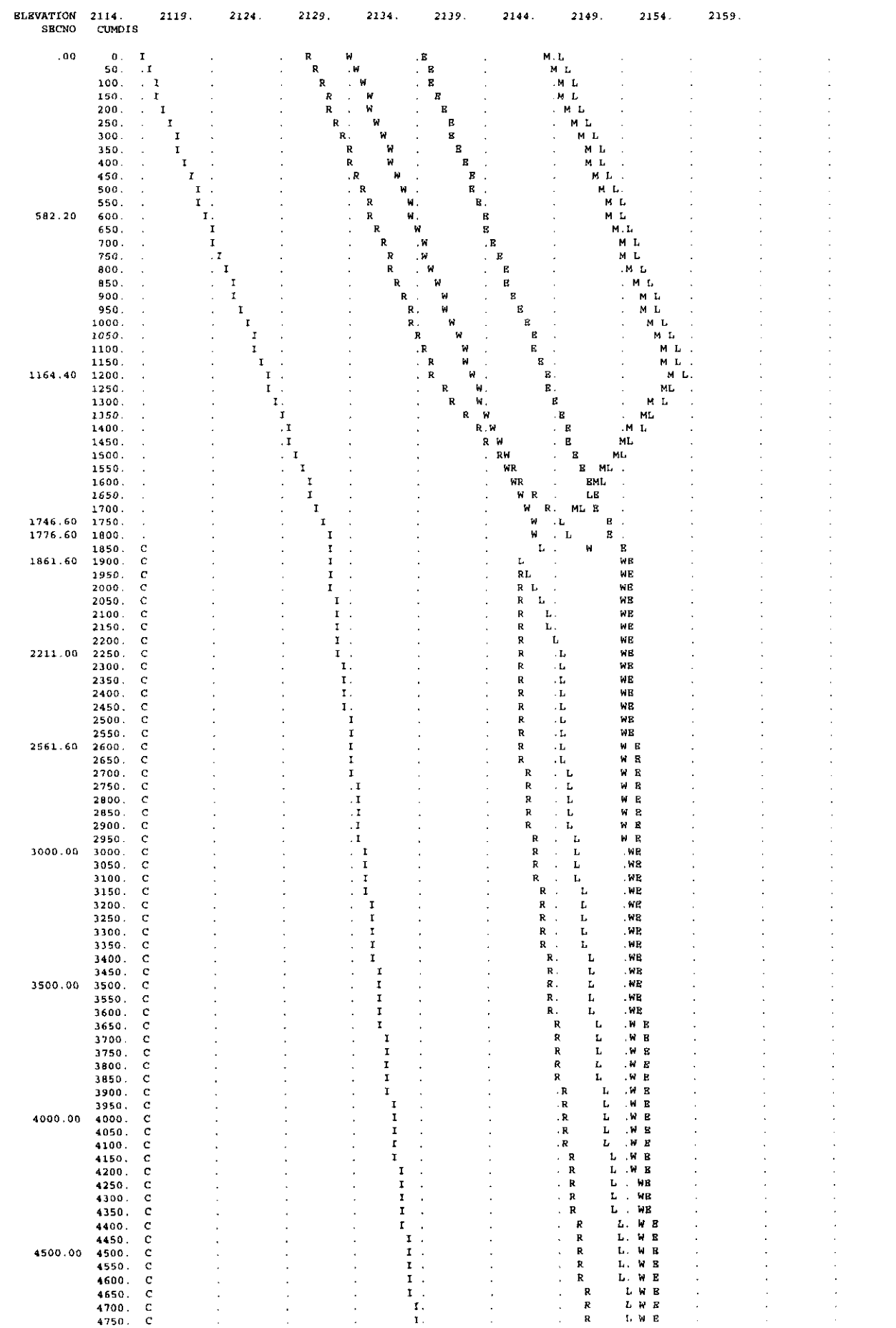
7000.000	14.33	2152.61	.00	.00	2154.20	1.60	.69	.06	2153.88
17855.0	.0	17855.0	.0	.0	1761.0	.0	318.7	26.4	2150.88
.21	.00	10.14	.00	.000	.025	.000	.000	2138.28	1005.09
.001464	500.	500.	500.	2	0	0	.00	182.21	1187.30

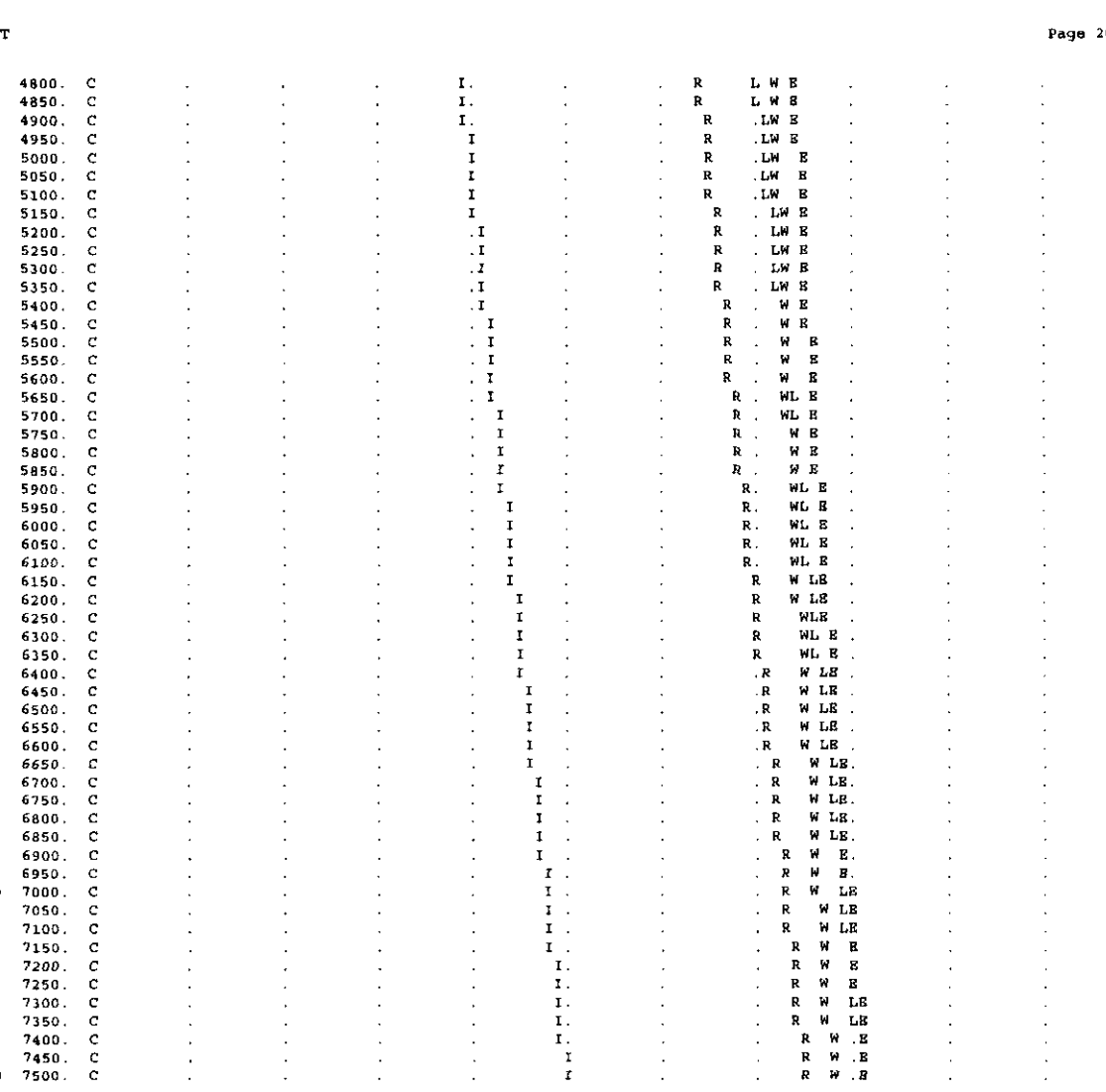
*SECNO 7500.000
3280 CROSS SECTION 7500.00 EXTENDED 1.44 FEET

7500.000	14.04	2153.32	.00	.00	2155.02	1.69	.76	.05	2154.88
17855.0	.0	17855.0	.0	.0	1709.4	.0	338.6	28.5	2151.88
.23	.00	10.45	.00	.000	.025	.000	.000	2139.28	1006.23
.001600	500.	500.	500.	2	0	0	.00	181.07	1187.30

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PROFILE FOR STREAM

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


ELEVATION 2114. 2119. 2124. 2129. 2134. 2139. 2144. 2149. 2154. 2159.
SECNO CUMDIS
.00 0.
582.20 600.
1164.40 1200.
1746.60 1750.
1776.60 1800.
1861.60 1900.
2211.00 2250.
2561.60 2600.
3000.00 3000.
3500.00 3500.
4000.00 4000.
4500.00 4500.



THIS RUN EXECUTED 22APR98 06:25:12

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILE: NLVDET1.DAT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	BLLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.000	.00	.00	.00	2114.40	2939.00	2119.92	2119.92	2122.13	59.82	11.94	246.09	380.01
*	.000	.00	.00	.00	2114.40	6751.00	2123.32	2123.32	2126.65	52.94	14.64	461.05	927.83
*	.000	.00	.00	.00	2114.40	8537.00	2124.56	2124.56	2128.29	51.58	15.51	550.60	1188.69
*	.000	.00	.00	.00	2114.40	17855.00	2129.51	2129.51	2134.82	44.42	18.52	978.21	2678.98
*	582.200	582.20	.00	.00	2118.82	2939.00	2124.34	2124.34	2126.55	59.64	11.93	246.34	380.56
*	582.200	582.20	.00	.00	2118.82	6751.00	2127.74	2127.74	2131.07	53.04	14.65	460.76	927.01
*	582.200	582.20	.00	.00	2118.82	8537.00	2128.99	2128.99	2132.71	51.34	15.48	551.53	1191.49
*	582.200	582.20	.00	.00	2118.82	17855.00	2133.95	2133.95	2139.24	44.12	18.48	980.64	2688.16
*	1164.400	582.20	.00	.00	2123.24	2939.00	2128.76	2128.76	2130.97	59.64	11.93	246.34	380.56
*	1164.400	582.20	.00	.00	2123.24	6751.00	2132.16	2132.16	2135.49	53.02	14.65	460.81	927.15
*	1164.400	582.20	.00	.00	2123.24	8537.00	2133.41	2133.41	2137.13	51.35	15.48	551.47	1191.32
*	1164.400	582.20	.00	.00	2123.24	17855.00	2138.36	2138.36	2143.66	44.25	18.49	979.58	2684.17
*	1746.600	582.20	.00	.00	2127.50	2939.00	2133.06	2133.06	2135.30	59.51	12.02	244.57	380.97
*	1746.600	582.20	.00	.00	2127.50	6751.00	2136.52	2136.52	2139.91	52.74	14.77	457.23	929.57
*	1746.600	582.20	.00	.00	2127.50	8537.00	2137.80	2137.80	2141.58	51.05	15.60	547.12	1194.84
*	1746.600	582.20	.00	.00	2127.50	17855.00	2142.93	2142.93	2148.21	46.23	18.44	968.25	2625.94

*	1776.600	30.00	.00	.00	2127.73	2939.00	2133.29	2133.29	2135.53	59.65	12.03	244.38	380.55
*	1776.600	30.00	.00	.00	2127.73	6751.00	2136.74	2136.74	2140.14	53.12	14.80	456.09	926.31
*	1776.600	30.00	.00	.00	2127.73	8537.00	2138.01	2138.01	2141.81	51.58	15.66	545.10	1188.70
*	1776.600	30.00	.00	.00	2127.73	17855.00	2143.10	2143.10	2148.44	46.96	18.55	962.75	2605.56
*	1861.600	85.00	.00	.00	2127.90	2939.00	2136.00	.00	2136.23	3.90	3.81	771.12	1488.47
*	1861.600	85.00	.00	.00	2127.90	6751.00	2140.81	.00	2141.13	3.27	4.54	1487.24	3734.28
*	1861.600	85.00	.00	.00	2127.90	8537.00	2142.58	.00	2142.93	3.01	4.75	1804.93	4920.32
*	1861.600	85.00	.00	.00	2127.90	17855.00	2149.41	.00	2149.94	2.30	5.87	3121.48	11774.21
	2211.000	349.40	.00	.00	2128.60	2939.00	2136.14	.00	2136.40	4.99	4.15	707.72	1315.38
	2211.000	349.40	.00	.00	2128.60	6751.00	2140.92	.00	2141.28	3.85	4.81	1403.56	3442.50
	2211.000	349.40	.00	.00	2128.60	8537.00	2142.68	.00	2143.06	3.72	4.99	1710.87	4428.88
	2211.000	349.40	.00	.00	2128.60	17855.00	2149.49	.00	2150.03	2.68	5.91	3019.22	10901.73

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2561.600	350.60	.00	.00	2129.40	2939.00	2136.31	.00	2136.64	6.96	4.66	630.24	1114.42
	2561.600	350.60	.00	.00	2129.40	6751.00	2141.04	.00	2141.46	4.82	5.22	1294.30	3076.10
	2561.600	350.60	.00	.00	2129.40	8537.00	2142.79	.00	2143.24	4.53	5.36	1591.85	4012.85
	2561.600	350.60	.00	.00	2129.40	17855.00	2149.55	.00	2150.16	3.12	6.27	2849.04	10116.32
	3000.000	438.40	.00	.00	2130.28	2939.00	2136.62	.00	2137.04	9.63	5.22	562.85	947.12
	3000.000	438.40	.00	.00	2130.28	6751.00	2141.23	.00	2141.74	6.15	5.69	1185.50	2722.02
	3000.000	438.40	.00	.00	2130.28	8537.00	2142.97	.00	2143.50	5.76	5.81	1468.90	3556.13
	3000.000	438.40	.00	.00	2130.28	17855.00	2149.67	.00	2150.34	3.68	6.60	2706.97	9313.71
	3500.000	500.00	.00	.00	2131.28	2939.00	2137.13	.00	2137.65	13.08	5.80	506.31	812.66
	3500.000	500.00	.00	.00	2131.28	6751.00	2141.53	.00	2142.14	7.97	6.25	1080.64	2391.61
*	3500.000	500.00	.00	.00	2131.28	8537.00	2143.24	.00	2143.86	6.93	6.35	1344.66	3243.68
	3500.000	500.00	.00	.00	2131.28	17855.00	2149.83	.00	2150.59	4.46	7.00	2549.39	8452.14
	4000.000	500.00	.00	.00	2132.28	2939.00	2137.81	.00	2138.42	16.14	6.24	471.02	731.67
	4000.000	500.00	.00	.00	2132.28	6751.00	2141.92	.00	2142.64	10.13	6.81	991.96	2121.02
*	4000.000	500.00	.00	.00	2132.28	8537.00	2143.57	.00	2144.31	8.70	6.89	1238.84	2894.24
	4000.000	500.00	.00	.00	2132.28	17855.00	2150.02	.00	2150.88	5.43	7.44	2399.13	7659.44
	4500.000	500.00	.00	.00	2133.28	2939.00	2138.64	.00	2139.30	18.16	6.50	452.30	689.66
	4500.000	500.00	.00	.00	2133.28	6751.00	2142.43	.00	2143.26	12.45	7.32	921.83	1913.13
*	4500.000	500.00	.00	.00	2133.28	8537.00	2144.00	.00	2144.85	10.70	7.42	1150.17	2609.46
	4500.000	500.00	.00	.00	2133.28	17855.00	2150.27	.00	2151.24	6.63	7.91	2256.87	6935.77
	5000.000	500.00	.00	.00	2134.28	2939.00	2139.56	.00	2140.24	19.21	6.62	443.71	670.62
	5000.000	500.00	.00	.00	2134.28	6751.00	2143.05	.00	2143.98	14.66	7.76	870.04	1763.26
*	5000.000	500.00	.00	.00	2134.28	8537.00	2144.52	.00	2145.50	12.78	7.91	1079.52	2388.14
	5000.000	500.00	.00	.00	2134.28	17855.00	2150.57	.00	2151.67	8.06	8.40	2125.31	6290.45
	5500.000	500.00	.00	.00	2135.28	2939.00	2140.53	.00	2141.22	19.67	6.68	440.06	662.59
	5500.000	500.00	.00	.00	2135.28	6751.00	2143.79	.00	2144.80	16.50	8.09	834.35	1661.87
*	5500.000	500.00	.00	.00	2135.28	8537.00	2145.16	.00	2146.23	14.73	8.32	1026.16	2224.36
	5500.000	500.00	.00	.00	2135.28	17855.00	2150.95	.00	2152.18	9.90	8.89	2008.07	5674.67
	6000.000	500.00	.00	.00	2136.28	2939.00	2141.51	.00	2142.21	19.79	6.69	439.20	660.68
	6000.000	500.00	.00	.00	2136.28	6751.00	2144.61	.00	2145.69	17.85	8.32	811.52	1597.86
	6000.000	500.00	.00	.00	2136.28	8537.00	2145.89	.00	2147.05	16.39	8.64	987.84	2108.65
	6000.000	500.00	.00	.00	2136.28	17855.00	2151.42	.00	2152.78	11.53	9.36	1908.19	5258.25
	6500.000	500.00	.00	.00	2137.28	2939.00	2142.50	.00	2143.20	19.88	6.70	438.48	659.11
	6500.000	500.00	.00	.00	2137.28	6751.00	2145.51	.00	2146.62	18.74	8.46	797.70	1559.43
	6500.000	500.00	.00	.00	2137.28	8537.00	2146.71	.00	2147.94	17.66	8.87	962.05	2031.67
	6500.000	500.00	.00	.00	2137.28	17855.00	2151.97	.00	2153.45	13.15	9.78	1825.75	4924.49
	7000.000	500.00	.00	.00	2138.28	2939.00	2143.50	.00	2144.20	20.02	6.72	437.48	656.92
	7000.000	500.00	.00	.00	2138.28	6751.00	2146.45	.00	2147.58	19.28	8.55	789.74	1537.38
	7000.000	500.00	.00	.00	2138.28	8537.00	2147.60	.00	2148.86	18.54	9.03	945.53	1982.75
	7000.000	500.00	.00	.00	2138.28	17855.00	2152.61	.00	2154.20	14.64	10.14	1761.04	4666.94

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	7500.000	500.00	.00	.00	2139.28	2939.00	2144.50	.00	2145.20	20.08	6.72	437.04	655.94
	7500.000	500.00	.00	.00	2139.28	6751.00	2147.42	.00	2148.57	19.67	8.61	784.19	1522.10
	7500.000	500.00	.00	.00	2139.28	8537.00	2148.52	.00	2149.82	19.11	9.13	935.33	1952.69
	7500.000	500.00	.00	.00	2139.28	17855.00	2153.32	.00	2155.02	16.00	10.45	1709.38	4464.20

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FILE: NLVDET1.DAT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.000	2939.00	2119.92	.00	.00	2.02	56.26	.00
*	.000	6751.00	2123.32	3.41	.00	-7.18	69.90	.00
*	.000	8537.00	2124.56	1.24	.00	-5.84	74.84	.00
*	.000	17855.00	2129.51	4.94	.00	-9.89	100.38	.00
*	582.200	2939.00	2124.34	.00	1.10	.00	56.28	582.20

*	582.200	6751.00	2127.74	3.40	4.42	.00	69.88	582.20
*	582.200	8537.00	2128.99	1.25	4.43	.00	74.89	582.20
*	582.200	17855.00	2133.95	4.96	4.44	.00	100.52	582.20
*	1164.400	2939.00	2128.76	.00	1.10	.00	56.28	582.20
*	1164.400	6751.00	2132.16	3.40	4.42	.00	69.88	582.20
*	1164.400	8537.00	2133.41	1.25	4.42	.00	74.89	582.20
*	1164.400	17855.00	2138.36	4.95	4.41	.00	100.46	582.20
*	1746.600	2939.00	2133.06	.00	1.08	.00	54.95	582.20
*	1746.600	6751.00	2136.52	3.46	4.36	.00	67.85	582.20
*	1746.600	8537.00	2137.80	1.28	4.39	.00	72.61	582.20
*	1746.600	17855.00	2142.93	5.13	4.57	.00	91.69	582.20
*	1776.600	2939.00	2133.29	.00	.23	.00	54.94	30.00
*	1776.600	6751.00	2136.74	3.45	.21	.00	67.78	30.00
*	1776.600	8537.00	2138.01	1.27	.20	.00	72.51	30.00
*	1776.600	17855.00	2143.10	5.09	.17	.00	91.47	30.00
*	1861.600	2939.00	2136.00	.00	.10	.00	129.92	85.00
*	1861.600	6751.00	2140.81	4.81	4.08	.00	168.27	85.00
*	1861.600	8537.00	2142.58	1.76	.16	.00	192.80	85.00
*	1861.600	17855.00	2149.41	6.83	6.31	.00	192.80	85.00
	2211.000	2939.00	2136.14	.00	.13	.00	126.27	349.40
	2211.000	6751.00	2140.92	4.78	.10	.00	164.55	349.40
	2211.000	8537.00	2142.68	1.76	.10	.00	184.38	349.40
	2211.000	17855.00	2149.49	6.81	.08	.00	193.70	349.40
	2561.600	2939.00	2136.31	.00	.17	.00	121.26	350.60
	2561.600	6751.00	2141.04	4.73	.12	.00	159.15	350.60
	2561.600	8537.00	2142.79	1.75	.11	.00	178.46	350.60
	2561.600	17855.00	2149.55	6.76	.07	.00	187.30	350.60
	3000.000	2939.00	2136.62	.00	.31	.00	116.73	438.40
	3000.000	6751.00	2141.23	4.61	.20	.00	153.58	438.40
	3000.000	8537.00	2142.97	1.74	.18	.00	175.68	438.40
	3000.000	17855.00	2149.67	6.70	.12	.00	187.30	438.40

1

22APR98 06:25:11 PAGE 32

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	3500.000	2939.00	2137.13	.00	.51	.00	112.79	500.00
	3500.000	6751.00	2141.53	4.40	.30	.00	148.02	500.00
*	3500.000	8537.00	2143.24	1.71	.14	.00	161.66	500.00
	3500.000	17855.00	2149.83	6.59	.16	.00	187.30	500.00
	4000.000	2939.00	2137.81	.00	.68	.00	110.26	500.00
	4000.000	6751.00	2141.92	4.11	.39	.00	143.15	500.00
*	4000.000	8537.00	2143.57	1.65	.18	.00	156.34	500.00
	4000.000	17855.00	2150.02	6.45	.20	.00	187.30	500.00
	4500.000	2939.00	2138.64	.00	.83	.00	108.89	500.00
	4500.000	6751.00	2142.43	3.79	.50	.00	139.17	500.00
*	4500.000	8537.00	2144.00	1.57	.22	.00	151.73	500.00
	4500.000	17855.00	2150.27	6.27	.24	.00	187.30	500.00
	5000.000	2939.00	2139.56	.00	.92	.00	108.26	500.00
	5000.000	6751.00	2143.05	3.49	.62	.00	136.16	500.00
*	5000.000	8537.00	2144.52	1.47	.28	.00	147.96	500.00
	5000.000	17855.00	2150.57	6.05	.30	.00	187.30	500.00
	5500.000	2939.00	2140.53	.00	.97	.00	107.99	500.00
	5500.000	6751.00	2143.79	3.26	.74	.00	134.05	500.00
*	5500.000	8537.00	2145.16	1.37	.33	.00	145.05	500.00
	5500.000	17855.00	2150.95	5.79	.38	.00	187.30	500.00
	6000.000	2939.00	2141.51	.00	.99	.00	107.92	500.00
	6000.000	6751.00	2144.61	3.10	.83	.00	132.68	500.00
	6000.000	8537.00	2145.89	1.28	.73	.00	142.92	500.00
	6000.000	17855.00	2151.42	5.52	.47	.00	185.41	500.00
	6500.000	2939.00	2142.50	.00	.99	.00	107.87	500.00
	6500.000	6751.00	2145.51	3.01	.90	.00	131.85	500.00
	6500.000	8537.00	2146.71	1.20	.82	.00	141.47	500.00
	6500.000	17855.00	2151.97	5.26	.55	.00	183.62	500.00
	7000.000	2939.00	2143.50	.00	1.00	.00	107.79	500.00
	7000.000	6751.00	2146.45	2.95	.94	.00	131.36	500.00
	7000.000	8537.00	2147.60	1.15	.88	.00	140.53	500.00
	7000.000	17855.00	2152.61	5.01	.64	.00	182.21	500.00
	7500.000	2939.00	2144.50	.00	1.00	.00	107.76	500.00
	7500.000	6751.00	2147.42	2.91	.97	.00	131.02	500.00
	7500.000	8537.00	2148.52	1.11	.93	.00	139.95	500.00
	7500.000	17855.00	2153.32	4.80	.72	.00	181.07	500.00

1

22APR98 06:25:11 PAGE 33

SUMMARY OF ERRORS AND SPECIAL NOTES

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 CAUTION SECNO=       .000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .000  PROFILE=  4  CRITICAL DEPTH ASSUMED

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 CAUTION SECNO=    582.200  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    582.200  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    582.200  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=    582.200  PROFILE=  4  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   1776.600  PROFILE=  3  CRITICAL DEPTH ASSUMED
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    22APR98       06:25:11                                                    PAGE   34


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 CAUTION SECNO=   5000.000  PROFILE=  3  INTERPOLATED X-SECTIONS USED

 CAUTION SECNO=   5500.000  PROFILE=  3  INTERPOLATED X-SECTIONS USED
```

E 630,500

E 631,000

E 631,500

N 564,500

N 564,000

N 564,571.0917
E 630,741.1874

LINE "B" INLET CHANNEL
SEE SHEET 10

3:1 MATCH EXIST. GRADE

2145

2140

2135

2130

2125

N 564,391.0000
E 630,880.0000

MATCH EXISTING GROUND AT EL. 2142.00

N 564,214.7297
E 630,802.2540

N 564,361.7820
E 631,174.0943

N 564,291.4820
E 630,849.9998

3:1 MATCH EXIST. GRADE

LINE "C" INLET CHANNEL
SEE SHEET 10

LINE "C"

TOP OF CUT

CUT-OFF WALL

DIVERSION DIKE

R/W BOUNDARY

CONTROL STRUCTURE

10+15 END CONTROL STRUCTURE
BEGIN INLET CHANNEL

INLET CHANNEL

SEE SHEET 11

N 564,065.0000
E 631,558.0000

N 564,064.6182
E 631,215.1844

CONTROL STRUCTURE
SEE SHEET 25
N 563,922.1888
E 631,444.3491

STA. BEGIN TRANSITION
STA. DIVERSION DIKE
BEGIN CONTROL STRUCTURE

9+85 END TRANSITION

N 564,095.4975
E 631,682.5948

2:1 50 MATCH EXIST. GRADE

N 563,945.8647
E 631,576.9821

LINE "D" INLET CHANNEL
SEE SHEET 11

LINE "D"

12+30 LINE "A" & LINE "D"

SEE SHEET 7

N 563,748.0641
E 631,724.9838

N 563,849.4098
E 631,779.1990

N 563,780.0460
E 631,491.6562

N 563,661.9519
E 631,636.0880

LINE "A" INLET CHANNEL
SEE SHEET 7

N 563,893.7189
E 631,393.1538

℄ EMBANKMENT

CUT-OFF WALL

TOE OF EMBANKMENT

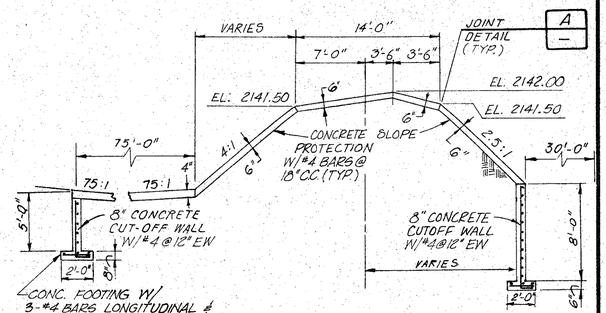
EMBANKMENT ALIGNMENT CHANGE

12+00 LINE "A" EMBANKMENT ALIGNMENT CHANGE

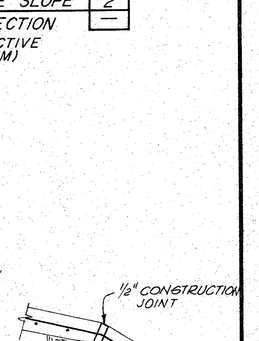
VARIES

REFERENCE NOTES.

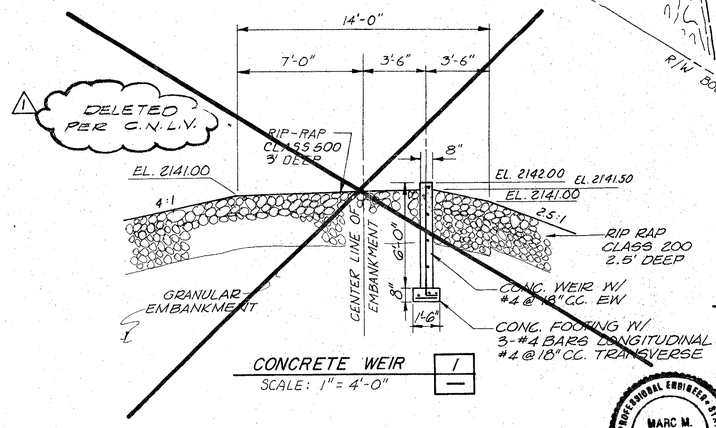
1. CONSTRUCT EARTHEN EMBANKMENT AS SHOWN W/SIDE SLOPES @ 4:1. TOP EL. = 2145.00



CONCRETE SLOPE PROTECTION (DEDUCTIVE ITEM) 2



JOINT DETAIL (TYP. AT ALL BENDS) A



CONCRETE WEIR 1

SCALE: 1" = 4'-0"

LAS VEGAS WASH DIVERSION PLAN

SCALE: 1" = 60'

RECORD DRAWING

These record drawings have been prepared based on information provided by others. The Engineer has not verified the accuracy and completeness and shall not be responsible for any errors or omissions which may be incorporated herein as a result.

REV	DATE	BY	DESCRIPTION
1	6-23-1994	J.B.	PER RECORD DRAWINGS

SCALE: AS SHOWN

DESIGNED: Joseph L. Bradwell
DRAWN: S. Flint
CHECKED: Fred Hollard

SUBMITTED: Alan M. Brown — PROJECT ENGINEER — 5818 — R.C.E. NO. — 5-3-93 — DATE

RECOMMENDED: Glenn K. Anderson — 2443 — R.C.E. NO. — 5-5-93 — DATE

MONTGOMERY ENGINEERS OF NEVADA, CONSULTING ENGINEERS, INC.

MARC M. BROWN — Civil — No. 5818 — REGISTERED PROFESSIONAL ENGINEER — STATE OF NEVADA

MONTGOMERY ENGINEERS OF NEVADA
1100 EAST SAHARA AVENUE, LAS VEGAS, NEVADA 89104

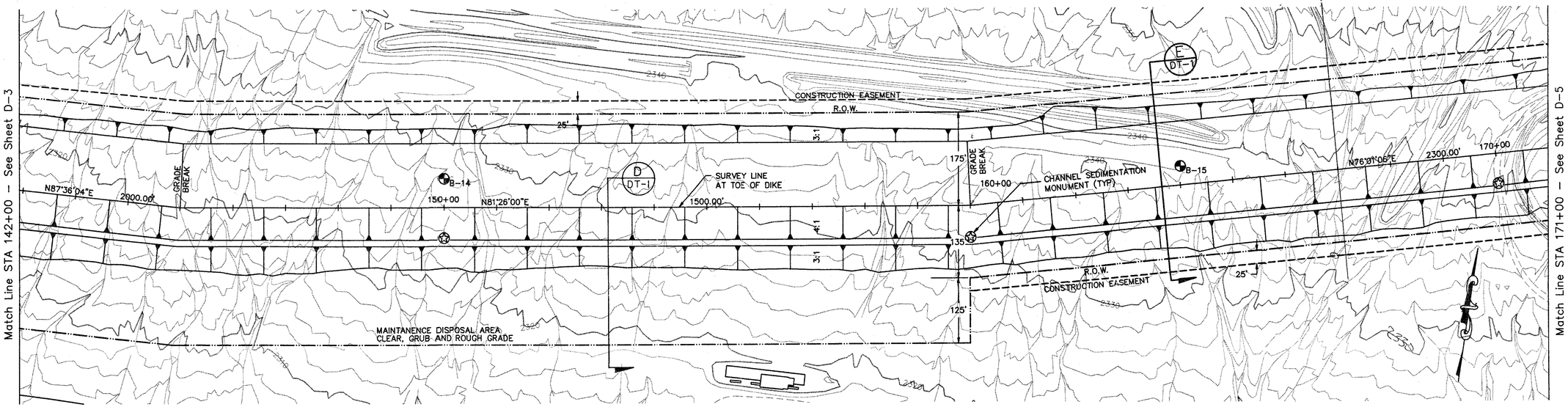
CITY OF NORTH LAS VEGAS, NEVADA

LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL PROJECT

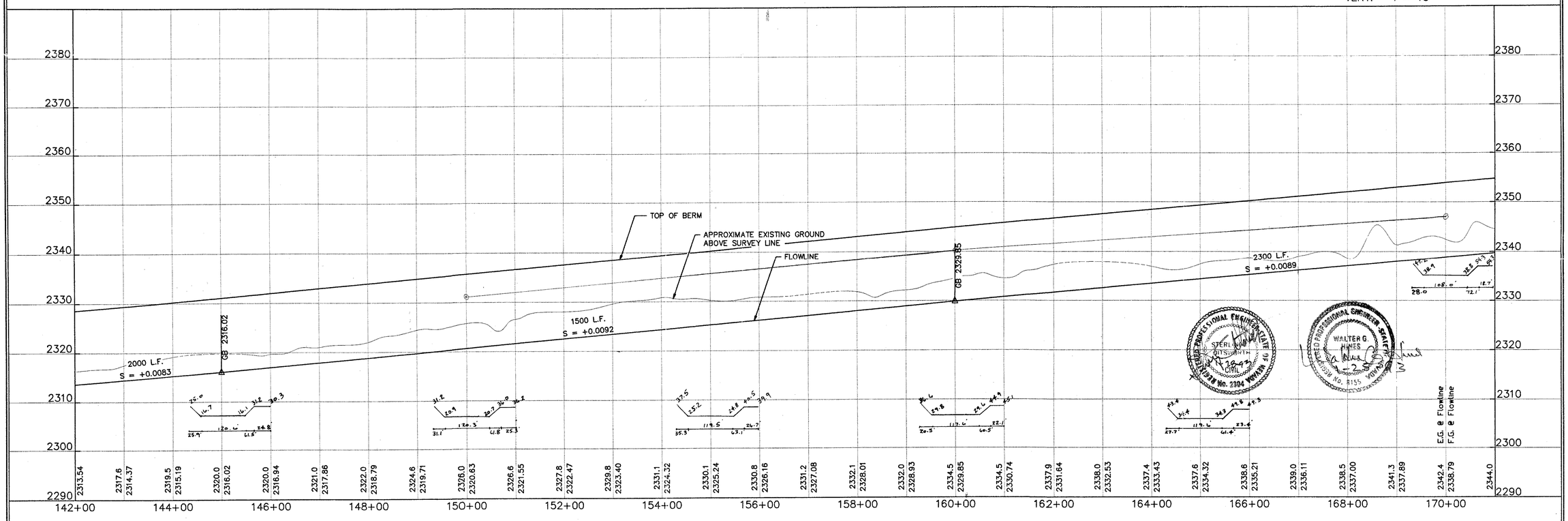
DIVERSION DIKE PLAN

SHEET 14 OF 25 SHEETS

JOB NO. 1243.0011 FILE



SCALE: HORIZ. 1"= 100'
VERT. 1"= 10'



MARK	DATE	BY	REVISION

DESIGNED: WJH
DRAWN: WJH
CHECKED: WGH

PROJECT ENGINEER — DATE 24 JAN 93
PROJECT MANAGER — DATE 1-28-93

Boyle Engineering Corporation
consulting engineers
1785 E. Sahara Ave. 300
Las Vegas, NV 89104
(702) 731-5511

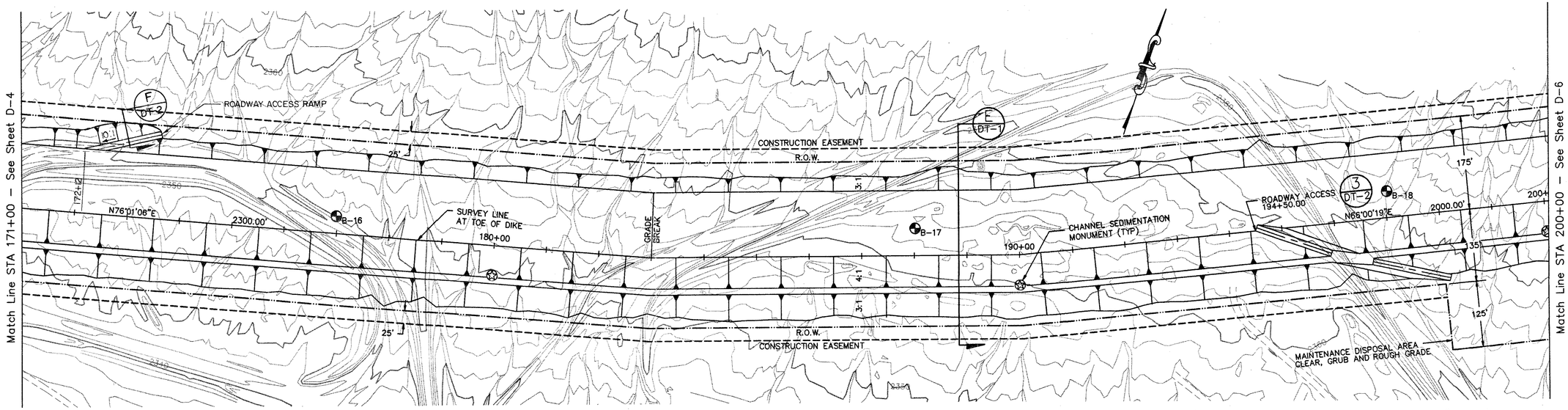
CITY OF NORTH LAS VEGAS
DEPARTMENT OF PUBLIC WORKS

KEY MAP

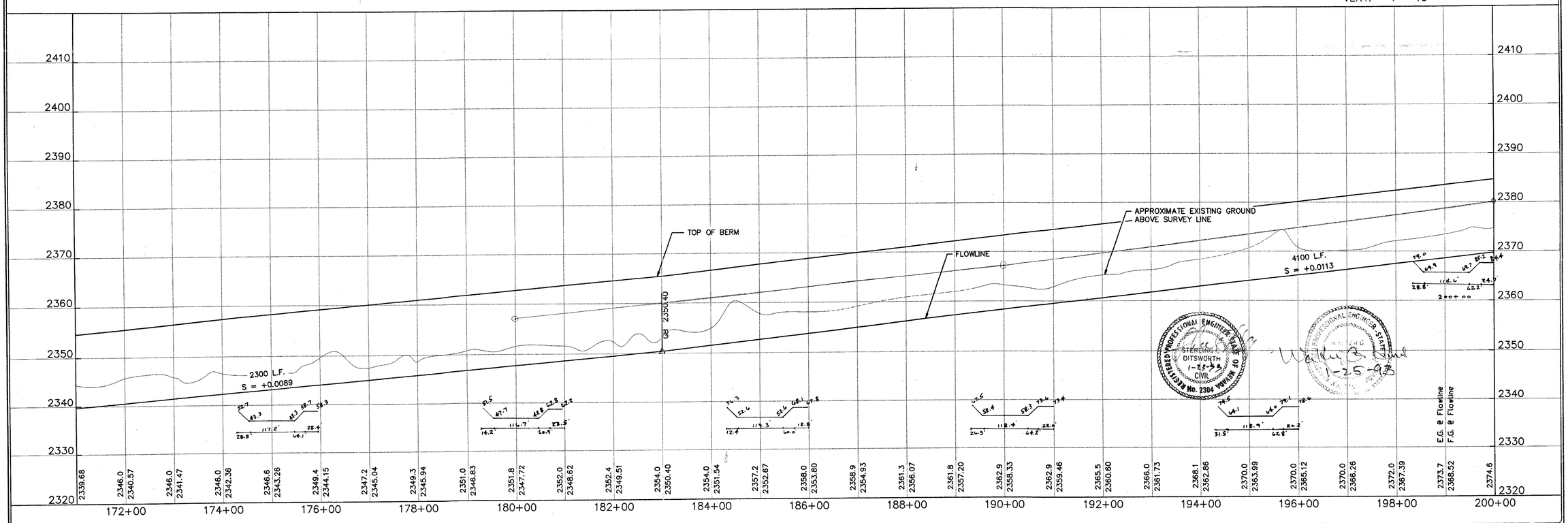
WEST RANGE WASH DIVERSION DIKE

DIKE PLAN AND PROFILE
142+00.00 TO 171+00.00

DRAWING
D-4
10 OF 20
rwdp04.dwg



SCALE: HORIZ. 1"= 100'
VERT. 1"= 10'



MARK	DATE	BY	REVISION

DESIGNED: WJH
DRAWN: WJH
CHECKED: WGH

PROJECT ENGINEER — DATE 24 JAN 03
PROJECT MANAGER — DATE 1-24-03

Boyle Engineering Corporation
consulting engineers
1785 E. Sahara Ave. 300
Las Vegas, NV 89104
(702) 731-5511

CITY OF NORTH LAS VEGAS
DEPARTMENT OF PUBLIC WORKS

KEY MAP

WEST RANGE WASH DIVERSION DIKE

DIKE PLAN AND PROFILE
171+00.00 TO 200+00.00

DRAWING D-5
11 OF 20
rwdp05.dwg

TORTOISE PROOF GATE, SEE SH. 24

S89°30'33"E

SECTION LINE

138 KV & 230 KV TRANSMISSION

S89°30'13"E

QUAIL SPRINGS WILDERNESS STUDY AREA

P.I.#1

N577384.35
E592628.30

INTERCEPTION BERM ACCESS ROAD
SEE PROFILE SH.23

90' NPC EASEMENT

TORTOISE-PROOF FENCING

P.I.#2
15' INSIDE RADIUS (TYP)
P.I.#3
P.I.#4

GATE STA 1+30

P.I.#1 STA 7+51.18
N577,019.37
E592,625.16

600' EASEMENT

365'

150'

25'-6"

39'-5"

N577025.85
E591872.97

S 89°30'33"E

0+00 5+00 10+00 15+00 20+00 25+00 30+00

STA 26+00 ACCESS RAMPS SEE DETAIL A48 SH7

MATCH LINE STA 32+00
SEE SH 5

P.I.#5

STA 0+55.60 BEGIN RCC SLOPE PROTECTION

NEVADA DIVISION OF STATE PARKS LAND

TORTOISE-PROOF FENCING

PE/L

NOTE:
FOR SECTION LINES AND PROPERTY BOUNDARIES, SEE INTERCEPTION BERM/CHANNEL SITE PLAN, SH 3.

KEY PLAN

INTERCEPTION BERM ACCESS ROAD LOCATION DATA

P.I. NO.	NORTH COORDINATE	EAST COORDINATE
1	577,289.66	591,911.87
2	577,272.86	591,936.73
3	577,232.86	591,936.39
4	577,175.18	591,952.90
5	576,842.06	591,964.90

SCALE
HORIZ. 1"=100'
VERT. 1"=4'

ACCESS ROAD
EL 2496.04
EL 2496.00
EL 2487.00
EL 2481.20
STA 0+55.60 BEGIN RCC SLOPE PROTECTION
STA 1+00
STA 1+30

NORTH BANK (T.O. 3:1 SLOPE)
SOUTH BANK (TOP OF BERM)
EXIST GRADE @ CHANNEL ℄
EXIST GRADE @ BERM ℄
℄CHANNEL ℄
S=0.0067 FT/FT
B.O RCC SLOPE PROTECTION (SOUTH BANK)
EL 2474.93
EL 2466.43

2496 2492 2488 2484 2480 2476 2472 2468 2464 2460

0+00 1 2 3 4 5+00 6 7 8 9 10+00 11 12 13 14 15+00 16 17 18 19 20+00 21 22 23 24 25+00 26 27 28 29 30+00 31 32+00

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10.26.98	AS BUILT		PT	MR	

DESIGNED ALK, JWS
DETAILED HLR
CHECKED DIH
APPROVED [signature] 5-28-91
DATE

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

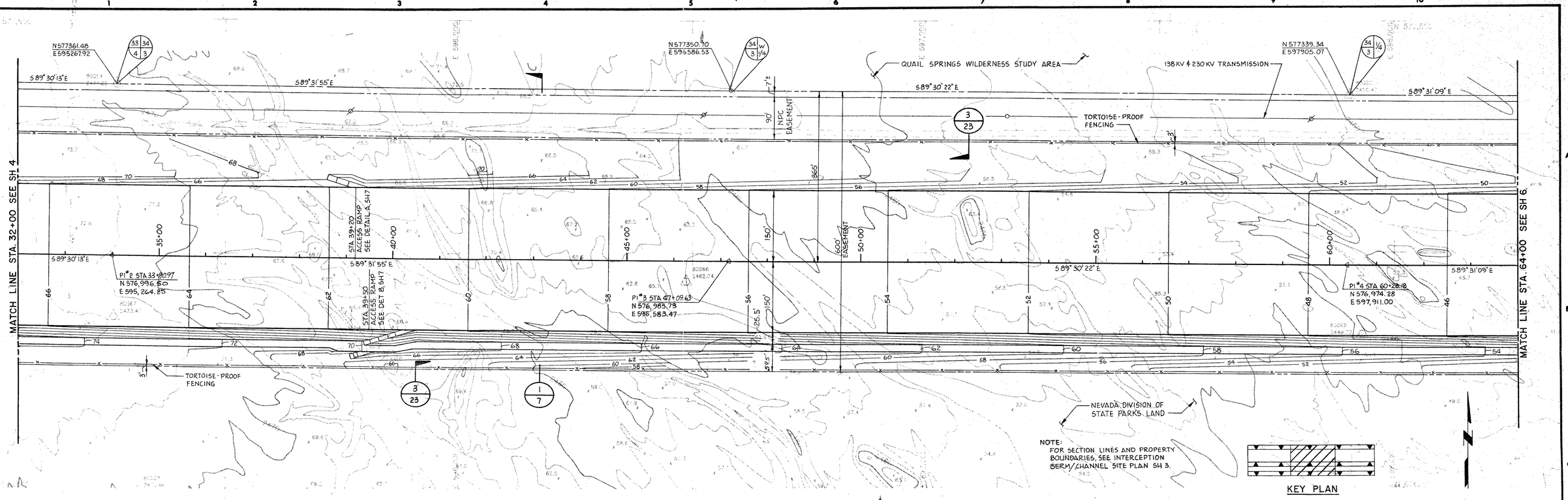
CITY OF NORTH LAS VEGAS

UPPER LAS VEGAS WASH DETENTION BASIN

INTERCEPTION BERM/CHANNEL
PLAN & PROFILE STA. 0+00 TO 32+00

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
DANA V. REEL
CIVIL
No. 7338

SHEET 4 OF 25



DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10.26.93	AS BUILT		PT	SC	MR

DESIGNED ALK JWS
DETAILED HLR
CHECKED DJH
APPROVED A. C. Roberts
DATE 5-28-93

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

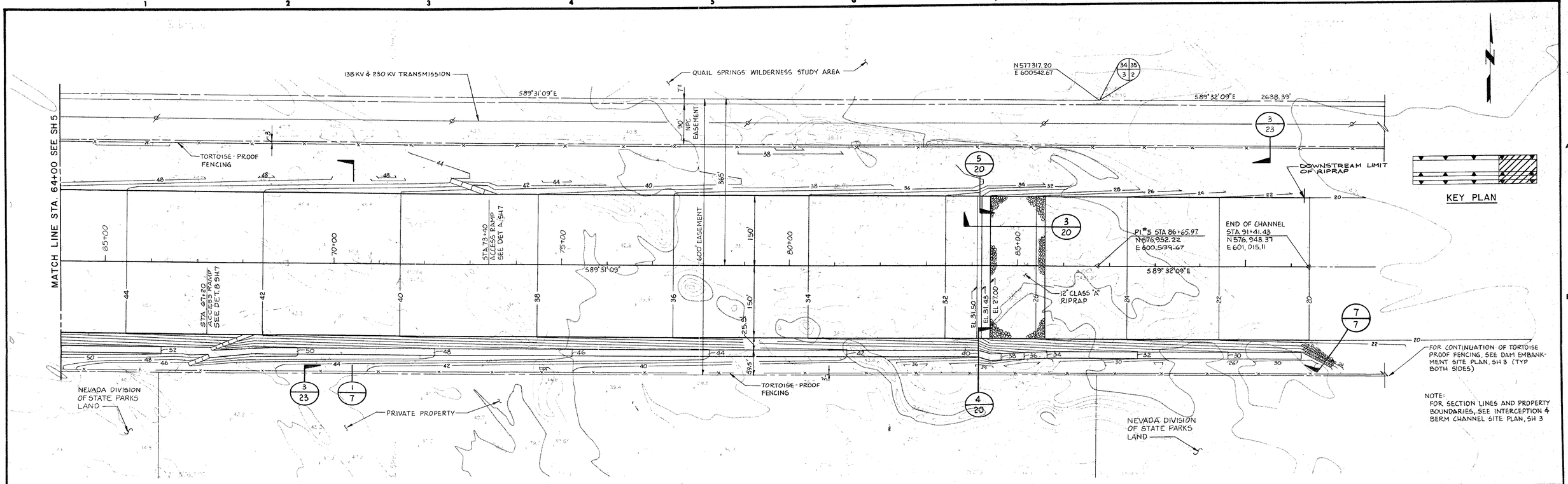
CITY OF NORTH LAS VEGAS

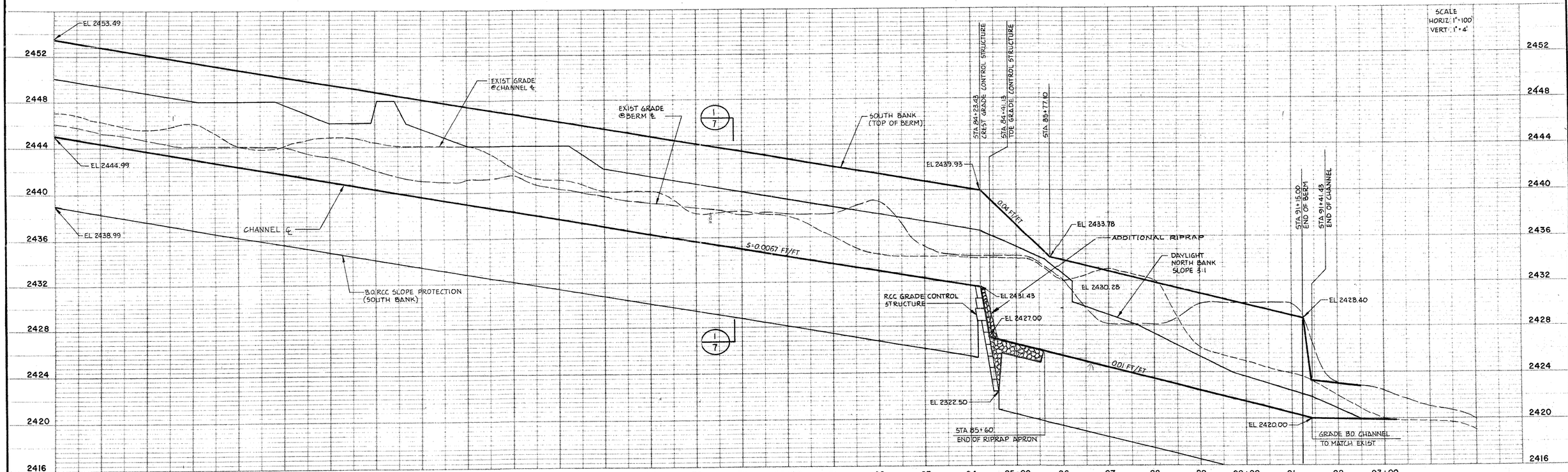
UPPER LAS VEGAS WASH DETENTION BASIN

INTERCEPTION BERM/CHANNEL
PLAN & PROFILE STA. 32+00 TO 64+00

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
DANA Y. REEL CIVIL
No. 7709

SHEET 5 OF 25





DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10-26-93	AS BUILT		PT	SC/RK	

DESIGNED ALK, JWS, SDC
DETAILED HLR
CHECKED DIH
APPROVED AC Roberts
DATE 5-28-91

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

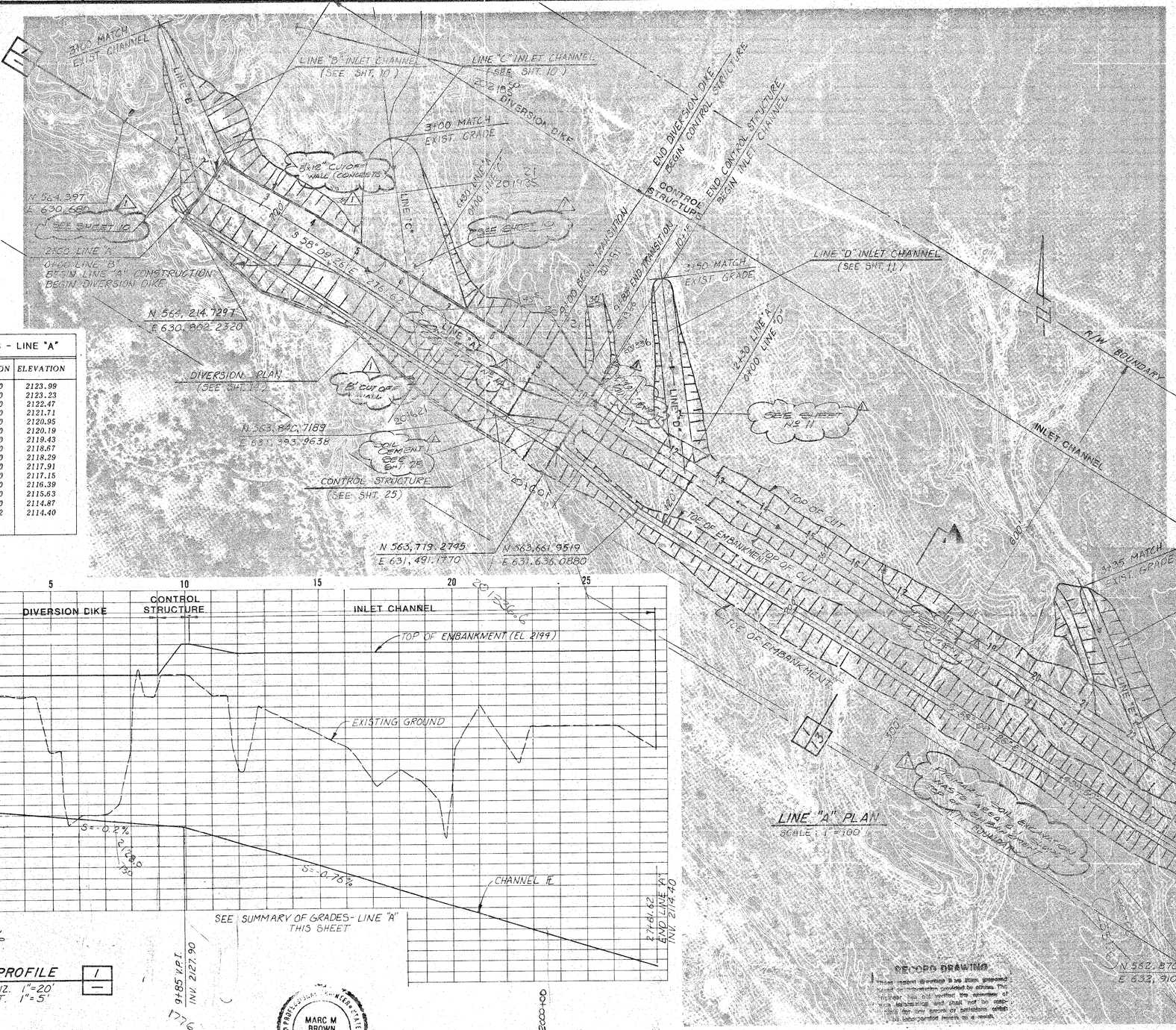
CITY OF NORTH LAS VEGAS

UPPER LAS VEGAS WASH DETENTION BASIN

INTERCEPTION BERM/CHANNEL PLAN & PROFILE STA. 64+00 TO 93+00

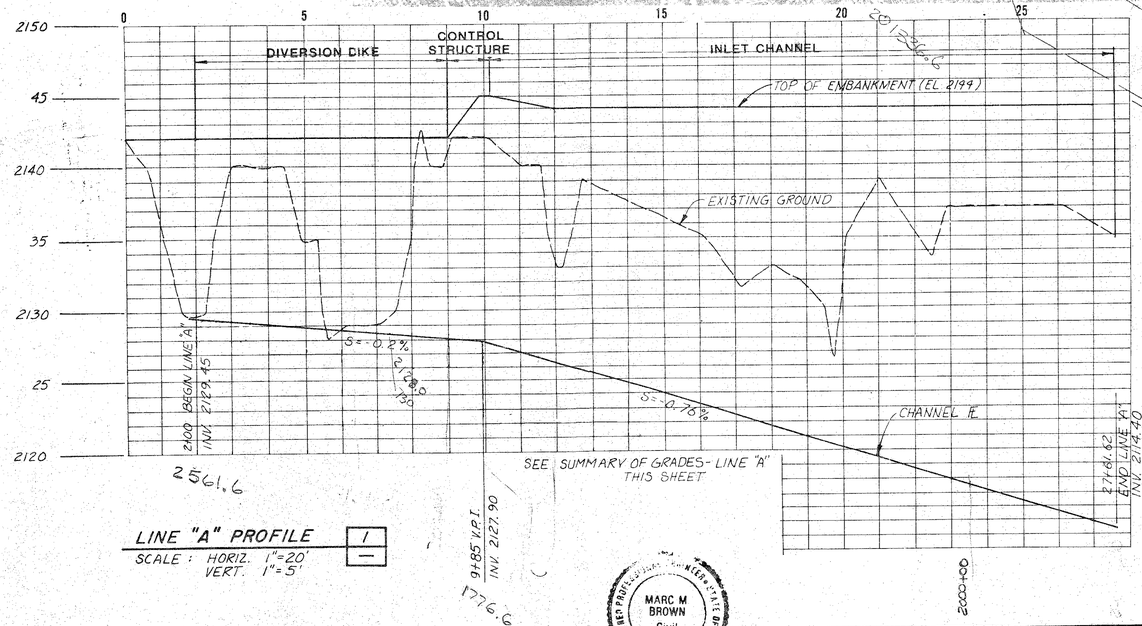
REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA
DANA V. REEL CIVIL

SHEET 6 OF 25



SUMMARY OF GRADES - LINE "A"

STATION	ELEVATION	STATION	ELEVATION
2+00	2129.45	15+00	2123.99
3+00	2129.27	16+00	2123.23
4+00	2129.07	17+00	2122.47
5+00	2128.87	18+00	2121.71
6+00	2128.67	19+00	2120.95
6+30	2128.56	20+00	2120.19
7+00	2128.47	21+00	2119.43
8+00	2128.27	22+00	2118.67
9+00	2128.07	22+50	2118.29
9+85	2127.90	23+00	2117.91
10+00	2127.79	24+00	2117.15
11+00	2127.03	25+00	2116.39
12+00	2126.27	26+00	2115.63
12+30	2126.04	27+00	2114.87
13+00	2125.51	27+62	2114.40
14+00	2124.75		



LINE "A" PROFILE

SCALE: HORIZ. 1"=20'
VERT. 1"=5'

1 / 1

MARC M BROWN Civil

JOB NO. 1243.011 FILE

REV	DATE	BY	DESCRIPTION
1	9-22-82	J.B.	PER RECORD DRAWINGS

SCALE: AS SHOWN

DESIGNED Joseph L. Bradford
DRAWN J. Flint
CHECKED Fay J. Holled

SUBMITTED
Marc M. Brown — PROJECT ENGINEER — 5818 R.C.E. NO. — 5-3-82 DATE

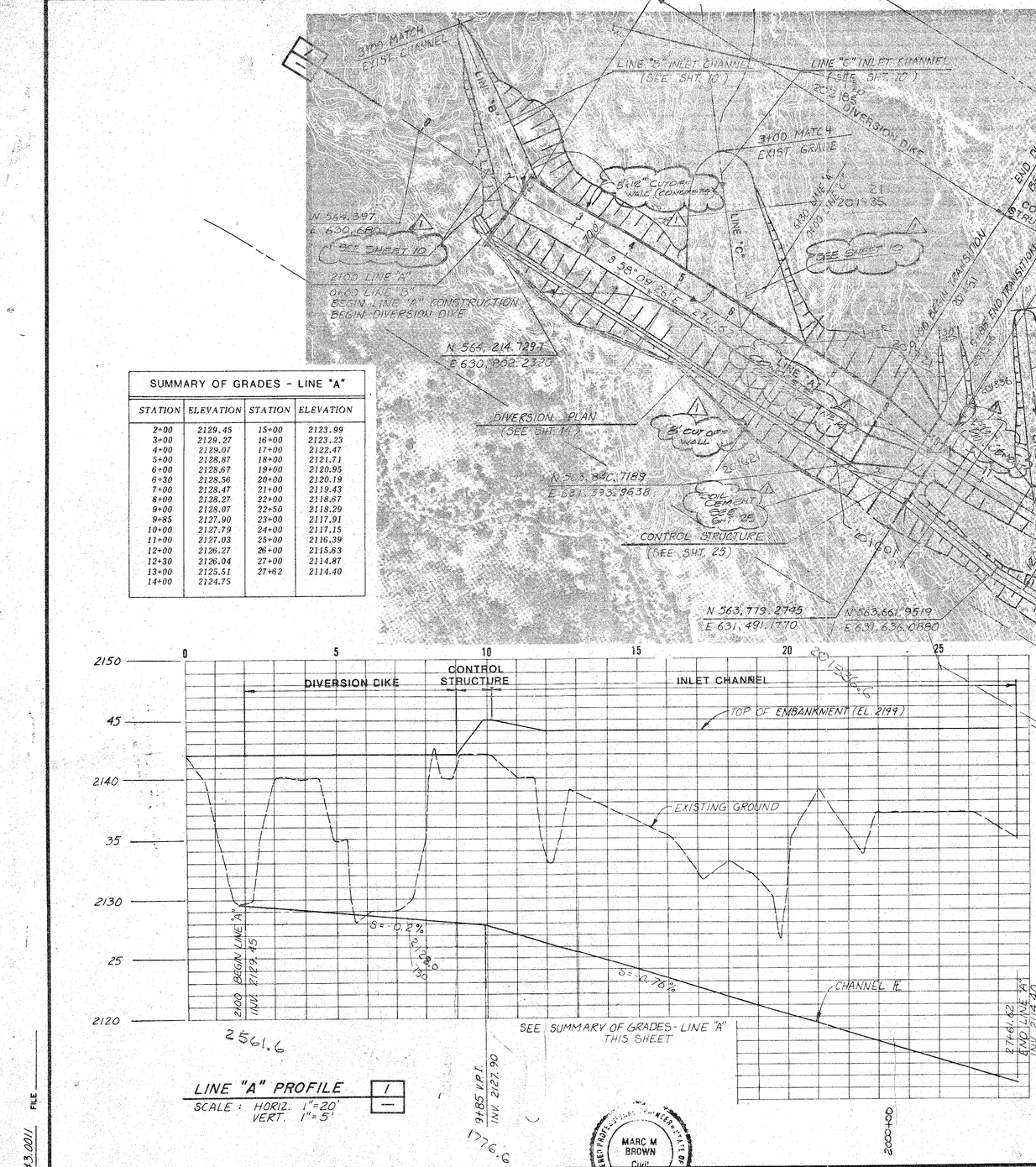
RECOMMENDED
Edward K. Anderson — MONTGOMERY ENGINEERS OF NEVADA CONSULTING ENGINEERS, INC. — 2443 R.C.E. NO. — 5-5-82 DATE

MONTGOMERY ENGINEERS OF NEVADA
1100 EAST SAHARA AVENUE, LAS VEGAS, NEVADA 89104

CITY OF NORTH LAS VEGAS, NEVADA
LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL PROJECT
LINE "A" PLAN & PROFILE

SHEET 7 OF SHEETS

SUMMARY OF GRADES - LINE "A"			
STATION	ELEVATION	STATION	ELEVATION
2+00	2129.45	15+00	2123.99
3+00	2129.27	16+00	2123.23
4+00	2129.07	17+00	2122.47
5+00	2128.87	18+00	2121.71
6+00	2128.67	19+00	2120.95
6+30	2128.56	20+00	2120.19
7+00	2128.47	21+00	2119.43
8+00	2128.27	22+00	2118.67
9+00	2128.07	22+50	2118.29
9+85	2127.90	23+00	2117.91
10+00	2127.79	24+00	2117.15
11+00	2127.03	25+00	2116.39
12+00	2126.27	26+00	2115.63
12+30	2126.04	27+00	2114.87
13+00	2125.51	27+62	2114.40
14+00	2124.75		



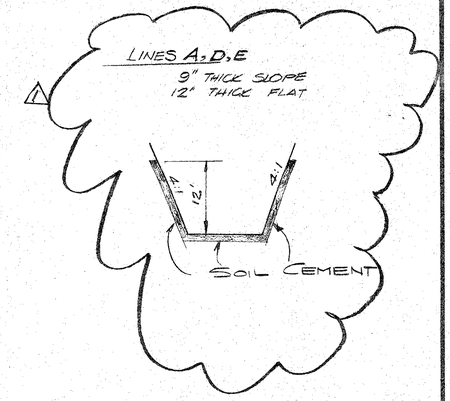
LINE "A" PROFILE

SCALE : HORIZ. 1"=20'
VERT. 1"=5'

7

LINE "A" PLAN

SCALE : 1"=100'



RECORD DRAWING

These record drawings have been prepared based on information provided by others. The engineer has not verified the accuracy of such information and shall not be responsible for any errors or omissions which may be contained herein as a result.

JOB NO. 1243.0011 FILE

REV	DATE	BY	DESCRIPTION
1	6-28-1982	J.B.	PER RECORD DRAWINGS

SCALE AS SHOWN

DESIGNED Joseph C. Brinkman
DRAWN S. Flint
CHECKED Ray J. Holler

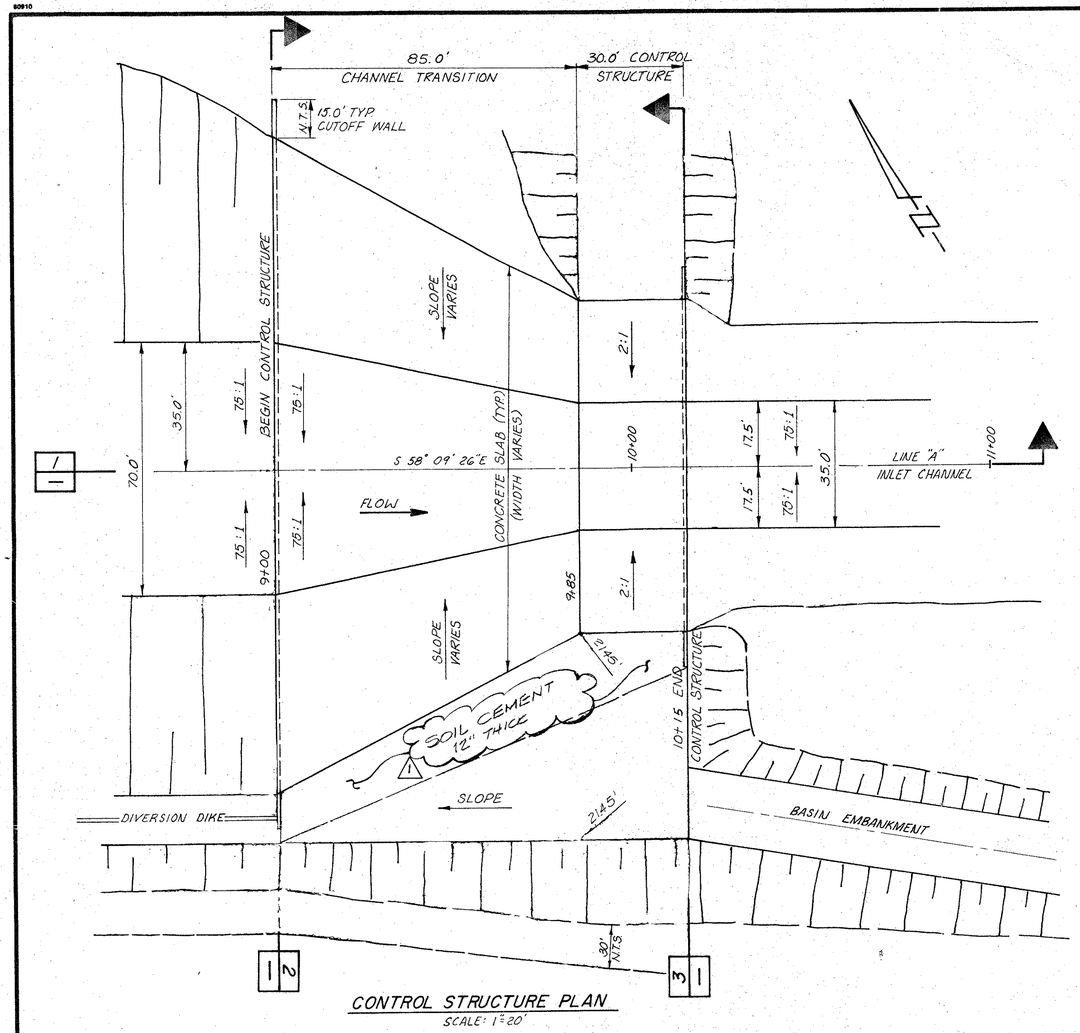
SUBMITTED Marc M. Brown, PROJECT ENGINEER, 5912, R.C.E. NO., 5-3-82, DATE
RECOMMENDED Ellwood K. Anderson, MONTGOMERY ENGINEERS OF NEVADA CONSULTING ENGINEERS, INC., 2443, R.C.E. NO., 5-5-82, DATE

MARC M BROWN 5912 Civil REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA

MONTGOMERY ENGINEERS OF NEVADA
1100 EAST SAHARA AVENUE, LAS VEGAS, NEVADA 89104

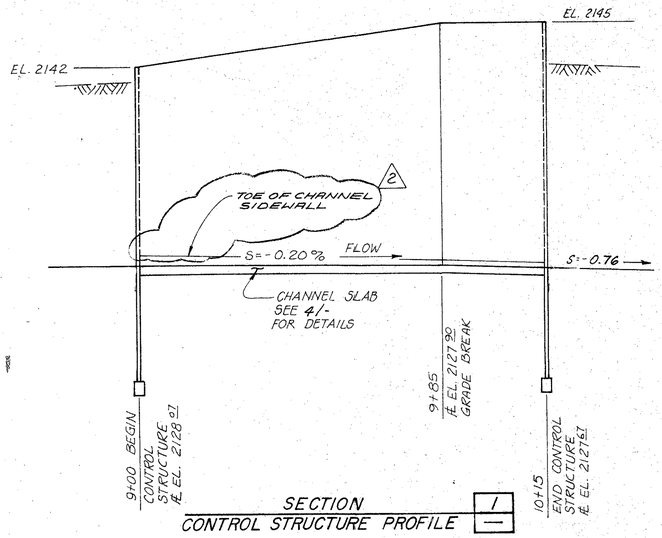
CITY OF NORTH LAS VEGAS, NEVADA
LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL PROJECT
LINE "A" PLAN & PROFILE

SHEET 7 OF SHEETS



CONTROL STRUCTURE PLAN

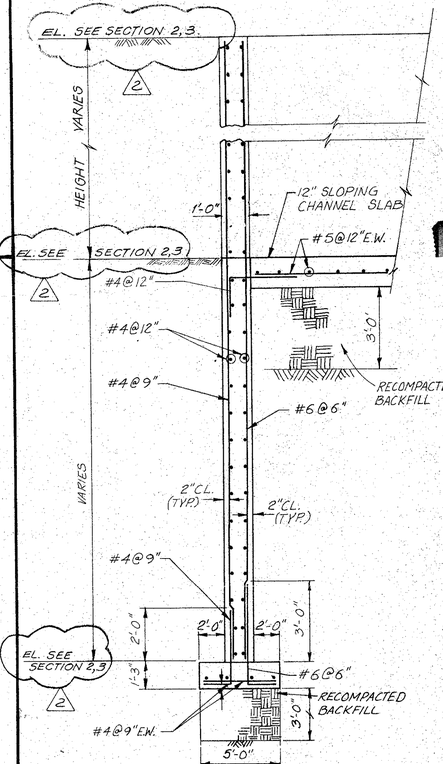
SCALE: 1"=20'



SECTION

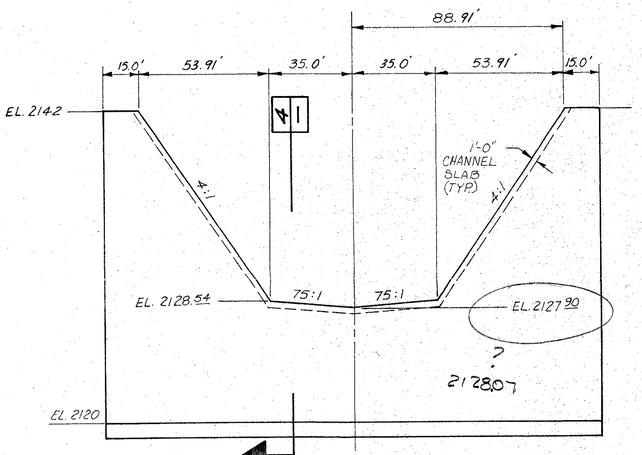
CONTROL STRUCTURE PROFILE

SCALE: HORIZ: 1"=20'
VERT: 1"=5'



SECTION

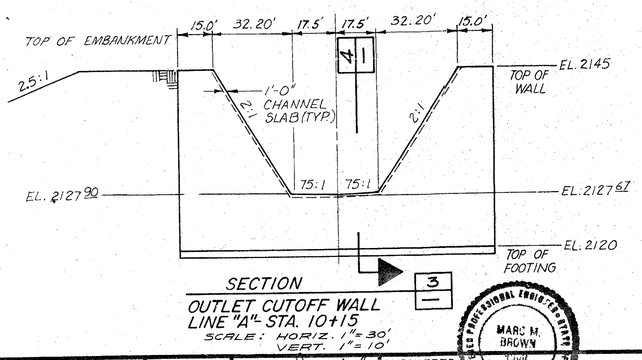
N.T.S.



SECTION

INLET CUTOFF WALL LINE "A"- STA. 9+00

SCALE: HORIZ. 1"=30'
VERT. 1"=5'



SECTION

OUTLET CUTOFF WALL LINE "A"- STA. 10+15

SCALE: HORIZ. 1"=30'
VERT. 1"=10'

RECORD DRAWING

These record drawings have been prepared based on information provided by others. The Engineer has not verified the accuracy of such information and shall not be responsible for any errors or omissions which may be incorporated herein as result.

MARC M. BROWN REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA Civil

REV	DATE	BY	DESCRIPTION
2	9/15/83	J.W.	ADD ELEV. & TOE OF CHANNEL
1	6-22-1983	J.B.	PER RECORD DRAWINGS

SCALE: AS NOTED

DESIGNED: D.N. Hoorley
DRAWN: S. Flint
CHECKED: Joseph E. Bosworth

SUBMITTED: Marc M. Brown — 5818 R.C.E. NO. — 5-5-83 DATE
PROJECT ENGINEER

RECOMMENDED: Clement Anderson — 2443 R.C.E. NO. — 5-5-83 DATE
MONTGOMERY ENGINEERS OF NEVADA CONSULTING ENGINEERS, INC.

MONTGOMERY ENGINEERS OF NEVADA
1100 EAST SAHARA AVENUE, LAS VEGAS, NEVADA 89104

CITY OF NORTH LAS VEGAS, NEVADA
LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL PROJECT
CONTROL STRUCTURE DETAILS

SHEET 25 OF 25 SHEETS

JOB NO. 1243.0011 FILE

80010

E 630,500

E 631,000

E 631,500

N 564,500

N 564,000

N 564,571.0917
E 630,741.1874

LINE "B" INLET CHANNEL
SEE SHEET 10

TO MATCH EXIST. GRADE

2145

2140

2135

2130

2125

LINE "A"

FLOW LINE "A"
FLOW LINE "B"
BEGIN TRANSITION

N 564,361.7820
E 631,174.0943

N 564,271.4820
E 630,849.8998

3100 MATCH EXIST. GRADE

LINE "C" INLET CHANNEL
SEE SHEET 10

N 564,321.0000
E 630,600.0000

MATCH TO EXISTING GROUND AT EL. 2142.00

N 564,214.7697
E 630,802.2540

8" CUTOFF WALL

TOP OF CUT

LINE "C"

SEE SHEET 11

N 564,065.0000
E 631,558.0000

N 564,064.6182
E 631,215.1844

6+30 LINE "A"
0+00 LINE "C"

CONTROL STRUCTURE
SEE SHEET 25
N 563,922.1888
E 631,444.3491

9+00 BEGIN TRANSITION
0+00 DIVERSION DIKE
BEGIN CONTROL STRUCTURE

N 564,095.4975
E 631,682.5948

2+50 MATCH EXIST. GRADE

2+85 END TRANSITION

N 563,945.8647
E 631,576.9821

LINE "D" INLET CHANNEL
SEE SHEET 11

DIVERSION DIKE

R/W BOUNDARY

CONTROL STRUCTURE

10+15 END CONTROL STRUCTURE
BEGIN INLET CHANNEL

INLET CHANNEL

CUT-OFF WALLS

TOE OF EMBANKMENT

LINE "C" INLET CHANNEL
SEE SHEET 7

N 563,890.7189
E 631,393.9838

℄ EMBANKMENT

N 563,780.0460
E 631,491.6862

N 563,661.9519
E 631,636.0880

0+80 LINE "A" EMBANKMENT CHANGE

12+00 LINE "A" EMBANKMENT ALIGNMENT CHANGE

N 563,869.4098
E 631,829.1990

12+30 LINE "A"
0+00 LINE "D"

SEE SHEET 11

N 563,748.0641
E 631,724.8838

2140

2145

2150

2155

2160

2165

2170

2175

2180

2185

2190

2195

2200

2205

2210

2215

2220

2225

2230

2235

2240

2245

2250

2255

2260

2265

2270

2275

2280

2285

2290

2295

2300

2305

2310

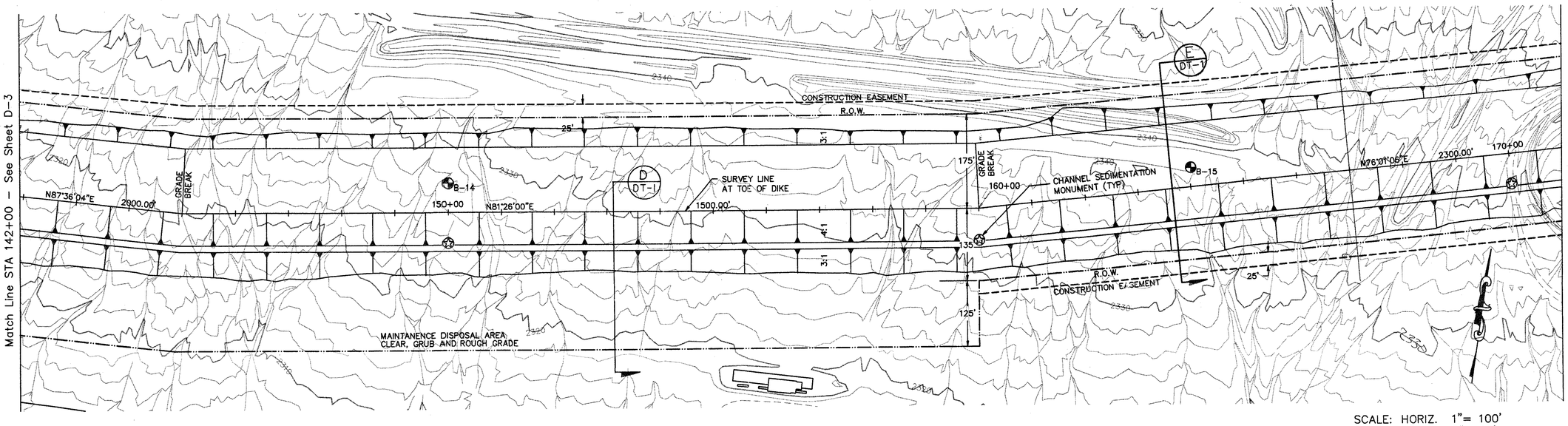
2315

2320

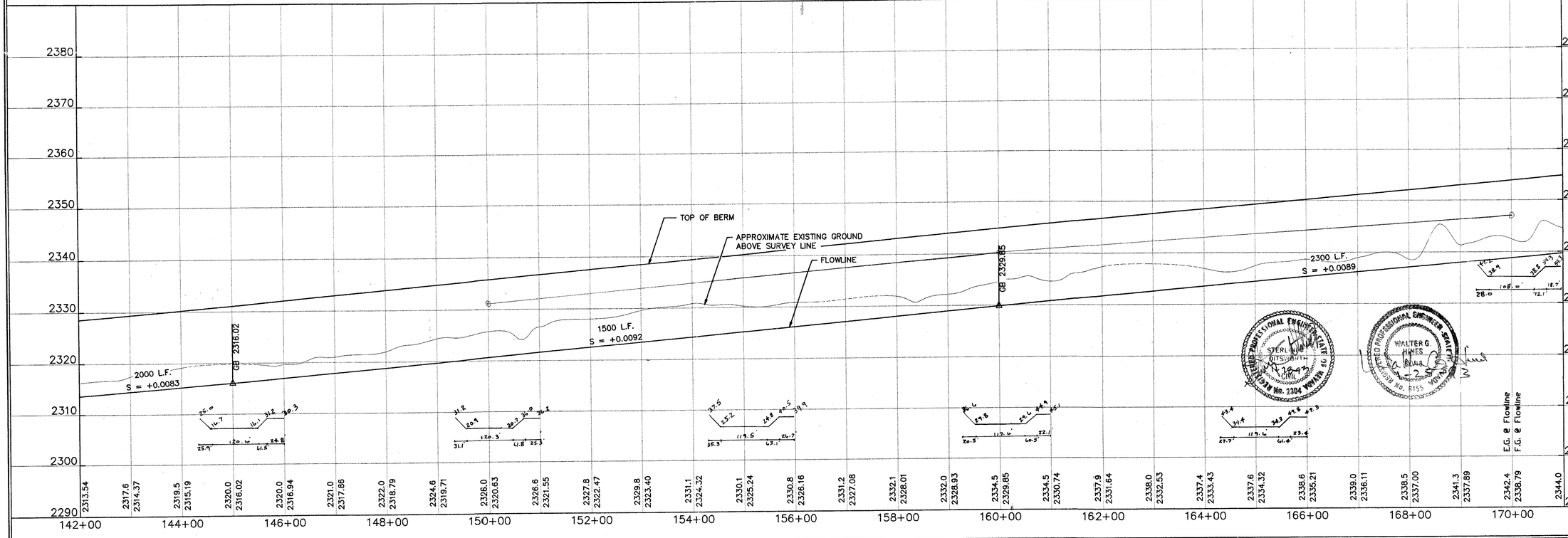
2325

2330

2335



SCALE: HORIZ. 1"= 100'
VERT. 1"= 10'



MARK	DATE	BY	REVISION

DESIGNED: WJH
DRAWN: WJH
CHECKED: WGH

PROJECT ENGINEER — DATE 24 JAN 93
PROJECT MANAGER — DATE 1-28-93

Boyle Engineering Corporation
consulting engineers
1785 E. Sahara Ave. 300
Las Vegas, NV 89104
(702) 731-5511

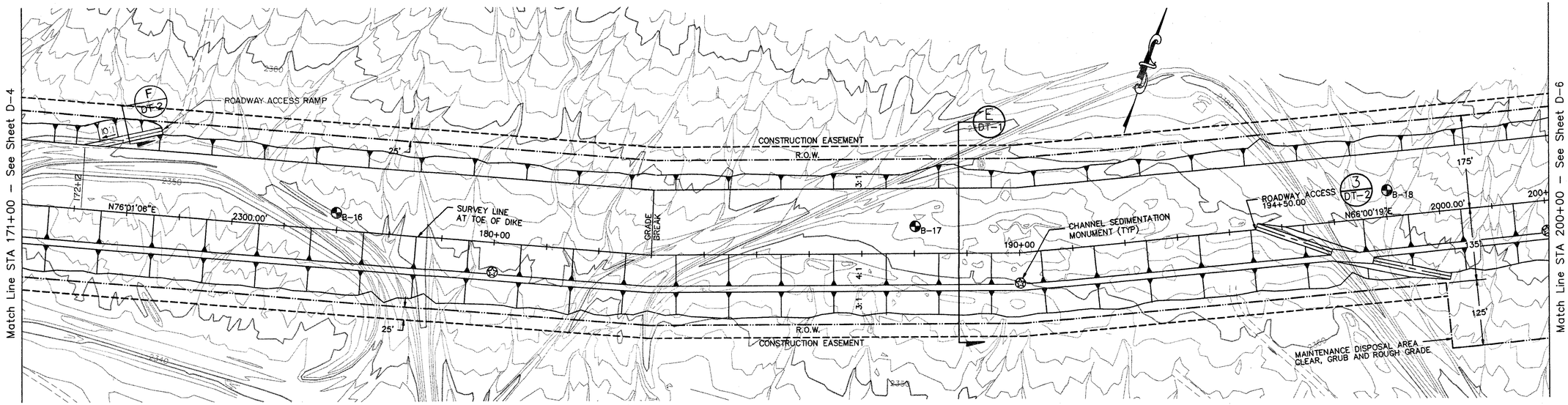
CITY OF NORTH LAS VEGAS
DEPARTMENT OF PUBLIC WORKS

KEY MAP

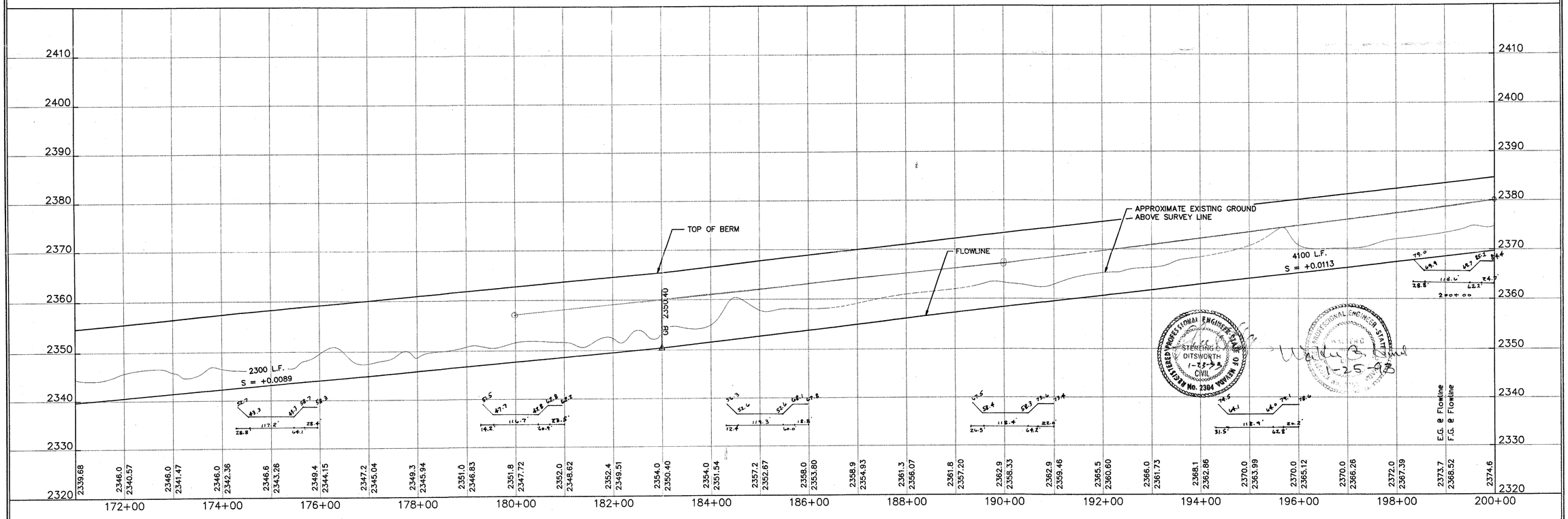
WEST RANGE WASH DIVERSION DIKE

DIKE PLAN AND PROFILE
142+00.00 TO 171+00.00

DRAWING
D-4
10 OF 20
rwdp04.dwg



SCALE: HORIZ. 1"= 100'
VERT. 1"= 10'



REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
STERLING G. DITSWORTH
1-23-98
CIVIL
No. 2304

PROFESSIONAL ENGINEER STATE OF NEVADA
1-25-98

MARK	DATE	BY	REVISION

DESIGNED: WJH
DRAWN: WJH
CHECKED: WGH

PROJECT ENGINEER — DATE 24JAN98
PROJECT MANAGER — DATE 1-26-98

Boyle Engineering Corporation
consulting engineers
1785 E. Sahara Ave. 300
Las Vegas, NV 89104
(702) 731-5511

CITY OF NORTH LAS VEGAS
DEPARTMENT OF PUBLIC WORKS

KEY MAP

WEST RANGE WASH DIVERSION DIKE

DIKE PLAN AND PROFILE
171+00.00 TO 200+00.00

DRAWING D-5
11 OF 20
rwdp05.dwg

TORTOISE PROOF GATE, SEE SH. 24

S89°30'33"E

SECTION LINE

138 KV & 230 KV TRANSMISSION

S89°30'13"E

QUAIL SPRINGS WILDERNESS STUDY AREA

P.I.#1

INTERCEPTION BERM ACCESS ROAD SEE PROFILE SH 23

N 577384.35
E 592628.30

90' NPC EASEMENT

TORTOISE-PROOF FENCING

P.I.#2

15' INSIDE RADIUS (TYP)

P.I.#3

P.I.#4

GATE STA 1+30

P.I.#1 STA 7+51.18
N 577,019.37
E 592,625.16

600' EASEMENT

365'

150'

N 577025.85
E 591873.97

S 89°30'33"E

S89°30'13"E

STA 20+00 ACCESS RAMPS SEE DETAIL A & B SH 7

MATCH LINE STA 32+00 SEE SH 5

P.I.#5

STA 0+55.60 BEGIN RCC SLOPE PROTECTION

NEVADA DIVISION OF STATE PARKS LAND

TORTOISE-PROOF FENCING

PE

PE/L

INTERCEPTION BERM ACCESS ROAD LOCATION DATA

P.I. NO.	NORTH COORDINATE	EAST COORDINATE
1	577,289.66	591,911.87
2	577,272.86	591,936.73
3	577,232.86	591,936.39
4	577,175.18	591,952.90
5	576,842.06	591,964.90

NOTE:
FOR SECTION LINES AND PROPERTY BOUNDARIES, SEE INTERCEPTION BERM/CHANNEL SITE PLAN, SH 3.

KEY PLAN

SCALE
HORIZ. 1" = 100'
VERT. 1" = 4'

ACCESS ROAD

EL 2496.04

EL 2496.00

EL 2487.00

EL 2481.20

STA 0+55.60 BEGIN RCC SLOPE PROTECTION

STA 1+00

STA 1+30

NORTH BANK (TO 3:1 SLOPE)

SOUTH BANK (TOP OF BERM)

EXIST GRADE @ CHANNEL ℄

EXIST GRADE @ BERM ℄

℄CHANNEL ℄

S=0.0067 FT/FT

EL 2474.93

EL 2466.43

B.O RCC SLOPE PROTECTION (SOUTH BANK)

2496 2492 2488 2484 2480 2476 2472 2468 2464 2460

0+00 1 2 3 4 5+00 6 7 8 9 10+00 11 12 13 14 15+00 16 17 18 19 20+00 21 22 23 24 25+00 26 27 28 29 30+00 31 32+00

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10.26.93	AS BUILT		PT	MCR	

DESIGNED ALR, JWS
DETAILED HLR
CHECKED DIH
APPROVED [signature] 5-28-91
DATE

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

CITY OF NORTH LAS VEGAS

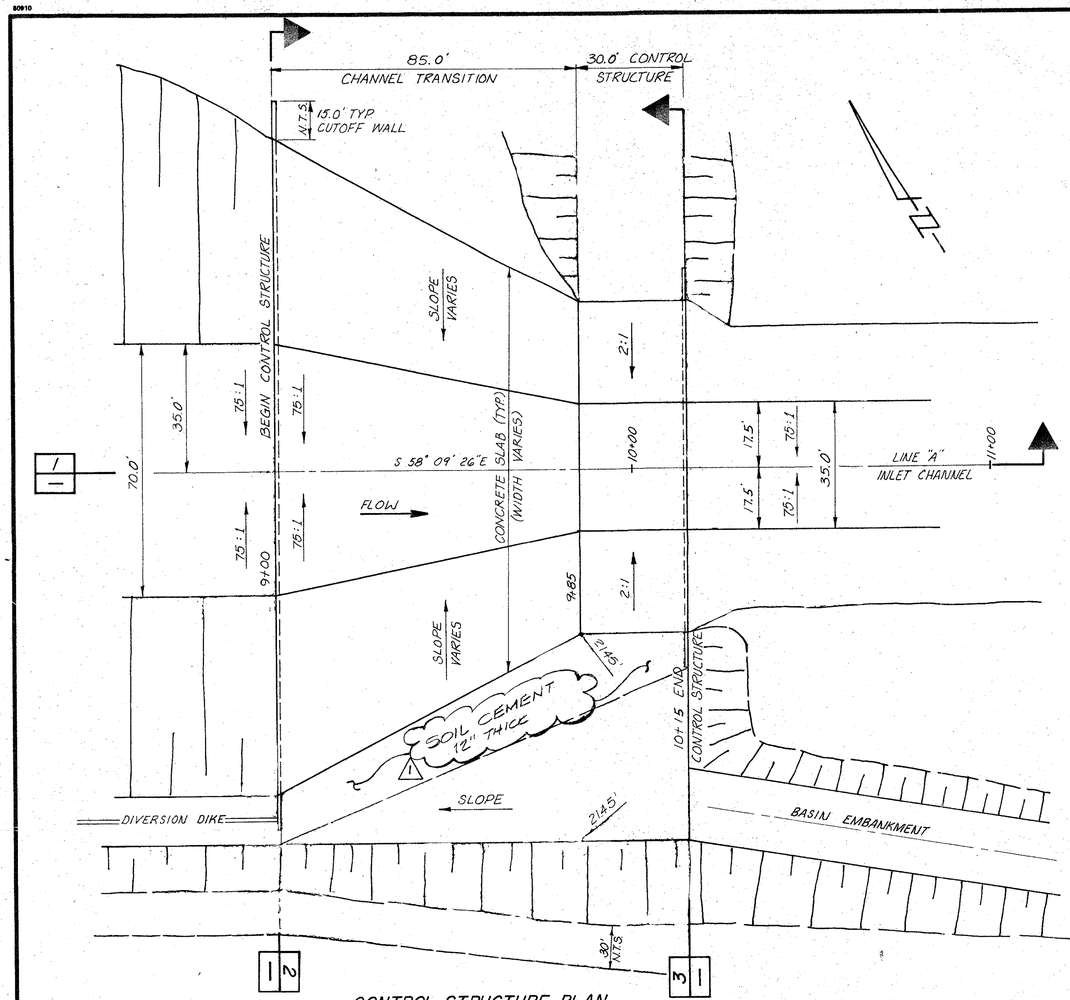
UPPER LAS VEGAS WASH DETENTION BASIN

INTERCEPTION BERM/CHANNEL
PLAN & PROFILE STA. 0+00 TO 32+00

REGISTERED PROFESSIONAL ENGINEER-STATE OF NEVADA
DANA V. REEL CIVIL
No. 7258

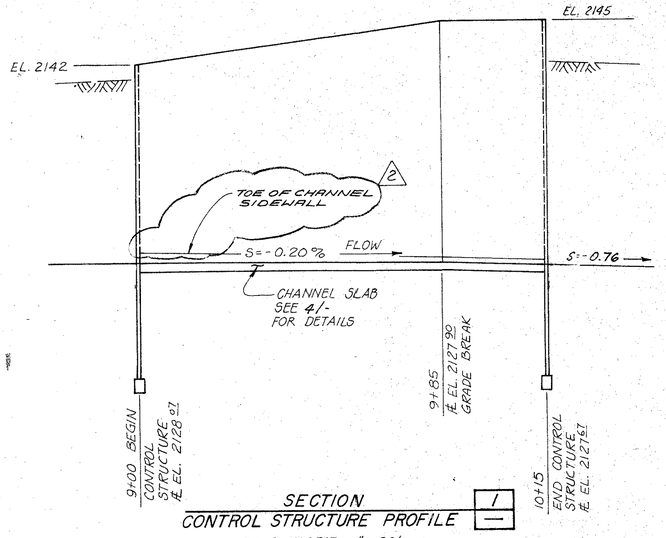
SHEET 4 OF 25

80910



CONTROL STRUCTURE PLAN

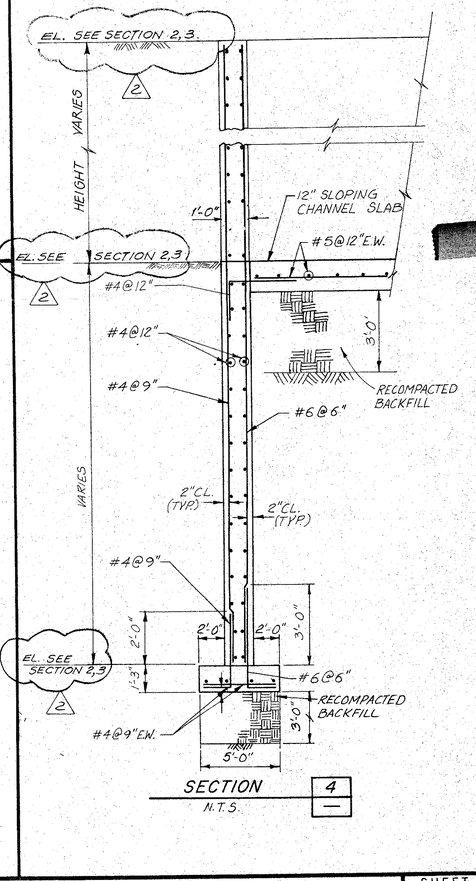
SCALE: 1"=20'



SECTION

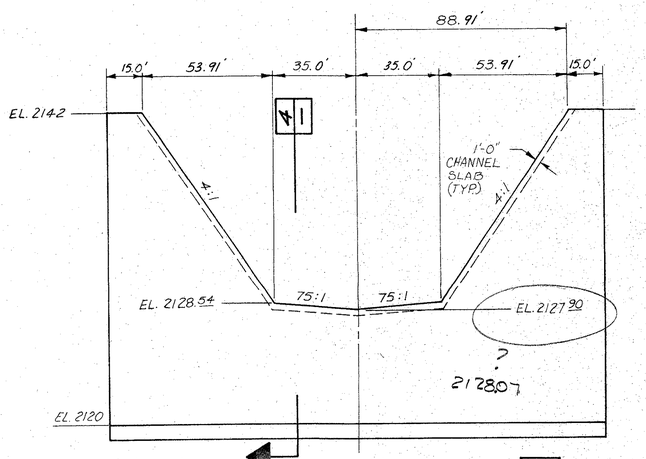
CONTROL STRUCTURE PROFILE

SCALE: HORIZ: 1"=20'
VERT: 1"=5'



SECTION

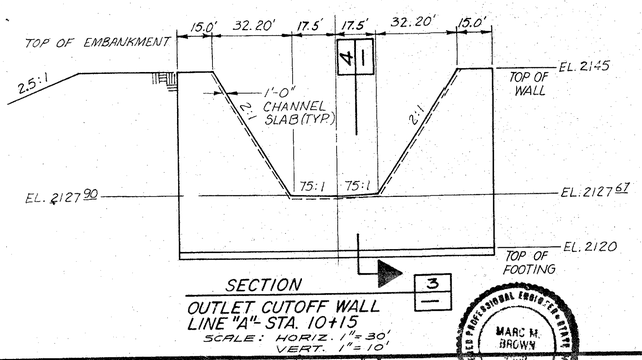
N.T.S.



SECTION

INLET CUTOFF WALL LINE "A"- STA. 9+00

SCALE: HORIZ. 1"=30'
VERT. 1"=5'



SECTION

OUTLET CUTOFF WALL LINE "A"- STA. 10+15

SCALE: HORIZ. 1"=30'
VERT. 1"=10'

RECORD DRAWING

These record drawings have been prepared based on information provided by others. The Engineer has not verified the accuracy of such information and shall not be responsible for any errors or omissions which may be incorporated herein as result.

REV	DATE	BY	DESCRIPTION
2	9/15/83	J.U.	ADD ELEV. & TOE OF CHANNEL
1	6-22-1900	J.B.	PER RECORD DRAWINGS

SCALE: AS NOTED

DESIGNED: D.N. Hartley
DRAWN: S. Flint
CHECKED: Joseph E. Bardwell

SUBMITTED: Marc M. Brown — PROJECT ENGINEER — 5818 R.C.E. NO. — 5-5-83 DATE

RECOMMENDED: Clemens Anderson — MONTGOMERY ENGINEERS/CONSULTING ENGINEERS, INC. — 2443 R.C.E. NO. — 5-5-83 DATE

REGISTERED PROFESSIONAL ENGINEER — MARC M. BROWN — CIVIL — STATE OF NEVADA

MONTGOMERY ENGINEERS OF NEVADA
1100 EAST SAHARA AVENUE, LAS VEGAS, NEVADA 89104

CITY OF NORTH LAS VEGAS, NEVADA

LAS VEGAS WASH DETENTION BASIN FLOOD CONTROL PROJECT

CONTROL STRUCTURE DETAILS

SHEET 25 OF 25 SHEETS

JOB NO. 1243.0011 FILE

MATCH LINE STA. 64+00 SEE SH 5

138 KV & 230 KV TRANSMISSION

589°31'09"E

TORTOISE-PROOF FENCING

QUAIL SPRINGS WILDERNESS STUDY AREA

7½

30' NPC EASEMENT

365'

600' EASEMENT

150'

25.5'

9.5'

N 577317.20
E 600542.67

589°32'09"E 2638.39'

3/23

DOWNSTREAM LIMIT OF RIPRAP

5/20

3/20

4/20

KEY PLAN

STA. 67+20 ACCESS RAMP SEE DET. B SH 7

STA. 73+40 ACCESS RAMP SEE DET. A, SH 7

65+00 70+00 75+00 80+00 85+00

589°31'09"

589°32'09"E

PI #5 STA 86+65.97
N 576,952.22
E 600,539.67

END OF CHANNEL
STA 91+41.43
N 576,948.37
E 601,015.11

12" CLASS 'A' RIPRAP

EL 31.50

EL 31.43

EL 27.00

3/23

1/7

7/7

NEVADA DIVISION OF STATE PARKS LAND

PRIVATE PROPERTY

TORTOISE-PROOF FENCING

NEVADA DIVISION OF STATE PARKS LAND

FOR CONTINUATION OF TORTOISE PROOF FENCING, SEE DAM EMBANKMENT SITE PLAN, SH 3 (TYP BOTH SIDES)

NOTE:
FOR SECTION LINES AND PROPERTY BOUNDARIES, SEE INTERCEPTION & BERM CHANNEL SITE PLAN, SH 3

SCALE
HORIZ: 1"=100'
VERT.: 1"=4'

EL 2453.49

EXIST GRADE @CHANNEL ℄

EXIST GRADE @BERM ℄

SOUTH BANK (TOP OF BERM)

STA 84+23.43
CREST GRADE CONTROL STRUCTURE

STA 84+41.13
TOE GRADE CONTROL STRUCTURE

STA 85+77.10

EL 2444.99

EL 2439.93

0.04 FT/FT

EL 2438.99

CHANNEL ℄

S=0.0067 FT/FT

EL 2433.78

ADDITIONAL RIPRAP

DAYLIGHT NORTH BANK SLOPE 3:1

STA 91+15.00
END OF BERM

STA 91+41.43
END OF CHANNEL

B.O.RCC SLOPE PROTECTION (SOUTH BANK)

EL 2430.28

RCC GRADE CONTROL STRUCTURE

EL 2431.43

EL 2428.40

EL 2427.00

0.01 FT/FT

EL 2322.50

EL 2420.00

STA 85+60
END OF RIPRAP APRON

GRADE B.O. CHANNEL TO MATCH EXIST

2452 2448 2444 2440 2436 2432 2428 2424 2420 2416

64+00 65+00 66 67 68 69 70+00 71 72 73 74 75+00 76 77 78 79 80+00 81 82 83 84 85+00 86 87 88 89 90+00 91 92 93+00

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10-26-98	AS BUILT		PT	SC	DK

DESIGNED ALK, JWS, SDC
DETAILED HLR
CHECKED DIH
APPROVED [signature]
DATE 5-28-99

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

CITY OF NORTH LAS VEGAS

UPPER LAS VEGAS WASH DETENTION BASIN

INTERCEPTION BERM/CHANNEL PLAN & PROFILE STA. 64+00 TO 93+00

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
DANA V. REEL CIVIL

SHEET 6 OF 25

N577361.48
E595267.92

N577350.70
E596586.53

N577339.34
E597905.07

QUAIL SPRINGS WILDERNESS STUDY AREA

138 KV & 230 KV TRANSMISSION

TORTOISE-PROOF FENCING

NPC EASEMENT 90'

600' EASEMENT

MATCH LINE STA. 32+00 SEE SH 4

MATCH LINE STA. 64+00 SEE SH 6

STA 39+20 ACCESS RAMP SEE DETAIL A, SH 7

STA 39+50 ACCESS RAMP SEE DET B, SH 7

PI #2 STA 33+00.97
N 576,996.50
E 595,264.85

PI #3 STA 47+09.63
N 576,985.78
E 596,583.47

PI #4 STA 60+28.18
N 576,974.28
E 597,911.00

NEVADA DIVISION OF STATE PARKS LAND

NOTE:
FOR SECTION LINES AND PROPERTY BOUNDARIES, SEE INTERCEPTION BERM/CHANNEL SITE PLAN SH 3.

KEY PLAN

SCALE
HORIZ 1"=100'
VERT 1"=4'

EL 2474.93

EL 2466.43

EL 2460.43

NORTH BANK (T.O. 3:1 SLOPE)

EXIST GRADE @ CHANNEL ℄

EXIST GRADE @ BERM ℄

SOUTH BANK (TOP OF BERM)

S=0.0067 FT/FT

CHANNEL ℄

B.O. RCC SLOPE PROTECTION (SOUTH BANK)

EL 2453.49

EL 2444.99

2476 2472 2468 2464 2460 2456 2452 2448 2444 2440

32+00 33 34 35+00 36 37 38 39 40+00 41 42 43 44 45+00 46 47 48 49 50+00 51 52 53 54 55+00 56 57 58 59 60+00 61 62 63 64+00

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
10.26.93	AS BUILT		PT	SK	MR

DESIGNED ALK JWS
DETAILED HLR
CHECKED DIH
APPROVED [signature]
DATE 5-23-91

Black & Veatch
Engineers - Architects
Las Vegas, Nevada

PROJECT NO. 17149

CITY OF NORTH LAS VEGAS
UPPER LAS VEGAS WASH
DETENTION BASIN

INTERCEPTION BERM/CHANNEL
PLAN & PROFILE STA. 32+00 TO 64+00

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
DANA V. REEL
CIVIL
No. 7738

SHEET 5 OF 25

UPPER LAS VEGAS WASH Volume III

Technical Support Data Notebook

Upper Las Vegas Wash
Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 3
Engineering Analysis
with North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 3
Engineering Analyses; with North Las Vegas Detention Basin Diversion Dike

A. Introduction to Volume 3

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TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 3

This volume of the TSDN contains engineering analyses performed during the FIS, including hydrologic and hydraulic analyses. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the analyses for the '**With North Las Vegas Detention Basin Diversion Dike**' case. Volume 4 contains similar analyses for the "Without North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

HYDROLOGY MEMORANDUM
UPPER LAS VEGAS WASH

1. Hydrology

1.1 Study Approach

The Upper Las Vegas Wash is an ephemeral desert stream draining a basin area of approximately 720 square miles originating in the Spring and Sheep Mountains upstream of the City of Las Vegas. Peak flows from the majority of the basin are controlled by two major detention basins: the North Las Vegas Detention Basin constructed in 1984 and the Upper Las Vegas Wash Detention Basin constructed in 1993. The tributary area to the North Las Vegas Detention Basin was increased by 48 square miles with construction of the Range Wash Diversion Dike in 1994. Figure 1-1 shows basin boundaries above the major flood control structures.

Previous hydrology studies for flood control facility design and for determining regulated flood discharges include work by the U.S. Army Corps of Engineers (1988), James M. Montgomery (1991), Boyle Engineering Corporation (1991) and by Black & Veatch (1993).

The approach and objectives for the current hydrologic analysis are to assess the adequacy of the previous analyses, and to update and re-run previously-developed Flood Insurance Study HEC-1 models as necessary to reflect existing flood control facilities.

1.2 Previous Hydrology Studies

The hydrology of the Upper Las Vegas Wash has been studied in numerous previous reports. Recent studies leading to the development of HEC-1 models adopted for use in the present work are listed below.

- U.S. Army Corps of Engineers (COE), South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988. That study provided a regional analysis of flood frequency data, including 20 years of peak flow data for USGS Gage 09419650, Las Vegas Wash at North Las Vegas. The Las Vegas Wash at this location reflects flows from the Upper Las Vegas Wash channel. The COE developed a computed probability 100-year regional flood frequency curve, reproduced here as Figure 1-2.

- Black & Veatch (B&V), "Flood Control Facilities Plan for the Northern Las Vegas Wash," August 1989. That study included the development of HEC-1 models with various storm centerings for the Upper Las Vegas Wash basin.

- Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood

Control Facility Plan," prepared for City of North Las Vegas, June 1991. That study included HEC-1 modeling and led to construction of the West Range Wash Diversion Dike which now diverts flow from 48 square miles of the Range Wash basin into the North Las Vegas Detention Basin.

- B&V, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991. That study included HEC-1 modeling of the upper portion of the Las Vegas Wash basin, and led to construction of the Upper Las Vegas Wash Detention Basin and an accompanying interception berm/channel extending to the west from that facility.

- James M. Montgomery (JMM), "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991). HEC-1 models for that study were based on the HEC-1 models developed by B&V (above). Model calibration was attained by matching previous COE and B&V discharges in an initial set of model runs which did not include proposed flood control facilities The proposed facilities were then introduced to the models to generate Flood Insurance Study (FIS) flows.

- B&V, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25 1993. That report included HEC-1 modeling of 6 storm centerings to examine impacts of the Upper Las Vegas Wash Detention Basin and West Range Wash Diversion Dike on outflows from the North Las Vegas Detention Basin. This work led to modification of the North Las Vegas Detention Basin outlet structure by closing two of the five original outlet pipes.

A review of peak flow data through 1993 for the USGS Las Vegas Wash gage (Gage 09419650, Las Vegas Wash at North Las Vegas) found that no significant flood events have occurred since the COE's 1988 analysis that would substantially change the results of that assessment. The lack of additional significant events in the Las Vegas Wash would tend to lower the COE-estimated 100-year discharge for that station, but the COE's adopted regional analysis curve (Figure 1-2) already results in a slightly lower 100-year discharge estimate for that station than frequency analysis of the individual station gage records. The COE's regional analysis for 100-year peak discharge versus drainage area therefore continues to be a reasonable method for estimating unregulated peak flows for the Upper Las Vegas Wash basin.

Existing HEC-1 models of the Upper Las Vegas Wash were "calibrated" to the COE regional analysis curve, and should provide a reasonable estimate of unregulated peak flows. However, it should be noted that there was no calibration to the shape or volume of runoff hydrographs, apparently due to a lack of data for such calibration. The accuracy of the shape and volume of simulated runoff hydrographs, which are important to the performance of detention facilities, is therefore unknown. Hydrographs simulated by the existing HEC-1 models assume a hydrograph shape defined by the SCS unitgraph approach.

The previous analyses considered numerous separate storm centerings over the basin to identify storm configurations which produced the highest peak flows at various locations in the basin. Multiple storm centerings were required because peak flows in the region result from cloudburst events having areas less than 200 square miles and that only cover a portion of the entire Upper Las Vegas Wash basin. For the present work, we have accepted the findings of the previous B&V (1993) and JMM (1991) studies as to which theoretical design storms are most critical for determining FIS discharges:

- The "Spring Mountain Storm" previously used by both JMM and B&V produces the highest uncontrolled peak inflows to the Upper Las Vegas Wash detention basin, as well as the highest peak outflows from both the Upper and North Las Vegas Wash detention basins. This storm was compared to the "Sheep Mountain Storm" by B&V (1993) and determined to be the critical storm for peak inflows and volumes to the North Las Vegas Detention Basin during design of outlet modifications. The Spring Mountain storm has been modeled as a 136.34 sq. mi. storm centered over the Spring Mountain Range. Spring Mountain storm HEC-1 models had previously been developed by JMM (1991) with 10-, 50-, and 100-year rainfall amounts. The Spring Mountain storm simulates a 100-year (uncontrolled) peak flow of 14,737 cfs into the Upper Las Vegas Wash detention basin. Considering the detention basin's total tributary area of approximately 516 sq. mi., the HEC-1 result, is consistent with the COE's regional analysis curve (Figure 1-2).

- The "Interbasin Storm" previously used by B&V produces the highest 100-year peak inflow to the North Las Vegas detention basin. The Interbasin storm has been modeled as a 54.37 sq. mi. storm covering the North Las Vegas Wash tributary area between the Upper and North Las Vegas Wash detention basins. A single Interbasin storm model had been developed by B&V (1993) to represent 100-year storm conditions only. The Interbasin storm simulates a 100-year (uncontrolled) peak flow of 8,537 cfs from the 54.37 sq. mi. basin and is consistent with the COE's regional analysis curve (Figure 1-2).

- An unnamed storm covering the entire 48.16 sq. mi. tributary area to the West Range Wash diversion dike produces the highest peak flows for the West Range Wash diversion dike. A HEC-1 model for this storm had previously been developed by Boyle (1991) for 100-year storm conditions only. This storm simulates a 100-year (uncontrolled) peak flow of 6,584 cfs from the 48.16 sq. mi. basin, which is about 13% lower than the 100-year peak flow indicated from the COE's regional analysis curve (Figure 1-2).

For purposes of the present work, the previously-developed Spring Mountain 10-, 50-, and 100-year HEC-1 models were updated to reflect the existing flood control facilities, and additional Interbasin storm models were developed to represent 10- and 50-year rainfall amounts. HEC-1 models representing 500-year rainfall amounts were developed for both the Spring Mountain and Interbasin storms.

No modifications were made to the HEC-1 model representing West Range Wash diversion dike flows, as FIS discharges for floodplain mapping were not required for this location. If required for other purposes, approximate 10- through 500-year values for West Range Wash diversion dike flows could be estimated by multiplying Interbasin storm values by 0.89, which is the ratio of Interbasin storm to West Range Wash diversion dike basin areas.

1.3 Modifications to Existing HEC-1 models.

HEC-1 models developed by JMM (1991) for the Spring Mountain storm and by B&V (1993) for the Interbasin storm were used as the basis for hydrologic modeling in the present study. No changes were made to any of the previously-defined runoff or channel routing parameters including basin areas, curve numbers, loss rates, channel geometry, and channel routing coefficients. Furthermore, no changes were made to subbasin rainfall amounts for 10- through 100-year return periods, precipitation multipliers, or depth-area correction factors, all of which appeared to be consistent with values recommended by the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

Spring Mountain Storm Files

Spring Mountain 10-, 50-, and 100-year storm HEC-1 files for the present study are based on HEC-1 files prepared by JMM (1991) for the previous FIS hydrology study. Modifications to the JMM files consisted of updating the detention basin characteristics for existing conditions as follows:

- Stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were updated to reflect as-built conditions. The 1991 JMM model had been based on a preliminary detention basin design which was revised prior to construction. The original (JMM, 1991) model SV, SE, and SQ data for the Upper Las Vegas Wash detention basin were replaced using the SV, SE, and SQ data from HEC-1 models prepared by B&V (1993). The B&V stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were reviewed and found to adequately reflect as-built conditions.

- The stage-discharge relationship for the North Las Vegas Wash detention basin was updated to reflect the existing three-pipe outlet structure with a four-feet high, 53-feet wide upstream barrier wall. The 1991 JMM model had assumed a four-pipe outlet structure based on preliminary design data; however, two of the structure's original five outlet pipes were subsequently blocked following construction of the Upper Las Vegas Wash detention basin. The original (JMM, 1991) model SQ data for the North Las Vegas Wash detention basin, for stages above seven feet, were replaced using the discharge data presented by B&V (1993) for a three-pipe outlet structure. Discharges below about seven feet stage were found to be controlled by the upstream barrier wall which was not represented in any of the previously

outlet rating curves. The rating curve for the barrier wall was computed for the current study by assuming orifice flow through the weep holes, plus weir flow at stages above four feet.

A Spring Mountain 500-year storm HEC-1 model was developed for the present study by modifying the 100-year model to include 500-year rather than 100-year rainfall amounts. This differs from the approach taken in the previous JMM (1991) FIS study in which 500-year flows were estimated by extrapolation of the flows simulated for 10-, 50-, and 100-year return periods. The previous method is likely to underestimate 500-year flows in the Upper Las Vegas Wash system because the detention basins are sized to be filled during a 100-year event. A substantial loss of flow control should therefore be expected at more extreme events due to spillway flow.

Spring Mountain storm 500-year rainfall amounts for each model subbasin were determined by extrapolation of the rainfall amounts from the JMM (1991) 10-, 50-, and 100-year Spring Mountain storm HEC-1 models.

Interbasin Storm Files

Interbasin storm 10- through 500-year rainfall HEC-1 files for the present study are based on the 100-year Interbasin storm HEC-1 file prepared by B&V (1993). This storm covers the Las Vegas Wash basin area beginning immediately downstream from the Upper Las Vegas Wash detention basin and extending to the outlet of the North Las Vegas detention basin. Hydraulic characteristics for the North Las Vegas detention basin were revised to be the same as for the updated Spring Mountain storm models discussed above.

Subbasin rainfall amounts for the 100-year Interbasin storm are as presented in the original B&V model. Rainfall amounts for 10- and 50- year storms are based on the 10- and 50-year subbasin rainfall amounts presented by JMM (1991) for the Lower Central Valley storm, which covers all but two of the subbasins included in the Interbasin storm. Rainfall amounts from the JMM (1991) 10- and 50-year models were divided by a factor of 0.62 to remove the depth-area correction factor which had been applied to subbasin rainfall amounts in the original development of the Lower Central Valley models. 10- and 50- year, 6-hour rainfall amounts for the two subbasins (104 and 105) not covered by the Lower Central Valley models were determined from NOAA Atlas 2 for Nevada. The 10- and 50-year atlas amounts were increased by factors of 1.24 and 1.39 respectively, as recommended by the CCRFCD (1990). A depth-area correction factor of 0.66 was applied for all Interbasin storms.

Subbasin rainfall amounts for the 500-year Interbasin storm were determined by extrapolation of rainfall amounts from the 10-, 50-, and 100-year Interbasin storm models.

Input files for all HEC-1 models modified or created for the purposes of this study are provided in digital form on a diskette which accompanies this report.

1.4 Revised FIS Discharges

Table 1 summarizes the results of the HEC-1 modeling at various points along the Upper Las Vegas Wash system. Computation nodes are shown in Figure 1-3. Table 2 compares the current model results with the previously adopted FIS flows.

The current model results for 10- through 100-year return periods are slightly lower than the previously-adopted FIS discharges. We do not consider the differences to be sufficiently large to warrant changing the previously-published 10- through 100-year flows which are currently being used by others for concurrent (downstream) floodplain mapping analyses.

The revised hydrologic analysis indicates a 500-year discharge downstream from the North Las Vegas detention basin which is about 80% larger than previously assumed. This increase in the 500-year discharge is due to a loss of detention basin flow control that was not specifically addressed in the previous FIS analysis.

REFERENCES

Black & Veatch, "Hydrologic Analysis of Proposed Transbasin Diversion from the Range Wash Watershed into the North Las Vegas Detention Basin," prepared for City of North Las Vegas, June 1990 draft.

Black & Veatch, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991.

Black & Veatch, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25, 1993.

Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood Control Facility Plan," prepared for City of North Las Vegas, June 1991.

Clark County Regional Flood Control District, "Hydrologic Criteria and Drainage Design Manual," Section 500 (Rainfall) and Section 600 (Storm Runoff), October 1990.

Montgomery, James M., "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991).

Montgomery, James M., "Clark County Regional Flood Control District, The Master Plan Update of the Las Vegas Valley (Volume II)," August 1991.

U.S. Army Corps of Engineers, South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988.

U.S. Army Corps of Engineers, Los Angeles District, "Special Flood Hazard Study, Las Vegas Wash and Tributaries, Clark County, Nevada," July 1988.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, NOAA Atlas 2: Precipitation-Frequency Atlas of the Western United States, Volume VII-Nevada, 1973.

Table 1-1
HEC-1 Results

Location	Storm ID	Model Node	Storm Return Period 10-yr	50-yr	100-yr	500-yr
Inflow to ULVWDB	Spring Mtn	WTRIBUS	3,465	10,312	14,737	24,938
Outflow from ULVWDB (Max basin stage, feet)	Spring Mtn	ULWDB	2,426 (2351.26)	3,888 (2366.98)	5,019 (2372.40)	19,217 (2375.68)
Inflow to NLVDB	Spring Mtn	NLVIN	2,400	3,878	4,796	**17,855**
	Interbasin		**2,939**	**6,751**	**8,537**	13,077
Diversion Dike Overflow at NLVDB	Spring Mtn	DIVDIKE	0	0	0	**6,838**
	Interbasin		0	0	**194**	3,226
NLVDB Pipe and Spillway Outflow (Max stage, feet above 2108 feet)	Spring Mtn	NLVDET	1,292 (9.90)	2,186 (22.5)	2,839 (27.42)	6,322 (31.44)
Total Discharge below NLVDB	Spring Mtn	2 combined	**1,292**	**2,186**	**2,839**	**8,988**
	Interbasin		1,220	2,074	2,345	5,438
Diversion along Railway	Spring Mtn	RRCHANNL	0	0	0	2,236
ULVW at Railway Bridge	Spring Mtn	RRBRIDGE	1,281	2,183	2,833	6,083
Diversion at King Charles Channel	Spring Mtn	KCHAR	1,024	1,746	2,266	4,866
ULVW at Hwy 15	Spring Mtn	I15 below KCHAR	256	437	567	1,217

Definitions:

ULVWDB = Upper Las Vegas Wash Detention Basin
NLVDB = North Las Vegas Detention Basin
ULVW = North Las Vegas Wash

Assumptions for Railway and King Charles Diversions:

HEC-1 model output for diversions from the main ULVW into the Railway and King Charles Channels are based on the following approximate relationships:

ULVW Flow cfs	Diversion to Railway Channel	NLVW Flow cfs	Diversion to King Charles
0	0	0	0
6,000	0	1,000	800
20,000	13,500	10,000	8,000

Storms:

Spring Mountain: a 136 square mile storm over the Spring Mountains upstream from the ULVWDB.
Interbasin: a 54 square mile storm between the ULVWDB and NLVDB

West Range Wash Diversion flows to NLVDB

West Range Wash Diversion flows were not modeled as part of the present study. Three estimates of the 100-year peak inflow from this 48.2 square mile basin are readily available as follows:

From HEC-1 model by Boyle (1991): 6,584 cfs
From COE Regional Curve: 48.2 times 155 cfs/sq mi: 7,471 cfs
Adjust Interbasin storm flows above DIVDIKE for basin area, 8,537 times (48/54):7,588 cfs

Table 1-2
Comparison of HEC-1 model results with previous (1991) FIS Discharges

Node (JMM, 1991)	10-year Peak Flow, cfs			50-year Peak Flow, cfs			100-year Peak Flow, cfs			500-year Peak Flow, cfs		
	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change	Adopted (1991)	Model (rev, 1996)	Change
RRBRIDGE	1,440	1,281	(159)	2,600	2,183	(417)	3,050	2,833	(217)	4,630	8,319	3,689
NC5	288	256	(32)	520	437	(83)	618	567	(51)	940	1,217	277

Node	Description Given by JMM, 1991
RRBRIDGE	Total flow at RR bridge (before diversion along RR to A Channel)
NC5	Outflow from NLV det. basin below King Charles Diversion

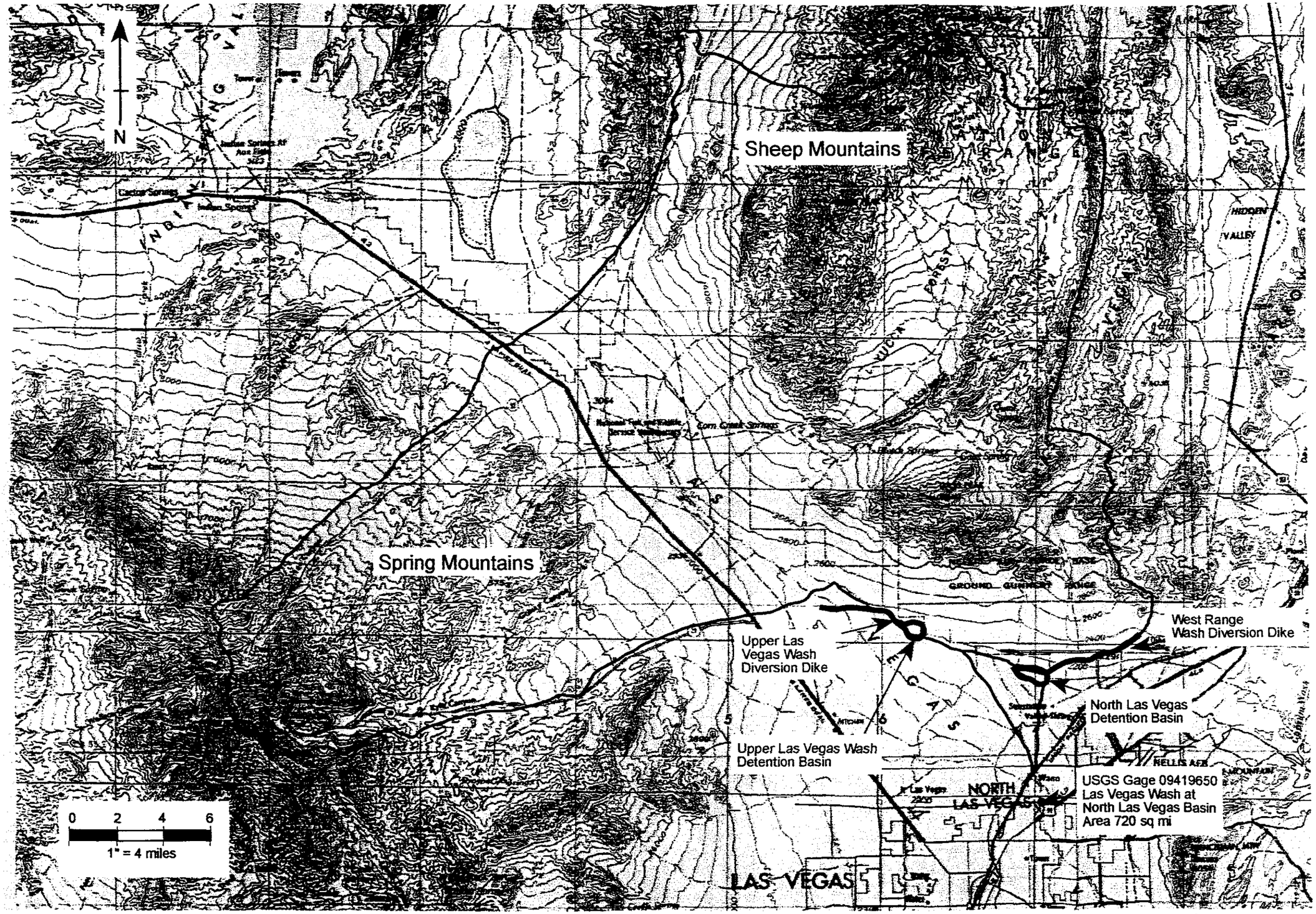
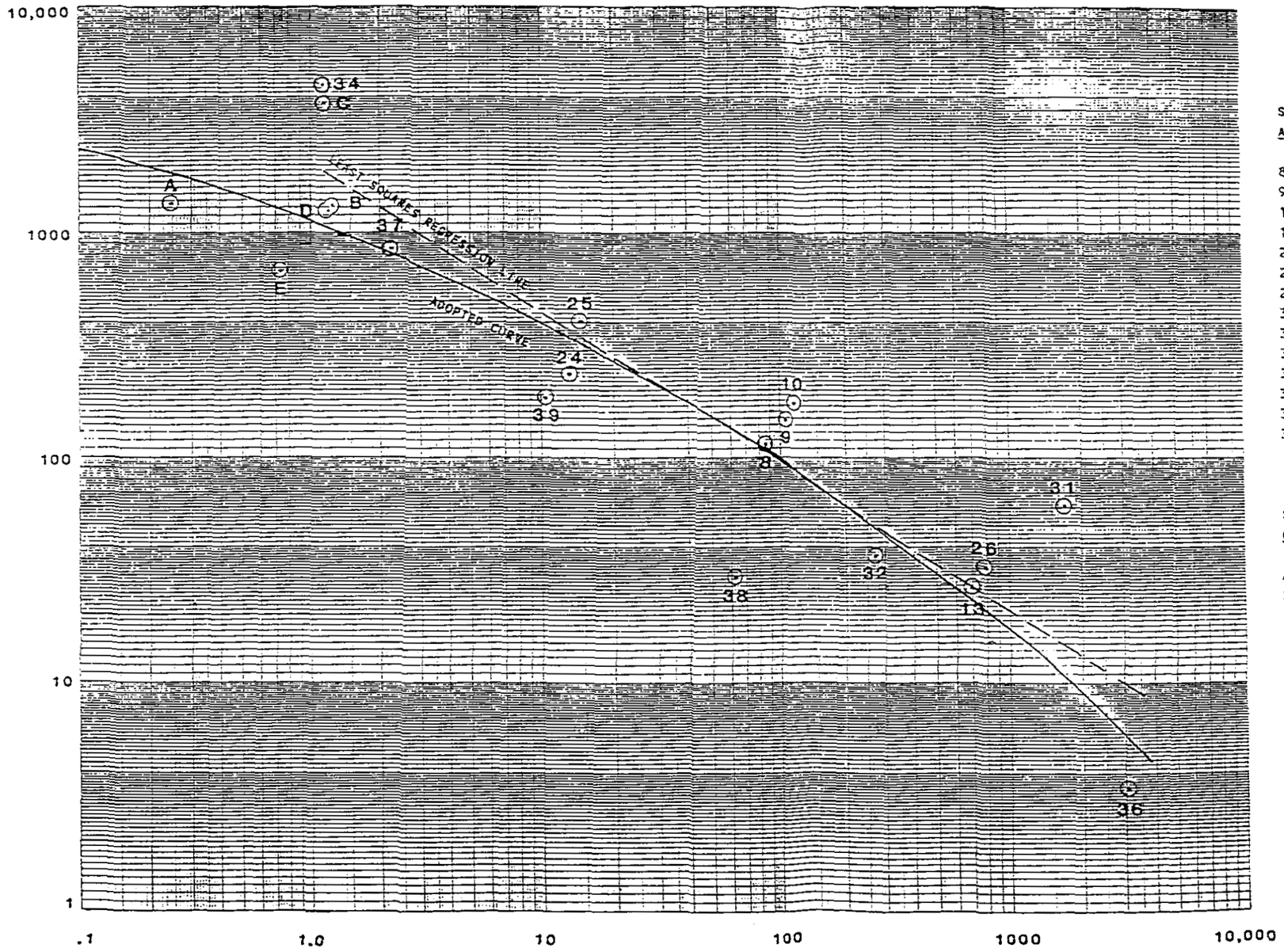


Figure 1-1 Tributary Area Map



STREAMGAUGES USED IN REGIONAL ANALYSIS (ANALYTICAL ANALYSIS)

8. FLAMINGO WASH @ LAS VEGAS
9. FLAMINGO WASH @ MARYLAND PKWY
10. FLAMINGO WASH NEAR MOUTH
13. LAS VEGAS WASH @ N. LAS VEGAS
24. TYSON WASH TR. NEAR QUARZITE
25. SACTO WASH TR. NEAR TOPOC
26. SACTO WASH NR. YUCCA, ARIZONA
31. SAN FELIPE CRK NR. WSTMRELND
32. SALT CREEK NEAR MECCA, CALIF.
34. CARUTHERS CRK NR. IVANPAH, CA
36. AMARGOSA RIVER @ TECOPA
37. AMARGOSA R TR. #1 NR. JOHNNIE
38. SALT WELLS CRK NR. WESTEND, CA
39. NINEMILE CREEK NEAR BROWN, CA

STREAMGAUGES USED TO HELP SHAPE CURVE (GRAPHICAL ANALYSIS)

A. BOOM CREEK NEAR BARSTOW, CA
B. DETRITAL WASH NR. CHLORIDE, AZ
C. LAS VEGAS WASH TR. NR. HENDERSON
D. LAS VEGAS WASH TR. S. OF NELLIS
E. BEACON CREEK AT HELENDALE, CA

LAS VEGAS FEASIBILITY STUDY

COMPUTED 100-YEAR PEAK DISCHARGE VERSUS DRAINAGE AREA

US ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

Source: Corps of Engineers, 1988

Figure 1-2. Corps of Engineers Adapted Regional 100-Year Peak Discharge Curve

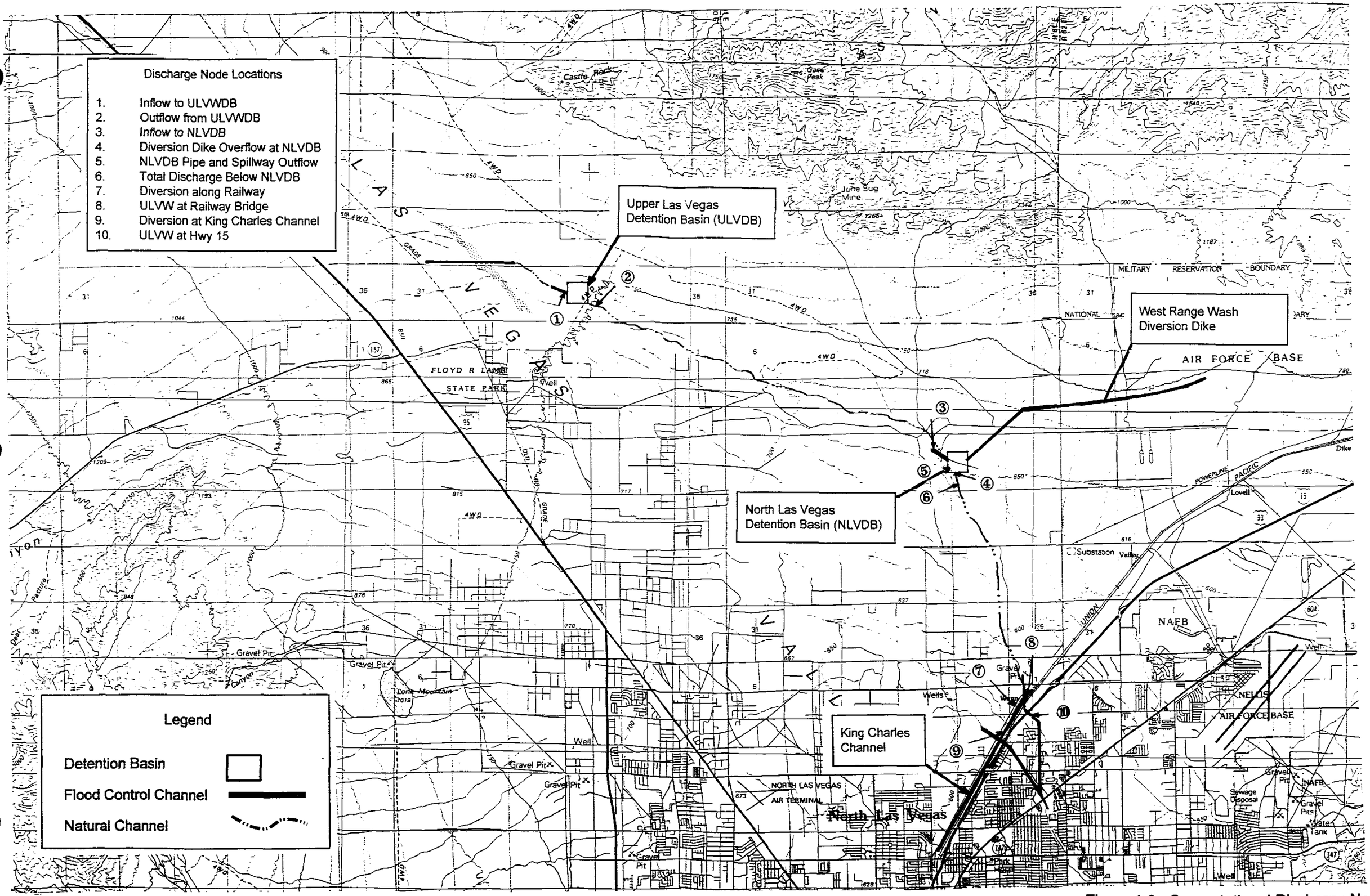


Figure 1-3. Computational Discharge Nodes

Study Contractor: Northwest Hydraulic Consultants

HYDROLOGIC ANALYSES INDEX

City of North Las Vegas, City of Las Vegas, and Clark County, Nevada
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

HYDROLOGIC ANALYSES INDEX

FLOODING SOURCE/ STREAM NAME	HYDROLOGIC METHOD/ MODEL USED	METHOD/MODEL ANALYSIS DATE	EXHIBIT NO. PAPER COPY	EXHIBIT NO. FLOPPY DISKETTES
Spring Mountain Storm/UCVM	HEC-1	5/96	A	CD
Lower Central Valley Storm/UCVM	HEC-1	5/96	B	CD
Interbasin Storm /UCVM	HEC-1	5/96	C	CD

HEC-1 Models

File name: MD_HECW.ME

METADATA FILE
Upper Las Vegas Wash Without North Las Vegas Detention Basin Diversion Dike

Data Set Identity:	HEC-1 and HEC-2 Data & Output Files
County and State:	Clark County, Nevada
Theme Keywords:	Hydrology and Hydraulics
Representation Model:	N/A
Spatial Object Types:	N/A
Data Set Size:	N/A
Transfer Format:	ASCII
Data Set Description:	HEC-1 and HEC-2 Data & Output Files
Intended Use:	Support for Hydrologic and Hydraulic Computations
Data set extent:	
List of file names included:	
Intended Scale of Use:	N/A
Resolution of Data:	N/A
Projection Name:	N/A
Horizontal Datum:	N/A
Vertical Datum:	National Geodetic Vertical Datum of 1929
Projection Units:	Feet

Zone Number:	N/A
Coordinate Precision:	N/A
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain
Policy Status:	N/A
Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors

Source Name:	HEC-1 and HEC-2 files
Source Scale:	N/A
Source Medium:	Paper, Compact Disk
Creator of Source:	Northwest Hydraulic Consultants
Date of Source Material:	22, April, 1998
Source Projection:	N/A
Processing Procedures:	N/A
Procedure Tolerances:	N/A
Positional Accuracy:	N/A
Positional Accuracy Method:	N/A
Attribute Accuracy:	N/A
Data Model Integrity:	N/A
Completeness:	N/A
Metadata Date:	22, April, 1998
Metadata Contact:	Edward E. Wallace

HEC-1 files listed below were prepared by Northwest Hydraulic Consultants Inc (NHC) for analysis of the North Las Vegas Wash and have not yet been approved. by FEMA. All files were based on files previously prepared by James M Montgomery (JMM) for the Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Flood Insurance Study Hydrology Report, dated September 1991. Source files for the Spring Mountain, Interbasin, and Lower Central Valley Storms were obtained in digital form from the CCRFCD and were all dated January 1991. The model for the Range Wash Storm was copied from the Boyle Engineering Corporation Technical Support Data Notebook for Clark County, Nevada and Incorporated areas, Range Wash Flood Insurance Restudy, Volume 2 Part 1.

Three modifications were made to the JMM HEC-1 files.

1. The files were updated to reflect the as-built stage-storage-outflow characteristics for the Upper Las Vegas Wash Detention Basin, which had not been constructed at the time of the JMM studies. The relationships used in the revised models correspond to data from HEC-1 models prepared in August 1993 by Black & Veatch for the report titled "North Las Vegas Detention Basin Outlet Modification Report."

2. The stage-outflow relationship for the North Las Vegas Detention was revised to reflect the three-pipe outflow configuration which presently exists (two pipes were blocked following completion of the Upper Las Vegas Wash Detention Basin). Also, the stage-outflow relation at low water levels was corrected to reflect the hydraulic control presented by a four-foot high wall (with 13 1-foot square weep holes) which is located immediatly upstream from the pipe inlets. This control appear to have been overlooked in the previous analyses.

3. 500-year storm HEC-1 models were created from the 100-year models by replacing all rainfall (PB Cards) data with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency extrapolation of rainfall amounts found in the JMM 10-. 50-, and 100-year models for each storm centering.

Modifications to the East and West Range Washes 100-Year, 6-Hour Storm, Future Conditions with Alternative IV Facilities, dated 6/5/92, included inserting the stage-outflow relationship for the North Las Vegas Detention described above in item 2. In addition the 100-Year rainfall (PB Cards) data were replaced with extrapolated 500-year amounts as described in item 3.

The HEC-1 models summarized below were used in the draft 1996 NHC Flood Insurance Study review submittal to FEMA.

SP_010.H1I - 10-year Spring Mountain Storm, modified from JMM

HEC-1 file SPR10.DAT as described above.

SP_050.H1I - 50-year Spring Mountain Storm, modified from JMM HEC-1 file SPR50.DAT as described above.

SP_100.H1I - 100-year Spring Mountain Storm, modified from JMM HEC-1 file SPR100.DAT as described above.

SP_500.H1I - 500-year Spring Mountain Storm, modified from JMM HEC-1 file SPR100.DAT as described above.

LC_010.H1I - 10-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW10.DAT as described above.

LC_050.H1I - 50-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW50.DAT as described above.

LC_100.H1I - 100-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW100.DAT as described above.

LC_500.H1I - 500-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW100.DAT as described above.

RW_500.H1I - 500-year Range Wash Storm, modified from Boyle HEC-1 file described in items 2 and 3.

Paper Copy A
SP Spring Mountain Storm

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*             VERSION 4.0.1 (LOCAL)     *
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*                                       *
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*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
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```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID        FEMA FLOOD INSURANCE STUDY, 1996
              2     ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID        SPRING MOUNTAIN 10-YEAR STORM
              4     ID
              5     ID        Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID        Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID        Study Hydrology Report dated 9/91.  Two modifications were made
              8     ID        to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID        and outflow characteristics were revised to reflect the as-built
             10     ID        configuration described by construction drawings dated 5/91 and HEC-1
             11     ID        models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID        relationship for the North Las Vegas Detention Basin was revised
             13     ID        to reflect the current three-pipe outlet condition (two of the five
             14     ID        pipes were blocked following construction of the upper basin) and the
             15     ID        hydraulic control created by the 4-foot high barrier wall located
             16     ID        upstream from the pipe inlets.
             17     ID
             18     ID        Remaining comments are from the original model dated 1/91.
             19     ID
             20     ID        CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             21     ID        NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
             22     ID        SPRING MOUNTAIN 10-YEAR STORM EXISTING CONDITIONS
             23     ID
             24     ID        Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
             25     ID        CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
             26     ID        The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
             27     ID        portion within the Gowan Area (which is not tributary to the Upper
             28     ID        Las Vegas Wash Detention Basin diversion)
             29     ID        Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
             30     ID        All routing steps immediately d/s of a diversion converted to
             31     ID        Muskingum routing to avoid zero flow, 8/90
             32     ID
             33     ID        This run models the diversion from the West Tributary to the proposed
             34     ID        Upper Las Vegas Wash Detention Basin, 1/91
             35     ID
*** FREE ***
             36     IT      6       0       0     200
             37     IO      5       0       0
             38     IN      5       0       0
             39     JR    PREC   0.903
                    * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                    * LAS VEGAS WASH DETENTION BASIN

             40     KK     201
             41     KM   RUNOFF FROM SUBBASIN 201
             42     BA   5.543
             43     PB    1.44
             44     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             45     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             46     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
             47     PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
             48     PC    .561    .610    .710    .720    .731    .752    .779    .790    .795    .804
             49     PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
             50     PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
```

1 HEC-1 INPUT PAGE 2

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             51     PC    .997    .999   1.00
             52     LS      0      80
```

```
53          UD    .208

54          KK     208
55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
56          RM       5    0.53    0.15

57          KK     207
58          KM   RUNOFF FROM SUBBASIN 207
59          BA   1.223
60          PB    1.36
61          LS       0      72
62          UD    .358

63          KK     208
64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
65          RM       2    0.20    0.15

66          KK     208
67          KM   RUNOFF FROM SUBBASIN 208
68          BA   8.778
69          PB    1.44
70          LS       0      70
71          UD    .833

72          KK      .
73          KM   COMBINE SUBBASINS 201, 207, & 208
74          HC       3

75          KK     218
76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
77          RM       3    0.35    0.15

78          KK     205
79          KM   RUNOFF FROM SUBBASIN 205
80          BA   9.587
81          PB    1.44
82          LS       0      78
83          UD    .794

84          KK     206
85          KM   RUNOFF FROM SUBBASIN 206
86          BA   6.635
87          PB    1.36
88          LS       0      64
89          UD    .754

90          KK     211
91          KM   RUNOFF FROM SUBBASIN 211
92          BA   3.691
93          PB    1.36
94          LS       0      80
95          UD    .527
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

96          KK      .
97          KM   COMBINE SUBBASINS 205, 206, & 211
98          HC       3

99          KK     217
100         KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101         RM       4    0.40    0.15

102         KK      .
103         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104         HC       2

105         KK     221
106         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107         RM       5    0.50    0.15

108         KK     222
109         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110         RM       5    0.51    0.15

111         KK     212
112         KM   RUNOFF FROM SUBBASIN 212
113         BA   5.641
114         PB    1.36
115         LS       0      82
116         UD    .403

117         KK     224
118         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119         RM       2    0.17    0.15

120         KK     222
121         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122         RM       6    0.63    0.15

123         KK      .
124         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125         HC       2

126         KK     223
127         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128         RM      18    1.84    0.15
```

```
129          KK     202
130          KM    RUNOFF FROM SUBBASIN 202
131          BA    5.523
132          PB     1.51
133          LS        0       80
134          UD     .134
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

135          KK     203
136          KM    ROUTE SUBBASIN 202 THRU SUBBASIN 203
137          RM        3    0.27    0.15

138          KK     203
139          KM    RUNOFF FROM SUBBASIN 203
140          BA    6.249
141          PB     1.51
142          LS        0       80
143          UD     .248

144          KK     204
145          KM    RUNOFF FROM SUBBASIN 204
146          BA    2.458
147          PB     1.59
148          LS        0       80
149          UD     .205

150          KK        .
151          KM    COMBINE SUBBASINS 202, 203, & 204
152          HC        3

153          KK     209
154          KM    ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
155          RM        4    0.40    0.15

156          KK     209
157          KM    RUNOFF FROM SUBBASIN 209
158          BA    2.824
159          PB     1.51
160          LS        0       69
161          UD     .500

162          KK     210
163          KM    RUNOFF FROM SUBBASIN 210
164          BA  9.4182
165          PB     1.51
166          LS        0       77
167          UD     .585

168          KK        .
169          KM    COMBINE SUBBASINS 202, 203, 204, 209, & 210
170          HC        3

171          KK     213
172          KM    ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
173          RM        5    0.54    0.15

174          KK     214
175          KM    RUNOFF FROM SUBBASIN 214
176          BA    7.167
177          PB     1.29
178          LS        0       80
179          UD     .869
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

180          KK     215
181          KM    RUNOFF FROM SUBBASIN 215
182          BA    9.983
183          PB     1.29
184          LS        0       78
185          UD     .717

186          KK     213
187          KM    RUNOFF FROM SUBBASIN 213
188          BA   16.253
189          PB     1.29
190          LS        0       77
191          UD    1.196

192          KK        .
193          KM    COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
194          HC        4

195          KK     223
196          KM    ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
197          KM     214, & 215 THRU SUBBASIN 223
198          RM        3    0.29    0.15

199          KK        V
200          RM        6    0.58    0.15

201          KK        V
202          RM       18    1.83    0.15
```

```
203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB    1.06
207          LS       0       77
208          UD    3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP     300       3

215          KK
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP     500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1     STOR      -1
222          SV       0       12      80      170      320      560     1000     1610     1800     1980
223          SV    2150     2330    2500     2690     2900     3100     3600     4950     6680
224          SE    2335     2340    2345     2350     2355     2360     2365     2370     2371     2372
225          SE    2373     2374    2375     2376     2377     2378     2380     2385     2390
226          SQ       0      600    1700     2300     2800     3300     3750     4100     4170     4240
227          SQ    6200     9960   15150    21140    28320    36220    54120   110170   180730

228          KK     116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK     109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
242          DI   17775   20135   23000
243          DQ       0       0       0       0       0     410    1225    2435    3565    5135
244          DQ    6775    8635   11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1     STOR      -1
249          SV       0       25     100      190      430      665     1095     1285     1435     1540
250          SV    1650     1825    1920     2000     2110     2200     2310     2430
251          SE       0        2       4        6       10       14       21       24       26       27
252          SE      28       30      31       32       33       34       35       36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0       77     117      597     1310     1660     2110     2260     2360     2690
254          SQ    3050     4630    5710     7090     8610    10140    11670    13200
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

255          KK
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
```

```
264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI        0    6000   20000
268          DQ        0       0   13500

269          KK      I15
270          KM        DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT    KCHAR
272          DI        0    1000   10000
273          DQ        0     800    8000

274          KK      NC1
275          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK      700  0.0058   0.016        0    TRAP       10        2

277          KK        V
278          RK     2000  0.0100   0.035        0    TRAP       30        2

279          KK      NC2
280          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM    TO GOWAN AVE.
282          RK     1300   .0056    .030        0    TRAP       12        2

283          KK      NC3
284          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM    TO CHEYENNE AVE.
286          RK     2600   .0021    .030        0    TRAP       20      2.5

287          KK      NC4
288          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM    TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK     1300    .003    .016        0    TRAP       18        2

291          KK      NC5
292          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM    (LINED CHANNEL)
294          RK      500    .001    .016        0    TRAP       18        2
```



```
1                                        HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM    Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA   0.001
300          PB    2.00
301          LS       0      80
302          UD    1.00

303          KKDUMMY_COMBINE
304          KM    Combine dummy subarea with recalled RRCHANNEL diversion
305          HC       2

306          KKRRCHANNL
307          RK     4900   .0041     .03        0    TRAP       40        2

308          KK     I-15
309          DR    KCHAR

310          KKDUMMY_AREA
311          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA   0.001
313          PB    2.00
314          LS       0      80
315          UD    1.00

316          KKDUMMY_COMBINE
317          KM    Combine dummy subarea with recalled KCHAR diversion
318          HC       2

319          KK ACHANNL
320          KM    COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC       2

322          KK      AC1
323          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK      750   .0092     .035        0    TRAP       12      1.5

325          KK      AC2
326          KM    ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK     1600   .0065     .035        0    TRAP       37      2.5

328          KK      AC3
329          RK     1600   .0065     .030        0    TRAP       52      1.5

330          KK      AC4
331          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK     1650   .0053     .030        0    TRAP       70      1.5
```



```
1                                        HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

333          KK NCHANNL
```

```
334          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
335          HC      2

336          KK     AC5
337          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
338          RK     450    .0053     .030        0    TRAP       70     1.5

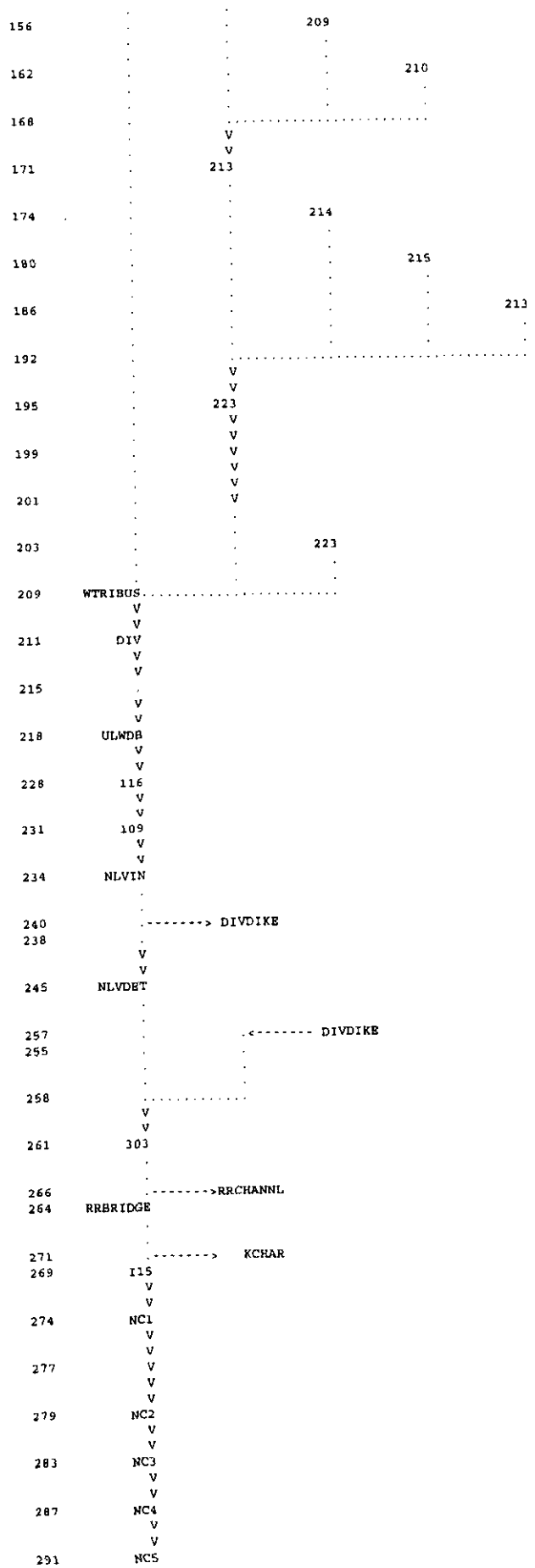
339          KK     AC6
340          RK    1300    .0047     .030        0    TRAP       78     1.5

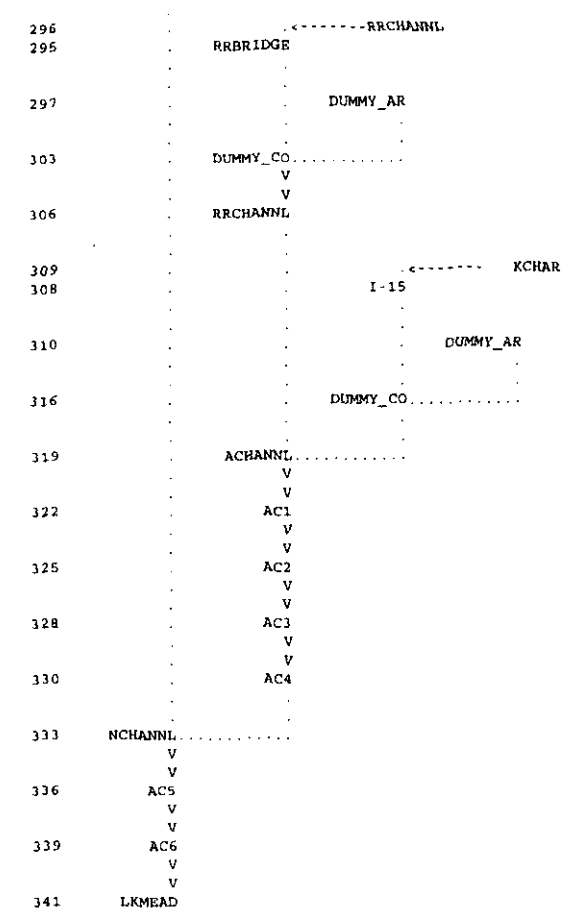
341          KK  LKMEAD
342          KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
343          KM   THRU "A" CHANNEL
344          RK    4500     .004     .030        0    TRAP       96     1.5
345          ZZ
1
                    SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
 LINE        (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

  NO.        (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

   40              201
                    V
                    V
   54              208
                    .
                    .
   57               .          207
                    .           V
                    .           V
   63               .          208
                    .           .
                    .           .
   66               .           .          208
                    .           .           .
                    .           .           .
   72               ..........................
                     V
                     V
   75              218
                    .
                    .
   78               .          205
                    .           .
                    .           .
   84               .           .          206
                    .           .           .
                    .           .           .
   90               .           .           .          211
                    .           .           .           .
                    .           .           .           .
   96               .           ..........................
                    .            V
                    .            V
   99               .          217
                    .           .
                    .           .
  102               ............
                     V
                     V
  105              221
                     V
                     V
  108              222
                    .
                    .
  111               .          212
                    .           V
                    .           V
  117               .          224
                    .           V
                    .           V
  120               .          222
                    .           .
                    .           .
  123               ............
                     V
                     V
  126              223
                    .
                    .
  129               .          202
                    .           V
                    .           V
  135               .          203
                    .           .
                    .           .
  138               .           .          203
                    .           .           .
                    .           .           .
  144               .           .           .          204
                    .           .           .           .
                    .           .           .           .
  150               .           ..........................
                    .            V
                    .            V
  153               .          209
                    .           .
```


209
210
213
214
215
223
WTRIBUS
DIV
ULWDB
116
109
NLVIN
DIVDIKE
NLVDET
DIVDIKE
303
RRCHANNL
RRBRIDGE
KCHAR
I15
NC1
NC2
NC3
NC4
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:01   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 10-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 10-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
  37 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME        0000  STARTING TIME
                         NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE     1   0  ENDING DATE
                       NDTIME       1954  ENDING TIME
                       ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL     0.10 HOURS
                        TOTAL TIME BASE    19.90 HOURS

            ENGLISH UNITS
                 DRAINAGE AREA          SQUARE MILES
                 PRECIPITATION DEPTH    INCHES
                 LENGTH, ELEVATION      FEET
                 FLOW                   CUBIC FEET PER SECOND
                 STORAGE VOLUME         ACRE-FEET
                 SURFACE AREA           ACRES
                 TEMPERATURE            DEGREES FAHRENHEIT

      JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                     0.90
1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS

                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION        STATION      AREA     PLAN                        RATIO 1
                                                                      0.90

 HYDROGRAPH AT
+                   201        5.54       1     FLOW                525.
                                                 TIME                3.60

 ROUTED TO
+                   208        5.54       1     FLOW                392.
                                                 TIME                4.20

 HYDROGRAPH AT
+                   207        1.22       1     FLOW                 33.
                                                 TIME                5.00

 ROUTED TO
+                   208        1.22       1     FLOW                 30.
                                                 TIME                5.20

 HYDROGRAPH AT
+                   208        8.78       1     FLOW                140.
                                                 TIME                5.50

   3 COMBINED AT
+                    .        15.54       1     FLOW                545.
                                                 TIME                5.40

 ROUTED TO
+                   218       15.54       1     FLOW                503.
                                                 TIME                5.70

 HYDROGRAPH AT
+                   205        9.59       1     FLOW                439.
                                                 TIME                5.30

 HYDROGRAPH AT
+                   206        6.64       1     FLOW                  5.
                                                 TIME                5.80

 HYDROGRAPH AT
+                   211        3.69       1     FLOW                205.
                                                 TIME                5.10

   3 COMBINED AT
+                    .        19.91       1     FLOW                634.
                                                 TIME                5.30

 ROUTED TO
+                   217       19.91       1     FLOW                609.
                                                 TIME                5.60

   2 COMBINED AT
+                    .        35.46       1     FLOW               1110.
                                                 TIME                5.70

 ROUTED TO
```

+	221	35.46	1	FLOW	1051.
				TIME	6.20
ROUTED TO					
+	222	35.46	1	FLOW	1011.
				TIME	6.60
HYDROGRAPH AT					
+	212	5.64	1	FLOW	431.
				TIME	3.90
ROUTED TO					
+	224	5.64	1	FLOW	414.
				TIME	4.10
ROUTED TO					
+	222	5.64	1	FLOW	362.
				TIME	4.70
2 COMBINED AT					
+	.	41.10	1	FLOW	1167.
				TIME	5.90
ROUTED TO					
+	223	41.10	1	FLOW	1123.
				TIME	8.00
HYDROGRAPH AT					
+	202	5.52	1	FLOW	715.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	557.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	632.
				TIME	3.70
HYDROGRAPH AT					
+	204	2.46	1	FLOW	324.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	1386.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	1203.
				TIME	4.20
HYDROGRAPH AT					
+	209	2.82	1	FLOW	63.
				TIME	5.20
HYDROGRAPH AT					
+	210	9.42	1	FLOW	504.
				TIME	5.20
3 COMBINED AT					
+	.	26.47	1	FLOW	1643.
				TIME	5.30
ROUTED TO					
+	213	26.47	1	FLOW	1482.
				TIME	5.80
HYDROGRAPH AT					
+	214	7.17	1	FLOW	290.
				TIME	5.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	352.
				TIME	5.30
HYDROGRAPH AT					
+	213	16.25	1	FLOW	398.
				TIME	5.70
4 COMBINED AT					
+	.	59.88	1	FLOW	2381.
				TIME	5.70
ROUTED TO					
+	223	59.88	1	FLOW	2332.
				TIME	6.00
ROUTED TO					
+	V	59.88	1	FLOW	2271.
				TIME	6.50
ROUTED TO					
+	V	59.88	1	FLOW	2164.
				TIME	8.10
HYDROGRAPH AT					
+	223	35.36	1	FLOW	181.
				TIME	8.00

3 COMBINED AT					
+	WTRIBUS	136.34	1	FLOW	3465.
				TIME	8.10
ROUTED TO					
+	DIV	136.34	1	FLOW	3460.
				TIME	8.20
ROUTED TO					
+	.	136.34	1	FLOW	3457.
				TIME	8.40
ROUTED TO					
+	ULWDB	136.34	1	FLOW	2426.
				TIME	9.30
			** PEAK STAGES IN FEET **		
			1	STAGE	2351.26
				TIME	9.30
ROUTED TO					
+	116	136.34	1	FLOW	2418.
				TIME	9.80
ROUTED TO					
+	109	136.34	1	FLOW	2410.
				TIME	10.20
ROUTED TO					
+	NLVIN	136.34	1	FLOW	2400.
				TIME	10.80
DIVERSION TO					
+	DIVDIKE	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT					
+	.	136.34	1	FLOW	2400.
				TIME	10.80
ROUTED TO					
+	NLVDET	136.34	1	FLOW	1292.
				TIME	12.70
			** PEAK STAGES IN FEET **		
			1	STAGE	9.90
				TIME	12.70
HYDROGRAPH AT					
+	.	0.00	1	FLOW	0.
				TIME	0.10
2 COMBINED AT					
+	.	136.34	1	FLOW	1292.
				TIME	12.70
ROUTED TO					
+	303	136.34	1	FLOW	1281.
				TIME	14.00
DIVERSION TO					
+	RRCHANNL	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT					
+	RRBRIDGE	136.34	1	FLOW	1281.
				TIME	14.00
DIVERSION TO					
+	KCHAR	136.34	1	FLOW	1024.
				TIME	14.00
HYDROGRAPH AT					
+	I15	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	NC1	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	V	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	NC2	136.34	1	FLOW	256.
				TIME	14.10
ROUTED TO					
+	NC3	136.34	1	FLOW	256.
				TIME	14.20
ROUTED TO					
+	NC4	136.34	1	FLOW	256.
				TIME	14.20
ROUTED TO					
+	NC5	136.34	1	FLOW	256.
				TIME	14.20

```
 HYDROGRAPH AT
+                RRBRIDGE       0.00      1   FLOW            0.
                                                TIME          0.10

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW            0.
                                                TIME          4.50

   2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW            0.
                                                TIME          4.50

 ROUTED TO
+                RRCHANNL       0.00      1   FLOW            0.
                                                TIME          8.20

 HYDROGRAPH AT
+                   I-15        0.00      1   FLOW         1024.
                                                TIME         14.00

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW            0.
                                                TIME          4.50

   2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW         1024.
                                                TIME         14.00

   2 COMBINED AT
+                ACHANNL        0.00      1   FLOW         1024.
                                                TIME         14.00

 ROUTED TO
+                     AC1       0.00      1   FLOW         1024.
                                                TIME         14.00

 ROUTED TO
+                     AC2       0.00      1   FLOW         1024.
                                                TIME         14.00

 ROUTED TO
+                     AC3       0.00      1   FLOW         1024.
                                                TIME         14.10

 ROUTED TO
+                     AC4       0.00      1   FLOW         1024.
                                                TIME         14.10

   2 COMBINED AT
+                NCHANNL      136.34      1   FLOW         1279.
                                                TIME         14.10

 ROUTED TO
+                     AC5      136.34      1   FLOW         1279.
                                                TIME         14.10

 ROUTED TO
+                     AC6      136.34      1   FLOW         1279.
                                                TIME         14.10

 ROUTED TO
+                  LKMEAD      136.34      1   FLOW         1279.
                                                TIME         14.20
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
          ISTAQ    ELEMENT        DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                            PEAK

                                  (MIN)      (CFS)     (MIN)       (IN)      (MIN)      (CFS)     (MIN)        (IN)

        FOR PLAN = 1  RATIO= 0.90
             DIV  MANE          5.21    3463.51     495.48       0.11       6.00    3459.62     492.00        0.11

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7722E+03 EXCESS=0.0000E+00 OUTFLOW=0.7720E+03 BASIN STORAGE=0.1069E+01 PERCENT ERROR=  -0.1

        FOR PLAN = 1  RATIO= 0.90
               MANE          3.77    3458.58     502.91       0.11       6.00    3456.94     504.00        0.11

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7720E+03 EXCESS=0.0000E+00 OUTFLOW=0.7711E+03 BASIN STORAGE=0.1033E+01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
             NC1  MANE          0.45     256.10     840.38       0.02       6.00     256.09     840.00        0.02

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1275E+03 EXCESS=0.0000E+00 OUTFLOW=0.1274E+03 BASIN STORAGE=0.9933E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
               V  MANE          1.58     256.07     843.08       0.02       6.00     255.97     840.00        0.02

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1274E+03 EXCESS=0.0000E+00 OUTFLOW=0.1268E+03 BASIN STORAGE=0.5542E+00 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          1.06    255.97    843.09      0.02      6.00    255.96    846.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1268E+03 EXCESS=0.0000E+00 OUTFLOW=0.1265E+03 BASIN STORAGE=0.3098E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          2.92    255.92    850.26      0.02      6.00    255.89    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1265E+03 EXCESS=0.0000E+00 OUTFLOW=0.1254E+03 BASIN STORAGE=0.1022E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.89    255.87    853.29      0.02      6.00    255.86    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1253E+03 EXCESS=0.0000E+00 OUTFLOW=0.1250E+03 BASIN STORAGE=0.2923E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.47    255.85    853.04      0.02      6.00    255.83    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1250E+03 EXCESS=0.0000E+00 OUTFLOW=0.1248E+03 BASIN STORAGE=0.1636E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
            RRCHANNL  MANE          6.00      0.11    493.12      0.64      6.00      0.11    492.00        0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.33   1024.42    840.53   4779.70      6.00   1024.37    840.00     4778.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5101E+03 EXCESS=0.0000E+00 OUTFLOW=0.5098E+03 BASIN STORAGE=0.4075E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.92   1024.33    841.67   4769.08      6.00   1024.08    840.00     4764.70

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5097E+03 EXCESS=0.0000E+00 OUTFLOW=0.5087E+03 BASIN STORAGE=0.1332E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.85   1024.07    841.79   4753.96      6.00   1023.77    846.00     4751.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5082E+03 EXCESS=0.0000E+00 OUTFLOW=0.5071E+03 BASIN STORAGE=0.1339E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          1.04   1023.74    846.47   4739.14      6.00   1023.74    846.00     4734.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5068E+03 EXCESS=0.0000E+00 OUTFLOW=0.5055E+03 BASIN STORAGE=0.1653E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.37   1279.22    846.44      0.09      6.00   1279.14    846.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6298E+03 EXCESS=0.0000E+00 OUTFLOW=0.6293E+03 BASIN STORAGE=0.5286E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.82   1279.11    847.76      0.09      6.00   1278.71    846.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6293E+03 EXCESS=0.0000E+00 OUTFLOW=0.6277E+03 BASIN STORAGE=0.1660E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
             LKMEAD  MANE          2.97   1278.70    852.17      0.09      6.00   1278.64    852.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6275E+03 EXCESS=0.0000E+00 OUTFLOW=0.6216E+03 BASIN STORAGE=0.6680E+01 PERCENT ERROR=  -0.1


*** NORMAL END OF HEC-1 ***
```

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)*
*         FEBRUARY 1991             *
*          VERSION 4.0.1 (LOCAL)    *
*                                   *
*  RUN DATE  05/10/96  TIME  16:25:20*
*                                   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 551-1748           *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), *HEC1GS, HEC1DB, AND HEC1KW.*

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: *NEW FINITE DIFFERENCE ALGORITHM*

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID        FEMA FLOOD INSURANCE STUDY, 1996
              2     ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID        SPRING MOUNTAIN 50-YEAR STORM
              4     ID
              5     ID        Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID        Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID        Study Hydrology Report dated 9/91.  Two modifications were made
              8     ID        to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID        and outflow characteristics were revised to reflect the as-built
             10     ID        configuration described by construction drawings dated 5/91 and HEC-1
             11     ID        models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID        relationship for the North Las Vegas Detention Basin was revised
             13     ID        to reflect the current three-pipe outlet condition (two of the five
             14     ID        pipes were blocked following construction of the upper basin) and the
             15     ID        hydraulic control created by the 4-foot high barrier wall located
             16     ID        upstream from the pipe inlets.
             17     ID
             18     ID        Remaining comments are from the original model dated 1/91.
             19     ID
             20     ID        CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             21     ID        NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
             22     ID        SPRING MOUNTAIN 50-YEAR STORM EXISTING CONDITIONS
             23     ID
             24     ID        Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
             25     ID        CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
             26     ID        The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
             27     ID        portion within the Gowan Area (which is not tributary to the Upper
             28     ID        Las Vegas Wash Detention Basin diversion)
             29     ID        Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
             30     ID        All routing steps immediataly d/s of a diversion converted to
             31     ID        Muskingum rouing to avoid zero flow, 8/90
             32     ID
             33     ID        This run models the diversion from the West Tributary to the proposed
             34     ID        Upper Las Vegas Wash Detention Basin, 1/91
             35     ID
*** FREE ***
             36     IT      6       0       0     200
             37     IO      5       0       0
             38     IN      5       0       0
             39     JR    PREC   0.903
                    * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                    * LAS VEGAS WASH DETENTION BASIN

             40     KK    201
             41     KM   RUNOFF FROM SUBBASIN 201
             42     BA   5.543
             43     PB    2.20
             44     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             45     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             46     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
             47     PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
             48     PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
             49     PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
             50     PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
```

1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             51     PC    .997    .999   1.00
             52     LS      0      80
```

```
53          UD    .208

54          KK     208
55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
56          RM       5    0.53    0.15

57          KK     207
58          KM   RUNOFF FROM SUBBASIN 207
59          BA   1.223
60          PB    2.03
61          LS       0       72
62          UD    .358

63          KK     208
64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
65          RM       2    0.20    0.15

66          KK     208
67          KM   RUNOFF FROM SUBBASIN 208
68          BA   8.778
69          PB    2.03
70          LS       0       70
71          UD    .833

72          KK       .
73          KM   COMBINE SUBBASINS 201, 207, & 208
74          HC       3

75          KK     218
76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
77          RM       3    0.35    0.15

78          KK     205
79          KM   RUNOFF FROM SUBBASIN 205
80          BA   9.587
81          PB    2.20
82          LS       0       78
83          UD    .794

84          KK     206
85          KM   RUNOFF FROM SUBBASIN 206
86          BA   6.635
87          PB    2.03
88          LS       0       64
89          UD    .754

90          KK     211
91          KM   RUNOFF FROM SUBBASIN 211
92          BA   3.691
93          PB    2.03
94          LS       0       80
95          UD    .527
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

96          KK       .
97          KM   COMBINE SUBBASINS 205, 206, & 211
98          HC       3

99          KK     217
100         KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101         RM       4    0.40    0.15

102         KK       .
103         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104         HC       2

105         KK     221
106         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107         RM       5    0.50    0.15

108         KK     222
109         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110         RM       5    0.51    0.15

111         KK     212
112         KM   RUNOFF FROM SUBBASIN 212
113         BA   5.641
114         PB    2.03
115         LS       0       82
116         UD    .403

117         KK     224
118         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119         RM       2    0.17    0.15

120         KK     222
121         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122         RM       6    0.63    0.15

123         KK       .
124         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125         HC       2

126         KK     223
127         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128         RM      18    1.84    0.15
```

```
129          KK     202
130          KM   RUNOFF FROM SUBBASIN 202
131          BA   5.523
132          PB    2.28
133          LS       0       80
134          UD    .134
```



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1                                        HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


135          KK     203
136          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
137          RM       3    0.27    0.15

138          KK     203
139          KM   RUNOFF FROM SUBBASIN 203
140          BA   6.249
141          PB    2.28
142          LS       0       80
143          UD    .248

144          KK     204
145          KM   RUNOFF FROM SUBBASIN 204
146          BA   2.458
147          PB    2.28
148          LS       0       80
149          UD    .205

150          KK       .
151          KM   COMBINE SUBBASINS 202, 203, & 204
152          HC       3

153          KK     209
154          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
155          RM       4    0.40    0.15

156          KK     209
157          KM   RUNOFF FROM SUBBASIN 209
158          BA   2.824
159          PB    2.28
160          LS       0       69
161          UD    .500

162          KK     210
163          KM   RUNOFF FROM SUBBASIN 210
164          BA  9.4182
165          PB    2.20
166          LS       0       77
167          UD    .585

168          KK       .
169          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
170          HC       3

171          KK     213
172          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
173          RM       5    0.54    0.15

174          KK     214
175          KM   RUNOFF FROM SUBBASIN 214
176          BA   7.167
177          PB    1.86
178          LS       0       80
179          UD    .869
```



```
1                                        HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


180          KK     215
181          KM   RUNOFF FROM SUBBASIN 215
182          BA   9.983
183          PB    1.86
184          LS       0       78
185          UD    .717

186          KK     213
187          KM   RUNOFF FROM SUBBASIN 213
188          BA  16.253
189          PB    2.03
190          LS       0       77
191          UD   1.196

192          KK       .
193          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
194          HC       4

195          KK     223
196          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
197          KM    214, & 215 THRU SUBBASIN 223
198          RM       3    0.29    0.15

199          KK       V
200          RM       6    0.58    0.15

201          KK       V
202          RM      18    1.83    0.15
```

```
203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB    1.52
207          LS       0       77
208          UD    3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP     300       3

215          KK      .
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP     500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1    STOR      -1
222          SV       0      12      80     170     320     560    1000    1610    1800    1980
223          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
224          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
225          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
226          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
227          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

228          KK     116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK     109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK      .
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
242          DI   17775   20135   23000
243          DQ       0       0       0       0       0     410    1225    2435    3565    5135
244          DQ    6775    8635   11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1    STOR      -1
249          SV       0      25     100     190     430     665    1095    1285    1435    1540
250          SV    1650    1825    1920    2000    2110    2200    2310    2430
251          SE       0       2       4       6      10      14      21      24      26      27
252          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
254          SQ    3050    4630    5710    7090    8610   10140   11670   13200
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

255          KK      .
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK      .
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
```

```
264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI        0    6000   20000
268          DQ        0       0   13500

269          KK      I15
270          KM        DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT    KCHAR
272          DI        0    1000   10000
273          DQ        0     800    8000

274          KK      NC1
275          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK      700  0.0058   0.016        0    TRAP       10        2

277          KK        V
278          RK     2000  0.0100   0.035        0    TRAP       30        2

279          KK      NC2
280          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM    TO GOWAN AVE.
282          RK     1300   .0056    .030        0    TRAP       12        2

283          KK      NC3
284          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM    TO CHEYENNE AVE.
286          RK     2600   .0021    .030        0    TRAP       20      2.5

287          KK      NC4
288          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM    TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK     1300    .003    .016        0    TRAP       18        2

291          KK      NC5
292          KM    ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM    (LINED CHANNEL)
294          RK      500    .001    .016        0    TRAP       18        2
1                                        HEC-1 INPUT                                          PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM    Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA    0.001
300          PB     2.00
301          LS        0       80
302          UD     1.00

303          KKDUMMY_COMBINE
304          KM    Combine dummy subarea with recalled RRCHANNEL diversion
305          HC        2

306          KKRRCHANNL
307          RK     4900   .0041     .03        0    TRAP       40        2

308          KK     I-15
309          DR    KCHAR

310          KKDUMMY_AREA
311          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA    0.001
313          PB     2.00
314          LS        0       80
315          UD     1.00

316          KKDUMMY_COMBINE
317          KM    Combine dummy subarea with recalled KCHAR diversion
318          HC        2

319          KK ACHANNL
320          KM    COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC        2

322          KK      AC1
323          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK      750   .0092    .035        0    TRAP       12      1.5

325          KK      AC2
326          KM    ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK     1600   .0065    .035        0    TRAP       37      2.5

328          KK      AC3
329          RK     1600   .0065    .030        0    TRAP       52      1.5

330          KK      AC4
331          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK     1650   .0053    .030        0    TRAP       70      1.5
1                                        HEC-1 INPUT                                          PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

333          KK NCHANNL
```

```
334          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
335          HC       2

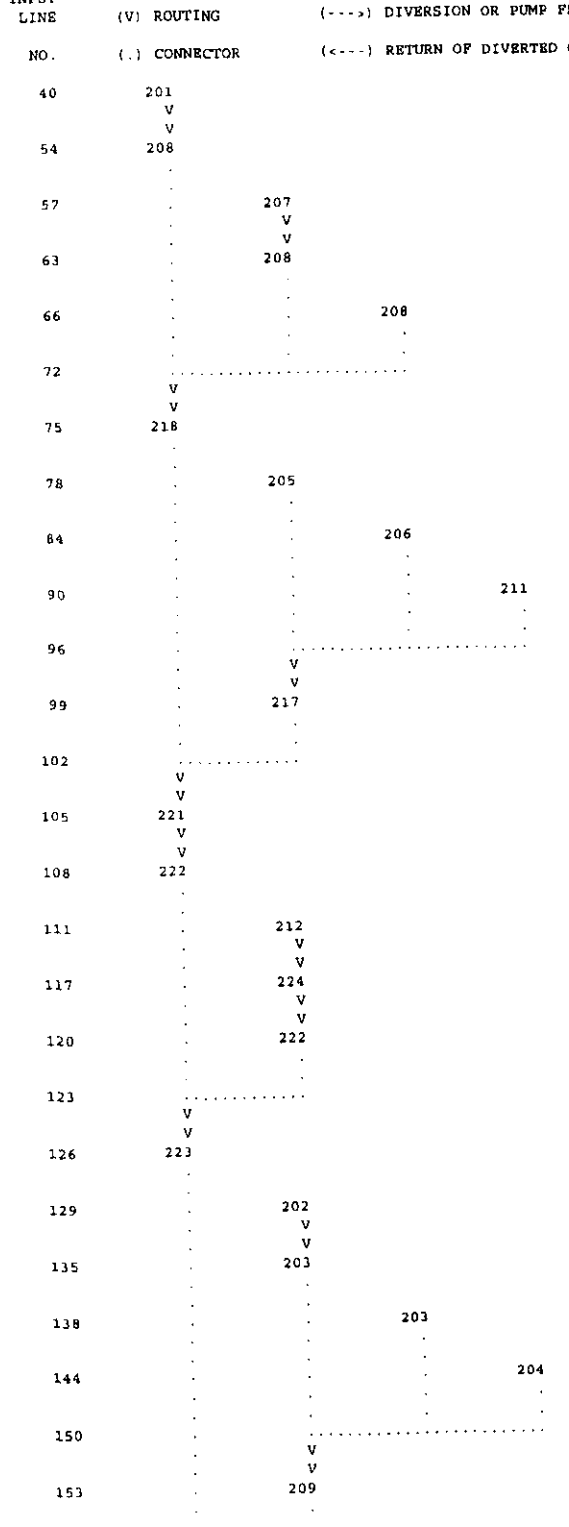
336          KK     AC5
337          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
338          RK     450    .0053     .030        0     TRAP       70      1.5

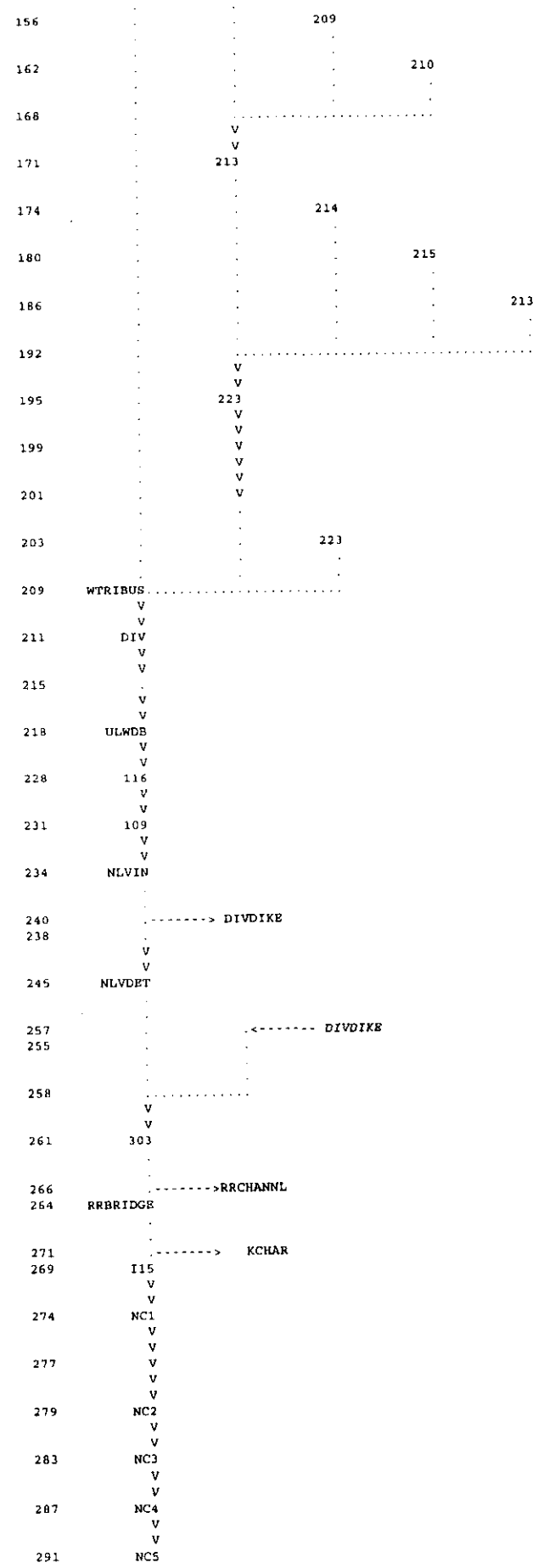
339          KK     AC6
340          RK    1300    .0047     .030        0     TRAP       78      1.5

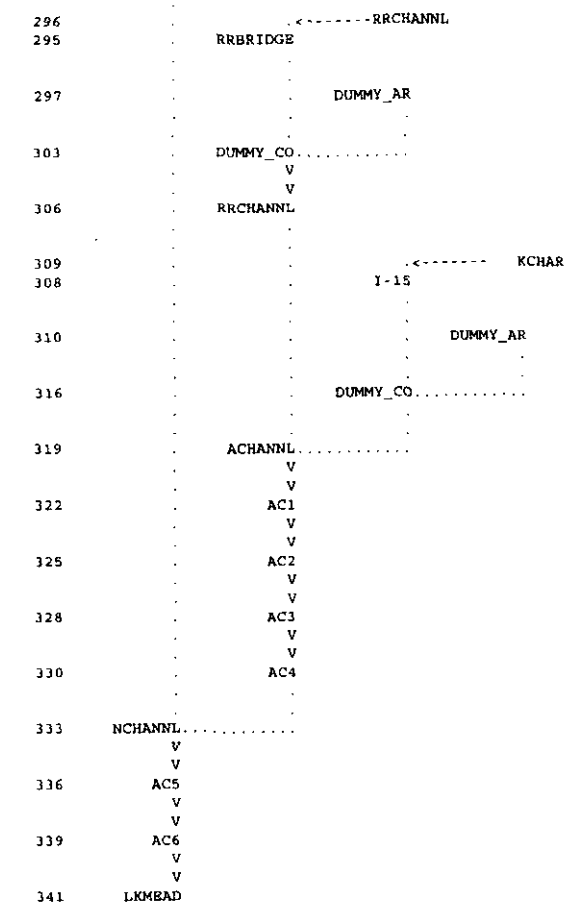
341          KK   LKMEAD
342          KM    ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
343          KM   THRU "A" CHANNEL
344          RK    4500     .004     .030        0     TRAP       96      1.5
345          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK




156
209
162
210
168
171
213
174
214
180
215
186
213
192
195
223
199
201
203
223
209
WTRIBUS
211
DIV
215
218
ULWDB
228
116
231
109
234
NLVIN
240
DIVDIKE
238
245
NLVDET
257
DIVDIKE
255
258
261
303
266
RRCHANNL
264
RRBRIDGE
271
KCHAR
269
I15
274
NC1
277
279
NC2
283
NC3
287
NC4
291
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:20   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 50-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 50-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT        HYDROGRAPH TIME DATA
                      NMIN          6  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME        1954  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL    0.10 HOURS
                      TOTAL TIME BASE   19.90 HOURS

           ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT

      JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.90
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					0.90
HYDROGRAPH AT					
+	201	5.54	1	FLOW	1666.
				TIME	3.60
ROUTED TO					
+	208	5.54	1	FLOW	1227.
				TIME	4.20
HYDROGRAPH AT					
+	207	1.22	1	FLOW	111.
				TIME	5.00
ROUTED TO					
+	208	1.22	1	FLOW	104.
				TIME	5.20
HYDROGRAPH AT					
+	208	8.78	1	FLOW	488.
				TIME	5.40
3 COMBINED AT					
+	.	15.54	1	FLOW	1608.
				TIME	4.20
ROUTED TO					
+	218	15.54	1	FLOW	1474.
				TIME	4.60
HYDROGRAPH AT					
+	205	9.59	1	FLOW	1258.
				TIME	4.30
HYDROGRAPH AT					
+	206	6.64	1	FLOW	202.
				TIME	5.40
HYDROGRAPH AT					
+	211	3.69	1	FLOW	589.
				TIME	4.00
3 COMBINED AT					
+	.	19.91	1	FLOW	1823.
				TIME	4.20
ROUTED TO					
+	217	19.91	1	FLOW	1749.
				TIME	5.60
2 COMBINED AT					
+	.	35.46	1	FLOW	3220.
				TIME	4.60
ROUTED TO					

+	221	35.46	1	FLOW	3043.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	2929.
				TIME	5.70
HYDROGRAPH AT					
+	212	5.64	1	FLOW	1218.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	1167.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	1011.
				TIME	4.70
2 COMBINED AT					
+	.	41.10	1	FLOW	3670.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	3418.
				TIME	7.70
HYDROGRAPH AT					
+	202	5.52	1	FLOW	1968.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	1634.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	1826.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	806.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	3975.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	3424.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	243.
				TIME	5.10
HYDROGRAPH AT					
+	210	9.42	1	FLOW	1337.
				TIME	4.10
3 COMBINED AT					
+	.	26.47	1	FLOW	4961.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	4394.
				TIME	4.70
HYDROGRAPH AT					
+	214	7.17	1	FLOW	702.
				TIME	4.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	882.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	1402.
				TIME	5.50
4 COMBINED AT					
+	.	59.88	1	FLOW	7015.
				TIME	4.70
ROUTED TO					
+	223	59.88	1	FLOW	6845.
				TIME	5.00
ROUTED TO					
+	V	59.88	1	FLOW	6583.
				TIME	5.60
ROUTED TO					
+	V	59.88	1	FLOW	6162.
				TIME	7.70
HYDROGRAPH AT					
+	223	35.36	1	FLOW	732.
				TIME	7.70

3 COMBINED AT +	WTRIBUS	136.34	1	FLOW	10312.
				TIME	7.70
ROUTED TO +	DIV	136.34	1	FLOW	10304.
				TIME	7.80
ROUTED TO +	.	136.34	1	FLOW	10299.
				TIME	7.90
ROUTED TO +	ULWDB	136.34	1	FLOW	3888.
				TIME	9.70
			** PEAK STAGES IN FEET **		
			1	STAGE	2366.98
				TIME	9.70
ROUTED TO +	116	136.34	1	FLOW	3885.
				TIME	10.20
ROUTED TO +	109	136.34	1	FLOW	3882.
				TIME	10.70
ROUTED TO +	NLVIN	136.34	1	FLOW	3878.
				TIME	11.20
DIVERSION TO +	DIVDIKE	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT +	.	136.34	1	FLOW	3878.
				TIME	11.20
ROUTED TO +	NLVDET	136.34	1	FLOW	2186.
				TIME	16.20
			** PEAK STAGES IN FEET **		
			1	STAGE	22.51
				TIME	16.20
HYDROGRAPH AT +	.	0.00	1	FLOW	0.
				TIME	0.10
2 COMBINED AT +	.	136.34	1	FLOW	2186.
				TIME	16.20
ROUTED TO +	303	136.34	1	FLOW	2183.
				TIME	17.40
DIVERSION TO +	RRCHANNL	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT +	RRBRIDGE	136.34	1	FLOW	2183.
				TIME	17.40
DIVERSION TO +	KCHAR	136.34	1	FLOW	1746.
				TIME	17.40
HYDROGRAPH AT +	I15	136.34	1	FLOW	437.
				TIME	17.40
ROUTED TO +	NC1	136.34	1	FLOW	437.
				TIME	17.40
ROUTED TO +	V	136.34	1	FLOW	437.
				TIME	17.50
ROUTED TO +	NC2	136.34	1	FLOW	437.
				TIME	17.50
ROUTED TO +	NC3	136.34	1	FLOW	437.
				TIME	17.60
ROUTED TO +	NC4	136.34	1	FLOW	437.
				TIME	17.60
ROUTED TO +	NC5	136.34	1	FLOW	437.
				TIME	17.60

```
 HYDROGRAPH AT
+                RRBRIDGE       0.00      1   FLOW          0.
                                                TIME          0.10

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW          0.
                                                TIME          4.50

   2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW          0.
                                                TIME          4.50

 ROUTED TO
+                RRCHANNL       0.00      1   FLOW          0.
                                                TIME          8.20

 HYDROGRAPH AT
+                   I-15        0.00      1   FLOW       1746.
                                                TIME         17.40

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW          0.
                                                TIME          4.50

   2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW       1746.
                                                TIME         17.40

   2 COMBINED AT
+                 ACHANNL       0.00      1   FLOW       1746.
                                                TIME         17.40

 ROUTED TO
+                     AC1       0.00      1   FLOW       1746.
                                                TIME         17.40

 ROUTED TO
+                     AC2       0.00      1   FLOW       1746.
                                                TIME         17.50

 ROUTED TO
+                     AC3       0.00      1   FLOW       1746.
                                                TIME         17.50

 ROUTED TO
+                     AC4       0.00      1   FLOW       1746.
                                                TIME         17.50

   2 COMBINED AT
+                 NCHANNL     136.34      1   FLOW       2183.
                                                TIME         17.50

 ROUTED TO
+                     AC5     136.34      1   FLOW       2183.
                                                TIME         17.50

 ROUTED TO
+                     AC6     136.34      1   FLOW       2183.
                                                TIME         17.60

 ROUTED TO
+                  LKMEAD     136.34      1   FLOW       2183.
                                                TIME         17.60
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ    ELEMENT        DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                       PEAK                                          PEAK

                                  (MIN)      (CFS)      (MIN)      (IN)     (MIN)      (CFS)      (MIN)      (IN)

        FOR PLAN = 1  RATIO= 0.90
            DIV  MANE            3.45   10304.62     467.32      0.33      6.00   10303.82     468.00      0.33

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2428E+04 EXCESS=0.0000E+00 OUTFLOW=0.2428E+04 BASIN STORAGE=0.1848E+01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
              MANE           2.42   10301.51     473.34      0.33      6.00   10299.06     474.00      0.33

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2428E+04 EXCESS=0.0000E+00 OUTFLOW=0.2426E+04 BASIN STORAGE=0.1893E+01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
            NC1  MANE            0.32     436.58    1044.80      0.04      6.00     436.57    1044.00      0.04

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2956E+03 EXCESS=0.0000E+00 OUTFLOW=0.2953E+03 BASIN STORAGE=0.3640E+00 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
              V  MANE            1.36     436.57    1047.44      0.04      6.00     436.57    1050.00      0.04

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2952E+03 EXCESS=0.0000E+00 OUTFLOW=0.2933E+03 BASIN STORAGE=0.1955E+01 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          0.87    436.56   1051.70      0.04      6.00    436.56   1050.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2931E+03 EXCESS=0.0000E+00 OUTFLOW=0.2921E+03 BASIN STORAGE=0.1155E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          2.45    436.55   1055.69      0.04      6.00    436.55   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2919E+03 EXCESS=0.0000E+00 OUTFLOW=0.2887E+03 BASIN STORAGE=0.3752E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.65    436.54   1057.52      0.04      6.00    436.53   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2880E+03 EXCESS=0.0000E+00 OUTFLOW=0.2872E+03 BASIN STORAGE=0.9907E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.42    436.53   1056.82      0.04      6.00    436.53   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2869E+03 EXCESS=0.0000E+00 OUTFLOW=0.2864E+03 BASIN STORAGE=0.5417E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
           RRCHANNL  MANE          6.00       0.11    493.12      0.64      6.00      0.11    492.00         0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.32   1746.32   1044.58  11071.28      6.00   1746.28   1044.00     11071.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1183E+04 EXCESS=0.0000E+00 OUTFLOW=0.1181E+04 BASIN STORAGE=0.1442E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.87   1746.28   1046.23  11036.84      6.00   1746.27   1050.00     11024.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1181E+04 EXCESS=0.0000E+00 OUTFLOW=0.1177E+04 BASIN STORAGE=0.4612E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.81   1746.26   1051.05  10984.78      6.00   1746.25   1050.00     10980.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1176E+04 EXCESS=0.0000E+00 OUTFLOW=0.1172E+04 BASIN STORAGE=0.4367E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          0.91   1746.23   1051.53  10931.93      6.00   1746.19   1050.00     10927.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1171E+04 EXCESS=0.0000E+00 OUTFLOW=0.1166E+04 BASIN STORAGE=0.5445E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.36   2182.63   1050.58      0.20      6.00   2182.60   1050.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1452E+04 EXCESS=0.0000E+00 OUTFLOW=0.1450E+04 BASIN STORAGE=0.1292E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.64   2182.59   1051.26      0.20      6.00   2182.57   1056.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1450E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.5505E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
             LKMEAD  MANE          2.51   2182.54   1060.33      0.20      6.00   2182.50   1056.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+04 EXCESS=0.0000E+00 OUTFLOW=0.1427E+04 BASIN STORAGE=0.2144E+02 PERCENT ERROR=  -0.3


*** NORMAL END OF HEC-1 ***
```

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*         FEBRUARY  1991             *
*          VERSION 4.0.1 (LOCAL)     *
*                                    *
*  RUN DATE  05/10/96  TIME  16:25:40*
*                                    *
**************************************
```


```
**************************************
*                                    *
*   U S  ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*          (916) 551-1748            *
*                                    *
**************************************
```


```
X      X  XXXXXXX   XXXXX            X
X      X  X        X     X          XX
X      X  X        X                 X
XXXXXXX   XXXX     X         XXXXX   X
X      X  X        X                 X
X      X  X        X     X           X
X      X  XXXXXXX   XXXXX            XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL. LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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      LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
          1         ID          FEMA FLOOD INSURANCE STUDY, 1996
          2         ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
          3         ID          SPRING MOUNTAIN 100-YEAR STORM
          4         ID
          5         ID          Current (05/96) model based on a HEC-1 model prepared by James M
          6         ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
          7         ID          Study Hydrology Report dated 9/91.  Two modifications were made
          8         ID          to the source model.  First, Upper Las Vegas Detention Basin storage
          9         ID          and outflow characteristics were revised to reflect the as-built
         10         ID          configuration described by construction drawings dated 5/91 and HEC-1
         11         ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
         12         ID          relationship for the North Las Vegas Detention Basin was revised
         13         ID          to reflect the current three-pipe outlet condition (two of the five
         14         ID          pipes were blocked following construction of the upper basin) and the
         15         ID          hydraulic control created by the 4-foot high barrier wall located
         16         ID          upstream from the pipe inlets.
         17         ID
         18         ID          Remaining comments are from the original model dated 1/91.
         19         ID
         20         ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
         21         ID          NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
         22         ID          SPRING MOUNTAIN 100-YEAR STORM EXISTING CONDITIONS
         23         ID
         24         ID          Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
         25         ID          CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
         26         ID          The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
         27         ID          portion within the Gowan Area (which is not tributary to the Upper
         28         ID          Las Vegas Wash Detention Basin diversion)
         29         ID          Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
         30         ID          All routing steps immediately d/s of a diversion converted to
         31         ID          Muskingum routing to avoid zero flow, 8/90
         32         ID
         33         ID          This run models the diversion from the West Tributary to the proposed
         34         ID          Upper Las Vegas Wash Detention Basin, 1/91
         35         ID
*** FREE ***
         36         IT       6        0        0      200
         37         IO       5        0        0
         38         IN       5        0        0
         39         JR     PREC    0.903
                    * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                    * LAS VEGAS WASH DETENTION BASIN

         40         KK      201
         41         KM    RUNOFF FROM SUBBASIN 201
         42         BA    5.543
         43         PB     2.44
         44         PC     .000     .020     .059     .080     .110     .144     .150     .160     .168     .171
         45         PC     .180     .182     .187     .190     .197     .202     .210     .220     .230     .241
         46         PC     .250     .259     .265     .280     .290     .300     .305     .309     .310     .317
         47         PC     .321     .327     .333     .346     .361     .381     .408     .430     .477     .514
         48         PC     .561     .630     .710     .720     .731     .752     .779     .790     .795     .804
         49         PC     .810     .820     .826     .840     .859     .889     .910     .938     .966     .970
         50         PC     .974     .979     .981     .983     .985     .989     .990     .992     .993     .996
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1 HEC-1 INPUT PAGE 2

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      LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

         51         PC     .997     .999    1.00
         52         LS       0       80
```

```
53          UD    .208

54          KK     208
55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
56          RM       5     0.53     0.15

57          KK     207
58          KM   RUNOFF FROM SUBBASIN 207
59          BA   1.223
60          PB    2.44
61          LS       0       72
62          UD    .358

63          KK     208
64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
65          RM       2     0.20     0.15

66          KK     208
67          KM   RUNOFF FROM SUBBASIN 208
68          BA   8.778
69          PB    2.53
70          LS       0       70
71          UD    .833

72          KK      .
73          KM   COMBINE SUBBASINS 201, 207, & 208
74          HC       3

75          KK     218
76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
77          RM       3     0.35     0.15

78          KK     205
79          KM   RUNOFF FROM SUBBASIN 205
80          BA   9.587
81          PB    2.53
82          LS       0       78
83          UD    .794

84          KK     206
85          KM   RUNOFF FROM SUBBASIN 206
86          BA   6.635
87          PB    2.36
88          LS       0       64
89          UD    .754

90          KK     211
91          KM   RUNOFF FROM SUBBASIN 211
92          BA   3.691
93          PB    2.44
94          LS       0       80
95          UD    .527
```


1 HEC-1 INPUT

```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

96          KK      .
97          KM   COMBINE SUBBASINS 205, 206, & 211
98          HC       3

99          KK     217
100         KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101         RM       4     0.40     0.15

102         KK      .
103         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104         HC       2

105         KK     221
106         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107         RM       5     0.50     0.15

108         KK     222
109         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110         RM       5     0.51     0.15

111         KK     212
112         KM   RUNOFF FROM SUBBASIN 212
113         BA   5.641
114         PB    2.44
115         LS       0       82
116         UD    .403

117         KK     224
118         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119         RM       2     0.17     0.15

120         KK     222
121         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122         RM       6     0.63     0.15

123         KK      .
124         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125         HC       2

126         KK     223
127         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128         RM      18     1.84     0.15
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```
 129          KK     202
 130          KM   RUNOFF FROM SUBBASIN 202
 131          BA   5.523
 132          PB    2.44
 133          LS       0       80
 134          UD    .134
1                                        HEC-1 INPUT                                        PAGE   4

 LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


 135          KK     203
 136          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
 137          RM       3    0.27    0.15

 138          KK     203
 139          KM   RUNOFF FROM SUBBASIN 203
 140          BA   6.249
 141          PB    2.62
 142          LS       0       80
 143          UD    .248

 144          KK     204
 145          KM   RUNOFF FROM SUBBASIN 204
 146          BA   2.458
 147          PB    2.62
 148          LS       0       80
 149          UD    .205

 150          KK       .
 151          KM   COMBINE SUBBASINS 202, 203, & 204
 152          HC       3

 153          KK     209
 154          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
 155          RM       4    0.40    0.15

 156          KK     209
 157          KM   RUNOFF FROM SUBBASIN 209
 158          BA   2.824
 159          PB    2.62
 160          LS       0       69
 161          UD    .500

 162          KK     210
 163          KM   RUNOFF FROM SUBBASIN 210
 164          BA  9.4182
 165          PB    2.53
 166          LS       0       77
 167          UD    .585

 168          KK       .
 169          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
 170          HC       3

 171          KK     213
 172          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
 173          RM       5    0.54    0.15

 174          KK     214
 175          KM   RUNOFF FROM SUBBASIN 214
 176          BA   7.167
 177          PB    2.44
 178          LS       0       80
 179          UD    .869
1                                        HEC-1 INPUT                                        PAGE   5

 LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


 180          KK     215
 181          KM   RUNOFF FROM SUBBASIN 215
 182          BA   9.983
 183          PB    2.36
 184          LS       0       78
 185          UD    .717

 186          KK     213
 187          KM   RUNOFF FROM SUBBASIN 213
 188          BA  16.253
 189          PB    2.27
 190          LS       0       77
 191          UD   1.196

 192          KK       .
 193          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
 194          HC       4

 195          KK     223
 196          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
 197          KM    214, & 215 THRU SUBBASIN 223
 198          RM       3    0.29    0.15

 199          KK       V
 200          RM       6    0.58    0.15

 201          KK       V
 202          RM      18    1.83    0.15
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203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB   1.74
207          LS      0      77
208          UD   3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP      300       3

215          KK
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP      500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1    STOR      -1
222          SV       0      12      80     170     320     560    1000    1610    1800    1980
223          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
224          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
225          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
226          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
227          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

228          KK     116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK     109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
242          DI   17775   20135   23000
243          DQ       0       0       0       0       0     410    1225    2435    3565    5135
244          DQ    6775    8635   11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1    STOR      -1
249          SV       0      25     100     190     430     665    1095    1285    1435    1540
250          SV    1650    1825    1920    2000    2110    2200    2310    2430
251          SE       0       2       4       6      10      14      21      24      26      27
252          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
254          SQ    3050    4630    5710    7090    8610   10140   11670   13200
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

255          KK
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
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264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI        0    6000   20000
268          DQ        0       0   13500

269          KK     I15
270          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT   KCHAR
272          DI        0    1000   10000
273          DQ        0     800    8000

274          KK     NC1
275          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK     700  0.0058   0.016        0    TRAP       10        2

277          KK       V
278          RK    2000  0.0100   0.035        0    TRAP       30        2

279          KK     NC2
280          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM   TO GOWAN AVE.
282          RK    1300    .0056    .030        0    TRAP       12        2

283          KK     NC3
284          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM   TO CHEYENNE AVE.
286          RK    2600    .0021    .030        0    TRAP       20      2.5

287          KK     NC4
288          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK    1300     .003    .016        0    TRAP       18        2

291          KK     NC5
292          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM   (LINED CHANNEL)
294          RK     500     .001    .016        0    TRAP       18        2
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA   0.001
300          PB    2.00
301          LS       0       80
302          UD    1.00

303          KKDUMMY_COMBINE
304          KM   Combine dummy subarea with recalled RRCHANNEL diversion
305          HC       2

306          KKRRCHANNL
307          RK    4900    .0041     .03        0    TRAP       40        2

308          KK    I-25
309          DR   KCHAR

310          KKDUMMY_AREA
311          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA   0.001
313          PB    2.00
314          LS       0       80
315          UD    1.00

316          KKDUMMY_COMBINE
317          KM   Combine dummy subarea with recalled KCHAR diversion
318          HC       2

319          KK ACHANNL
320          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC       2

322          KK     AC1
323          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK     750    .0092    .035        0    TRAP       12      1.5

325          KK     AC2
326          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK    1600    .0065    .035        0    TRAP       37      2.5

328          KK     AC3
329          RK    1600    .0065    .030        0    TRAP       52      1.5

330          KK     AC4
331          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK    1650    .0053    .030        0    TRAP       70      1.5
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

333          KK NCHANNL
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```
          334          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          335          HC        2

          336          KK      AC5
          337          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
          338          RK      450    .0053     .030        0     TRAP       70      1.5

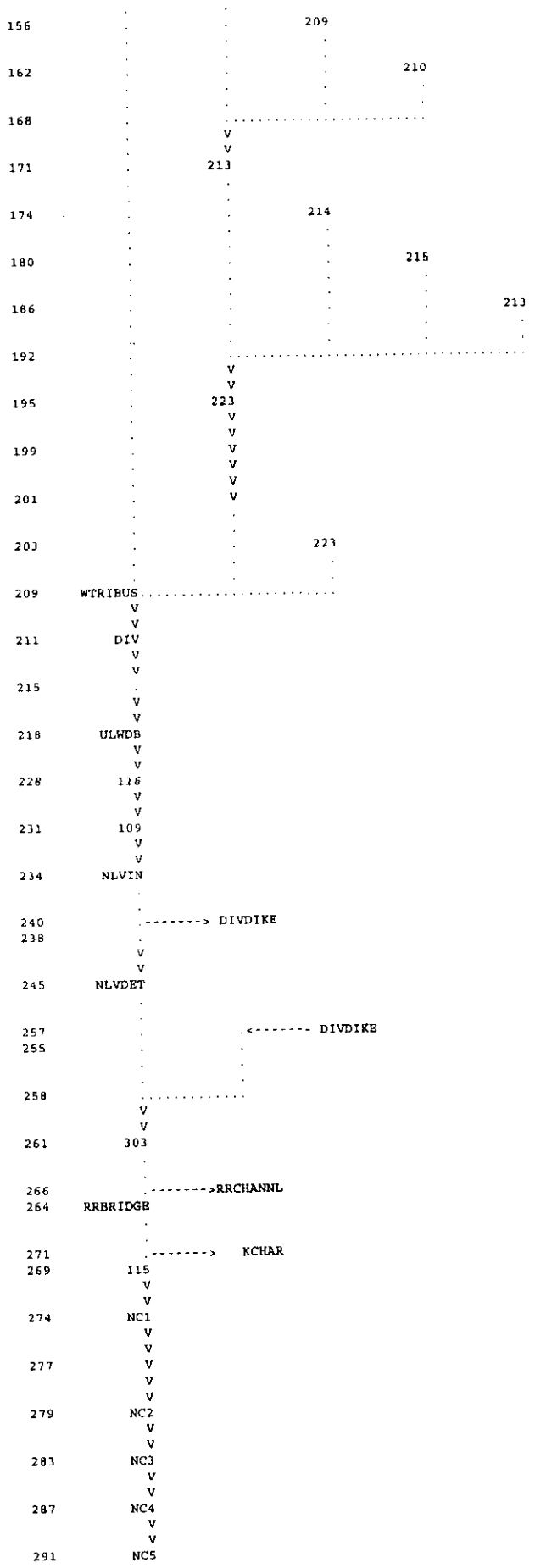
          339          KK      AC6
          340          RK     1300    .0047     .030        0     TRAP       78      1.5

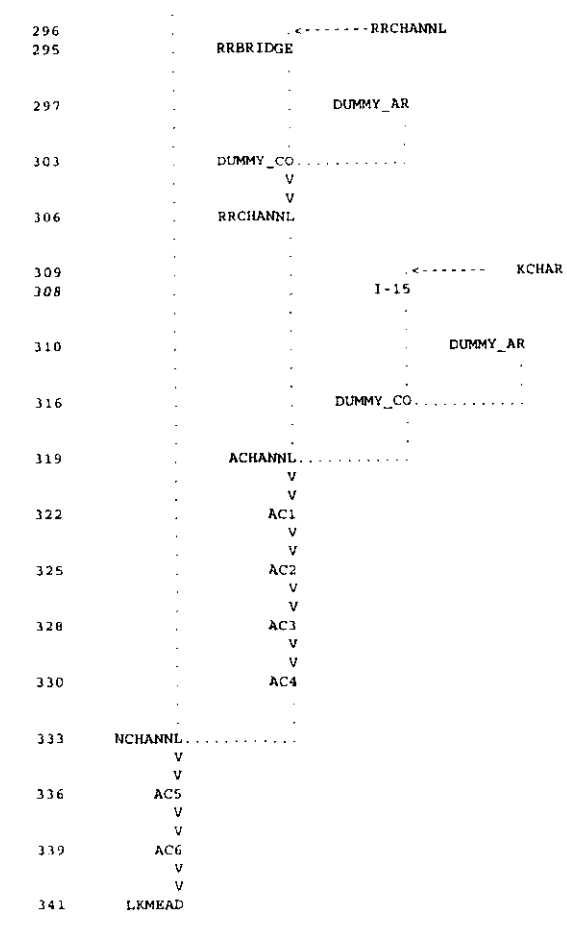
          341          KK   LKMEAD
          342          KM    ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
          343          KM    THRU "A" CHANNEL
          344          RK     4500     .004     .030        0     TRAP       96      1.5
          345          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          201
                 V
                 V
    54          208
                  .
                  .
    57            .          207
                  .            V
                  .            V
    63            .          208
                  .            .
                  .            .
    66            .            .          208
                  .            .            .
                  .            .            .
    72            ..........................
                 V
                 V
    75          218
                  .
                  .
    78            .          205
                  .            .
                  .            .
    84            .            .          206
                  .            .            .
                  .            .            .
    90            .            .            .          211
                  .            .            .           .
                  .            .            .           .
    96            .            ..........................
                  .          V
                  .          V
    99            .        217
                  .          .
                  .          .
   102            ............
                 V
                 V
   105         221
                 V
                 V
   108         222
                  .
                  .
   111            .         212
                  .           V
                  .           V
   117            .         224
                  .           V
                  .           V
   120            .         222
                  .           .
                  .           .
   123            ............
                 V
                 V
   126         223
                  .
                  .
   129            .         202
                  .           V
                  .           V
   135            .         203
                  .           .
                  .           .
   138            .           .          203
                  .           .            .
                  .           .            .
   144            .           .            .          204
                  .           .            .           .
                  .           .            .           .
   150            .           ..........................
                  .         V
                  .         V
   153            .       209
                  .         .
```


156
209
162
210
168
171
213
174
214
180
215
186
213
192
195
223
199
201
203
223
209
WTRIBUS
211
DIV
215
218
ULWDB
228
116
231
109
234
NLVIN
240
DIVDIKE
238
245
NLVDET
257
DIVDIKE
255
258
261
303
266
RRCHANNL
264
RRBRIDGE
271
KCHAR
269
I15
274
NC1
277
279
NC2
283
NC3
287
NC4
291
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:40   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 *models* prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 100-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper *Las Vegas Wash* Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
  37 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                        NMIN          6  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1   0  ENDING DATE
                      NDTIME       1954  ENDING TIME
                       ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL     0.10 HOURS
                         TOTAL TIME BASE    19.90 HOURS

           ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT

      JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                     0.90

          *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


          *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


          *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


          *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

               PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                        TIME TO PEAK IN HOURS

                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA    PLAN                 RATIO 1
                                                              0.90

 HYDROGRAPH AT
+                  201        5.54     1    FLOW            2080.
                                             TIME             3.60

 ROUTED TO
+                  208        5.54     1    FLOW            1537.
                                             TIME             4.10

 HYDROGRAPH AT
+                  207        1.22     1    FLOW             182.
                                             TIME             3.80

 ROUTED TO
+                  208        1.22     1    FLOW             171.
                                             TIME             4.00

 HYDROGRAPH AT
+                  208        8.78     1    FLOW             868.
                                             TIME             5.30

   3 COMBINED AT
+                    .       15.54     1    FLOW            2405.
                                             TIME             4.20

 ROUTED TO
+                  218       15.54     1    FLOW            2219.
                                             TIME             4.60

 HYDROGRAPH AT
+                  205        9.59     1    FLOW            1747.
                                             TIME             4.30

 HYDROGRAPH AT
+                  206        6.64     1    FLOW             348.
                                             TIME             5.40

 HYDROGRAPH AT
```

+	211	3.69	1	FLOW	887.
				TIME	4.00
3 COMBINED AT					
+	.	19.91	1	FLOW	2688.
				TIME	4.20
ROUTED TO					
+	217	19.91	1	FLOW	2576.
				TIME	4.60
2 COMBINED AT					
+	.	35.46	1	FLOW	4796.
				TIME	4.60
ROUTED TO					
+	221	35.46	1	FLOW	4543.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	4360.
				TIME	5.70
HYDROGRAPH AT					
+	212	5.64	1	FLOW	1780.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	1702.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	1476.
				TIME	4.60
2 COMBINED AT					
+	.	41.10	1	FLOW	5368.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	4970.
				TIME	7.70
HYDROGRAPH AT					
+	202	5.52	1	FLOW	2259.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	1887.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	2450.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	1074.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	5034.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	4339.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	340.
				TIME	5.10
HYDROGRAPH AT					
+	210	9.42	1	FLOW	1879.
				TIME	4.00
3 COMBINED AT					
+	.	26.47	1	FLOW	6540.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	5797.
				TIME	4.60
HYDROGRAPH AT					
+	214	7.17	1	FLOW	1318.
				TIME	4.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	1645.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	1804.
				TIME	5.40
4 COMBINED AT					
+	.	59.88	1	FLOW	9985.
				TIME	4.60

```
 ROUTED TO
+                    223      59.88     1   FLOW        9732.
                                            TIME         4.90

 ROUTED TO
+                      V      59.88     1   FLOW        9341.
                                            TIME         5.60

 ROUTED TO
+                      V      59.88     1   FLOW        8681.
                                            TIME         7.60

 HYDROGRAPH AT
+                    223      35.36     1   FLOW        1093.
                                            TIME         7.60

   3 COMBINED AT
+                 WTRIBUS     136.34     1   FLOW       14737.
                                            TIME         7.60

 ROUTED TO
+                    DIV      136.34     1   FLOW       14736.
                                            TIME         7.70

 ROUTED TO
+                      .      136.34     1   FLOW       14720.
                                            TIME         7.80

 ROUTED TO
+                  ULWDB      136.34     1   FLOW        5019.
                                            TIME         9.70

                                          ** PEAK STAGES IN FEET **
                                          1   STAGE    2372.40
                                              TIME         9.70

 ROUTED TO
+                    116      136.34     1   FLOW        4928.
                                            TIME        10.30

 ROUTED TO
+                    109      136.34     1   FLOW        4866.
                                            TIME        10.70

 ROUTED TO
+                  NLVIN      136.34     1   FLOW        4796.
                                            TIME        11.20

 DIVERSION TO
+                 DIVDIKE     136.34     1   FLOW           0.
                                            TIME         0.10

 HYDROGRAPH AT
+                      .      136.34     1   FLOW        4796.
                                            TIME        11.20

 ROUTED TO
+                 NLVDET      136.34     1   FLOW        2839.
                                            TIME        17.80

                                          ** PEAK STAGES IN FEET **
                                          1   STAGE      27.42
                                              TIME        17.80

 HYDROGRAPH AT
+                      .        0.00     1   FLOW           0.
                                            TIME         0.10

   2 COMBINED AT
+                      .      136.34     1   FLOW        2839.
                                            TIME        17.80

 ROUTED TO
+                    303      136.34     1   FLOW        2833.
                                            TIME        19.10

 DIVERSION TO
+                RRCHANNL     136.34     1   FLOW           0.
                                            TIME         0.10

 HYDROGRAPH AT
+                RRBRIDGE     136.34     1   FLOW        2833.
                                            TIME        19.10

 DIVERSION TO
+                    KCHAR    136.34     1   FLOW        2266.
                                            TIME        19.10

 HYDROGRAPH AT
+                     I15     136.34     1   FLOW         567.
                                            TIME        19.10

 ROUTED TO
+                     NC1     136.34     1   FLOW         567.
                                            TIME        19.10

 ROUTED TO
+                      V      136.34     1   FLOW         566.
                                            TIME        19.10
```

ROUTED TO	NC2	136.34	1	FLOW	566.
+				TIME	19.20
ROUTED TO	NC3	136.34	1	FLOW	566.
+				TIME	19.20
ROUTED TO	NC4	136.34	1	FLOW	566.
+				TIME	19.20
ROUTED TO	NC5	136.34	1	FLOW	566.
+				TIME	19.30
HYDROGRAPH AT	RRBRIDGE	0.00	1	FLOW	0.
+				TIME	0.10
HYDROGRAPH AT	DUMMY_AR	0.00	1	FLOW	0.
+				TIME	4.50
2 COMBINED AT	DUMMY_CO	0.00	1	FLOW	0.
+				TIME	4.50
ROUTED TO	RRCHANNL	0.00	1	FLOW	0.
+				TIME	8.20
HYDROGRAPH AT	I-15	0.00	1	FLOW	2266.
+				TIME	19.10
HYDROGRAPH AT	DUMMY_AR	0.00	1	FLOW	0.
+				TIME	4.50
2 COMBINED AT	DUMMY_CO	0.00	1	FLOW	2266.
+				TIME	19.10
2 COMBINED AT	ACHANNL	0.00	1	FLOW	2266.
+				TIME	19.10
ROUTED TO	AC1	0.00	1	FLOW	2266.
+				TIME	19.10
ROUTED TO	AC2	0.00	1	FLOW	2266.
+				TIME	19.10
ROUTED TO	AC3	0.00	1	FLOW	2266.
+				TIME	19.10
ROUTED TO	AC4	0.00	1	FLOW	2279.
+				TIME	19.90
2 COMBINED AT	NCHANNL	136.34	1	FLOW	2832.
+				TIME	19.20
ROUTED TO	AC5	136.34	1	FLOW	2832.
+				TIME	19.20
ROUTED TO	AC6	136.34	1	FLOW	2832.
+				TIME	19.20
ROUTED TO	LKMEAD	136.34	1	FLOW	2832.
+				TIME	19.30

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 0.90									
DIV	MANE	2.99	14736.23	461.92	0.48	6.00	14735.65	462.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3514E+04 EXCESS=0.0000E+00 OUTFLOW=0.3514E+04 BASIN STORAGE=0.2276E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90									
	MANE	2.07	14734.29	466.27	0.48	6.00	14720.41	468.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3515E+04 EXCESS=0.0000E+00 OUTFLOW=0.3513E+04 BASIN STORAGE=0.2134E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC1	MANE	0.29	566.51	1146.38	0.05	6.00	566.50	1146.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3511E+03 EXCESS=0.0000E+00 OUTFLOW=0.3506E+03 BASIN STORAGE=0.4630E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

V	MANE	1.23	566.49	1148.49	0.05	6.00	566.45	1146.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3483E+03 EXCESS=0.0000E+00 OUTFLOW=0.3473E+03 BASIN STORAGE=0.1225E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC2	MANE	0.76	566.45	1147.51	0.05	6.00	566.40	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3468E+03 EXCESS=0.0000E+00 OUTFLOW=0.3457E+03 BASIN STORAGE=0.9998E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC3	MANE	2.27	566.40	1154.27	0.05	6.00	566.40	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3455E+03 EXCESS=0.0000E+00 OUTFLOW=0.3422E+03 BASIN STORAGE=0.3699E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

NC4	MANE	0.64	566.39	1153.09	0.05	6.00	566.35	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3413E+03 EXCESS=0.0000E+00 OUTFLOW=0.3401E+03 BASIN STORAGE=0.1218E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC5	MANE	0.43	566.35	1152.96	0.05	6.00	566.33	1150.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3400E+03 EXCESS=0.0000E+00 OUTFLOW=0.3395E+03 BASIN STORAGE=0.6101E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

RRCHANNL	MANE	6.00	0.11	493.12	0.64	6.00	0.11	492.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

FOR PLAN = 1 RATIO= 0.90

AC1	MANE	0.30	2266.03	1146.43	13157.84	6.00	2266.01	1146.00	13148.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1405E+04 EXCESS=0.0000E+00 OUTFLOW=0.1403E+04 BASIN STORAGE=0.1749E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC2	MANE	0.75	2265.98	1147.41	13101.38	6.00	2265.89	1146.00	13090.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1403E+04 EXCESS=0.0000E+00 OUTFLOW=0.1397E+04 BASIN STORAGE=0.5880E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

AC3	MANE	0.68	2284.16	1194.46	13048.25	6.00	2265.73	1146.00	13035.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1396E+04 EXCESS=0.0000E+00 OUTFLOW=0.1392E+04 BASIN STORAGE=0.5555E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

AC4	MANE	0.86	2296.82	1194.31	12978.20	6.00	2279.18	1194.00	12970.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1390E+04 EXCESS=0.0000E+00 OUTFLOW=0.1384E+04 BASIN STORAGE=0.6485E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC5	MANE	0.25	2838.09	1194.12	0.24	6.00	2831.86	1152.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1723E+04 EXCESS=0.0000E+00 OUTFLOW=0.1721E+04 BASIN STORAGE=0.1846E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC6	MANE	0.58	2854.92	1194.42	0.24	6.00	2831.76	1152.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1721E+04 EXCESS=0.0000E+00 OUTFLOW=0.1715E+04 BASIN STORAGE=0.6804E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

LKMEAD	MANE	2.28	2861.88	1195.82	0.23	6.00	2831.53	1158.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1714E+04 EXCESS=0.0000E+00 OUTFLOW=0.1693E+04 BASIN STORAGE=0.2625E+02 PERCENT ERROR= -0.3

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:26:00   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748               *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID          FEMA FLOOD INSURANCE STUDY, 1996
              2     ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID          SPRING MOUNTAIN 500-YEAR STORM
              4     ID
              5     ID          Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID          Study Hydrology Report dated 9/91.  Three modifications were made
              8     ID          to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID          and outflow characteristics were revised to reflect the as-built
             10     ID          configuration described by construction drawings dated 5/91 and HEC-1
             11     ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID          relationship for the North Las Vegas Detention Basin was revised
             13     ID          to reflect the current three-pipe outlet condition (two of the five
             14     ID          pipes were blocked following construction of the upper basin) and the
             15     ID          hydraulic control created by the 4-foot high barrier wall located
             16     ID          upstream from the pipe inlets.  Third, the source 100-year model
             17     ID          was converted to reflect 500-year conditions by replacing all PB
             18     ID          cards with 500-year amounts.  500-year rainfall amounts were
             19     ID          determined for each subbasin by frequency extrapolation of the
             20     ID          amounts presented by JMM in the 10-, 50-, and 100-year Spring
             21     ID          Mountain Storm models.
             22     ID
             23     ID
             24     ID          Remaining comments are from the original model dated 1/91.
             25     ID
             26     ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             27     ID          NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
             28     ID          SPRING MOUNTAIN 500-YEAR STORM (100-year model with 500-year rain)
             29     ID
             30     ID          Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
             31     ID          CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
             32     ID          The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
             33     ID          portion within the Gowan Area (which is not tributary to the Upper
             34     ID          Las Vegas Wash Detention Basin diversion)
             35     ID          Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
             36     ID          All routing steps immediately d/s of a diversion converted to
             37     ID          Muskingum routing to avoid zero flow, 8/90
             38     ID
             39     ID          This run models the diversion from the West Tributary to the proposed
             40     ID          Upper Las Vegas Wash Detention Basin, 1/91
             41     ID
*** FREE ***
             42     IT       6        0        0     200
             43     IO       5        0        0
             44     IN       5        0        0
             45     JR     PRRC   0.903
                    * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                    * LAS VEGAS WASH DETENTION BASIN
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1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             46     KK     201
             47     KM   RUNOFF FROM SUBBASIN 201
             48     BA   5.543
             49     PB    3.18
             50     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             51     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             52     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
```

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 53          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
 54          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
 55          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
 56          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
 57          PC    .997    .999   1.00
 58          LS      0      80
 59          UD    .208

 60          KK     208
 61          KM    ROUTE SUBBASIN 201 THRU SUBBASIN 208
 62          RM       5    0.53    0.15

 63          KK     207
 64          KM    RUNOFF FROM SUBBASIN 207
 65          BA    1.223
 66          PB     3.14
 67          LS        0      72
 68          UD     .358

 69          KK     208
 70          KM    ROUTE SUBBASIN 207 THRU SUBBASIN 208
 71          RM       2    0.20    0.15

 72          KK     208
 73          KM    RUNOFF FROM SUBBASIN 208
 74          BA    8.778
 75          PB     3.19
 76          LS        0      70
 77          UD     .833

 78          KK
 79          KM    COMBINE SUBBASINS 201, 207, & 208
 80          HC       3

 81          KK     218
 82          KM    ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
 83          RM       3    0.35    0.15

 84          KK     205
 85          KM    RUNOFF FROM SUBBASIN 205
 86          BA    9.587
 87          PB     3.29
 88          LS        0      78
 89          UD     .794

1                                    HEC-1 INPUT                                    PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 90          KK     206
 91          KM    RUNOFF FROM SUBBASIN 206
 92          BA    6.635
 93          PB     3.04
 94          LS        0      64
 95          UD     .754

 96          KK     211
 97          KM    RUNOFF FROM SUBBASIN 211
 98          BA    3.691
 99          PB     3.14
100          LS        0      80
101          UD     .527

102          KK
103          KM    COMBINE SUBBASINS 205, 206, & 211
104          HC       3

105          KK     217
106          KM    ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
107          RM       4    0.40    0.15

108          KK
109          KM    COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
110          HC       2

111          KK     221
112          KM    ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
113          RM       5    0.50    0.15

114          KK     222
115          KM    ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
116          RM       5    0.51    0.15

117          KK     212
118          KM    RUNOFF FROM SUBBASIN 212
119          BA    5.641
120          PB     3.14
121          LS        0      82
122          UD     .403

123          KK     224
124          KM    ROUTE SUBBASIN 212 THRU SUBBASIN 224
125          RM       2    0.17    0.15

126          KK     222
127          KM    ROUTE SUBBASIN 212 THRU SUBBASIN 222
128          RM       6    0.63    0.15

1                                    HEC-1 INPUT                                    PAGE  4
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  129     KK        .
  130     KM    COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
  131     HC        2

  132     KK      223
  133     KM    ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
  134     RM       18     1.84     0.15

  135     KK      202
  136     KM    RUNOFF FROM SUBBASIN 202
  137     BA    5.523
  138     PB     3.16
  139     LS        0       80
  140     UD     .134

  141     KK      203
  142     KM    ROUTE SUBBASIN 202 THRU SUBBASIN 203
  143     RM        3     0.27     0.15

  144     KK      203
  145     KM    RUNOFF FROM SUBBASIN 203
  146     BA    6.249
  147     PB     3.39
  148     LS        0       80
  149     UD     .248

  150     KK      204
  151     KM    RUNOFF FROM SUBBASIN 204
  152     BA    2.458
  153     PB     3.32
  154     LS        0       80
  155     UD     .205

  156     KK        .
  157     KM    COMBINE SUBBASINS 202, 203, & 204
  158     HC        3

  159     KK      209
  160     KM    ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
  161     RM        4     0.40     0.15

  162     KK      209
  163     KM    RUNOFF FROM SUBBASIN 209
  164     BA    2.824
  165     PB     3.39
  166     LS        0       69
  167     UD     .500

  168     KK      210
  169     KM    RUNOFF FROM SUBBASIN 210
  170     BA  9.4182
  171     PB     3.23
  172     LS        0       77
  173     UD     .585
```



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1
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  174     KK        .
  175     KM    COMBINE SUBBASINS 202, 203, 204, 209, & 210
  176     HC        3

  177     KK      213
  178     KM    ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
  179     RM        5     0.54     0.15

  180     KK      214
  181     KM    RUNOFF FROM SUBBASIN 214
  182     BA    7.167
  183     PB     3.10
  184     LS        0       80
  185     UD     .869

  186     KK      215
  187     KM    RUNOFF FROM SUBBASIN 215
  188     BA    9.983
  189     PB     3.00
  190     LS        0       78
  191     UD     .717

  192     KK      213
  193     KM    RUNOFF FROM SUBBASIN 213
  194     BA   16.253
  195     PB     2.99
  196     LS        0       77
  197     UD    1.196

  198     KK        .
  199     KM    COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
  200     HC        4

  201     KK      223
  202     KM    ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
  203     KM     214, & 215 THRU SUBBASIN 223
  204     RM        3     0.29     0.15
```

```
205          KK        V
206          RM        6     0.58     0.15

207          KK        V
208          RM       18     1.83     0.15

209          KK      223
210          KM    RUNOFF FROM SUBBASIN 223
211          BA   35.362
212          PB     2.21
213          LS         0       77
214          UD     3.44
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

215          KK WTRIBUS
216          HC        3

217 .        KK      DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY EL&V = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
218          KM    DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
219          KM    UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
220          RK     9200  0.0067    0.030        0     TRAP      300        3

221          KK        .
222          KM    ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
223          RK     5800  0.0083    0.030        0     TRAP      500        1

224          KK    ULWDB
225          KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
226          KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
227          RS        1     STOR       -1
228          SV        0       12       80      170      320      560     1000     1610     1800     1980
229          SV     2150     2330     2500     2690     2900     3100     3600     4950     6680
230          SE     2335     2340     2345     2350     2355     2360     2365     2370     2371     2372
231          SE     2373     2374     2375     2376     2377     2378     2380     2385     2390
232          SQ        0      600     1700     2300     2800     3300     3750     4100     4170     4240
233          SQ     6200     9960    15150    21140    28320    36220    54120   110190   180730

234          KK      116
235          KM    ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
236          RM        5     0.50     0.15

237          KK      109
238          KM    ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
239          RM        4     0.42     0.15

240          KK    NLVIN
241          KM    ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
242          KM    NORTH LAS VEGAS DETENTION BASIN
243          RM        5     0.54     0.15
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

244          KK        .
245          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
246          DT DIVDIKE
247          DI        0     2000     6000     8000     8200     8910    10225    11935    13565    15635
248          DI    17775    20135    23000
249          DQ        0        0        0        0        0      410     1225     2435     3565     5135
250          DQ     6775     8635    11000

251          KK  NLVDET
252          KM    ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
253          KM    OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
254          RS        1     STOR       -1
255          SV        0       25      100      190      430      665     1095     1285     1435     1540
256          SV     1650     1825     1920     2000     2110     2200     2310     2430
257          SE        0        2        4        6       10       14       21       24       26       27
258          SE       28       30       31       32       33       34       35       36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
259          SQ        0       77      117      597     1310     1660     2110     2260     2360     2690
260          SQ     3050     4630     5710     7090     8610    10140    11670    13200

261          KK        .
262          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
263          DR DIVDIKE

264          KK        .
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265          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
266          HC       2

267          KK     303
268          KM   ROUTE OUTFLOW THRU SUBBASIN 303
269          RM      13    1.28    0.15

270          KKRRBRIDGE
271          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
272          DTRRCHANNL
273          DI       0    6000   20000
274          DQ       0       0   13500

275          KK     I15
276          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
277          DT   KCHAR
278          DI       0    1000   10000
279          DQ       0     800    8000

280          KK     NC1
281          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
282          RK     700  0.0058   0.016       0    TRAP      10       2
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

283          KK       V
284          RK    2000  0.0100   0.035       0    TRAP      30       2

285          KK     NC2
286          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
287          KM   TO GOWAN AVE.
288          RK    1300   .0056    .030       0    TRAP      12       2

289          KK     NC3
290          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
291          KM   TO CHEYENNE AVE.
292          RK    2600   .0021    .030       0    TRAP      20     2.5

293          KK     NC4
294          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
295          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
296          RK    1300    .003    .016       0    TRAP      18       2

297          KK     NC5
298          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
299          KM   (LINED CHANNEL)
300          RK     500    .001    .016       0    TRAP      18       2

301          KKRRBRIDGE
302          DRRRCHANNL

303          KKDUMMY_AREA
304          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
305          BA   0.001
306          PB    2.00
307          LS       0      80
308          UD    1.00

309          KKDUMMY_COMBINE
310          KM   Combine dummy subarea with recalled RRCHANNEL diversion
311          HC       2

312          KKRRCHANNL
313          RK    4900   .0041     .03       0    TRAP      40       2

314          KK    I-15
315          DR   KCHAR

316          KKDUMMY_AREA
317          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
318          BA   0.001
319          PB    2.00
320          LS       0      80
321          UD    1.00
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

322          KKDUMMY_COMBINE
323          KM   Combine dummy subarea with recalled KCHAR diversion
324          HC       2

325          KK ACHANNL
326          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
327          HC       2

328          KK     AC1
329          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
330          RK     750   .0092    .035       0    TRAP      12     1.5

331          KK     AC2
332          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
333          RK    1600   .0065    .035       0    TRAP      37     2.5

334          KK     AC3
335          RK    1600   .0065    .030       0    TRAP      52     1.5
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336          KK     AC4
337          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
338          RK    1650    .0053     .030        0    TRAP       70      1.5

339          KK NCHANNL
340          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
341          HC       2

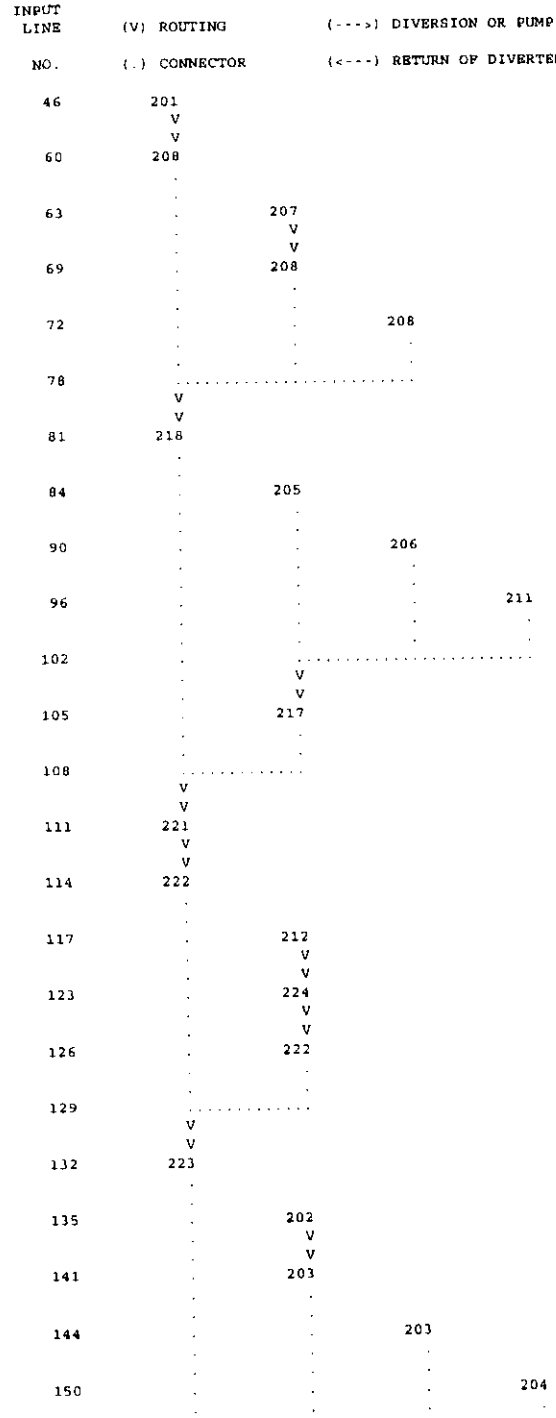
342          KK     AC5
343          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
344          RK     450    .0053     .030        0    TRAP       70      1.5

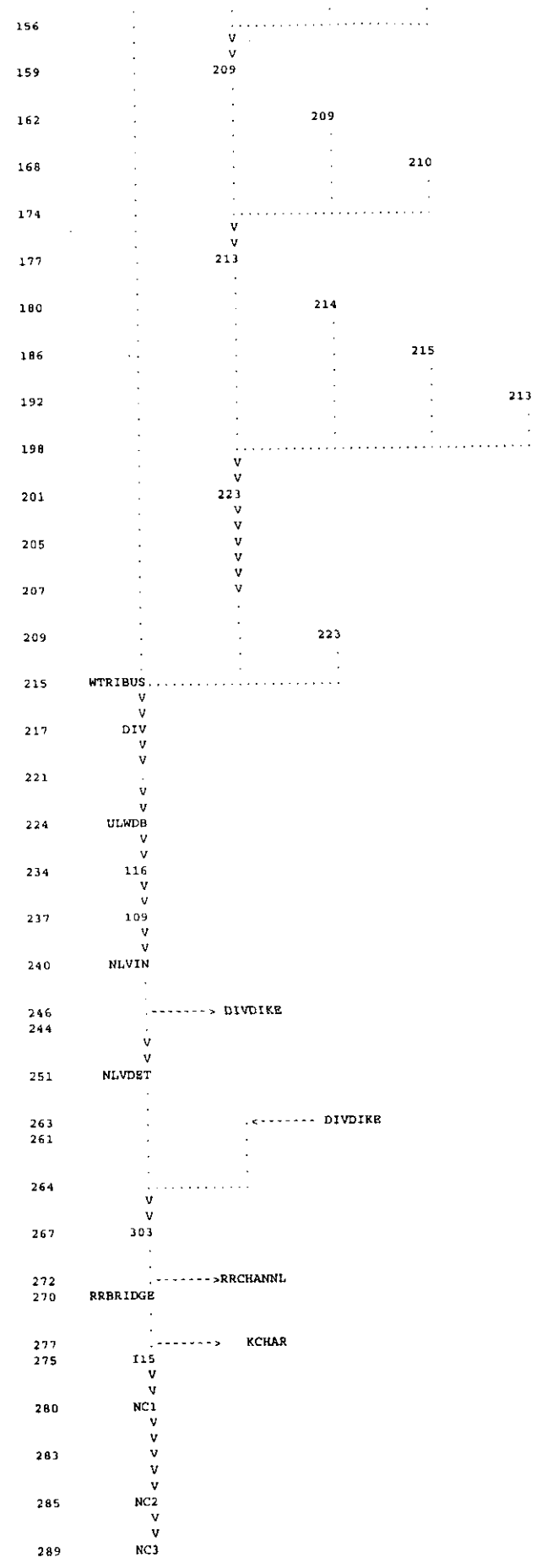
345          KK     AC6
346          RK    1300    .0047     .030        0    TRAP       78      1.5

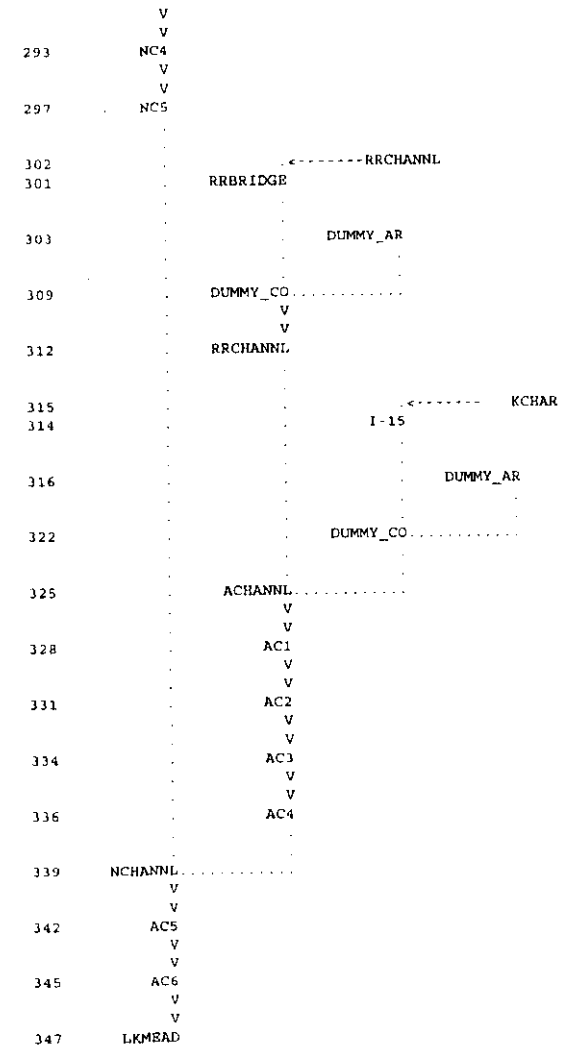
347          KK  LKMEAD
348          KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
349          KM   THRU "A" CHANNEL
350          RK    4500     .004     .030        0    TRAP       96      1.5
351          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK




156
159
209
162
209
168
210
174
177
213
180
214
186
215
192
213
198
201
223
205
207
209
223
215
WTRIBUS
217
DIV
221
224
ULWDB
234
116
237
109
240
NLVIN
246
DIVDIKE
244
251
NLVDET
263
DIVDIKR
261
264
267
303
272
RRCHANNL
270
RRBRIDGE
277
KCHAR
275
I15
280
NC1
283
285
NC2
289
NC3



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:26:00   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 500-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Three modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets. Third, the source 100-year model was converted to reflect 500-year conditions by replacing all PB cards with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency extrapolation of the amounts presented by JMM in the 10-, 50-, and 100-year Spring Mountain Storm models.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY

SPRING MOUNTAIN 500-YEAR STORM (100-year model with 500-year rain)

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
portion within the Gowan Area (which is not tributary to the Upper
Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to
Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed
Upper Las Vegas Wash Detention Basin, 1/91

43 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	6	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	200	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1 0	ENDING DATE
NDTIME	1954	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.10 HOURS
TOTAL TIME BASE 19.90 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
0.90

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 0.90
HYDROGRAPH AT					
+	201	5.54	1	FLOW	3457.
				TIME	3.60
ROUTED TO					
+	208	5.54	1	FLOW	2583.
				TIME	4.10
HYDROGRAPH AT					
+	207	1.22	1	FLOW	360.
				TIME	3.80
ROUTED TO					
+	208	1.22	1	FLOW	338.
				TIME	4.00
HYDROGRAPH AT					
+	208	8.78	1	FLOW	1508.
				TIME	4.40
3 COMBINED AT					
+	.	15.54	1	FLOW	4291.
				TIME	4.20
ROUTED TO					
+	218	15.54	1	FLOW	3992.
				TIME	4.50
HYDROGRAPH AT					
+	205	9.59	1	FLOW	2997.
				TIME	4.20
HYDROGRAPH AT					
+	206	6.64	1	FLOW	719.
				TIME	5.30
HYDROGRAPH AT					
+	211	3.69	1	FLOW	1461.
				TIME	3.90
3 COMBINED AT					

+	.	19.91	1	FLOW	4823.
				TIME	4.20
ROUTED TO					
+	217	19.91	1	FLOW	4625.
				TIME	4.60
2 COMBINED AT					
+	.	35.46	1	FLOW	8580.
				TIME	4.50
ROUTED TO					
+	221	35.46	1	FLOW	8139.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	7782.
				TIME	5.60
HYDROGRAPH AT					
+	212	5.64	1	FLOW	2819.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	2689.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	2344.
				TIME	4.60
2 COMBINED AT					
+	.	41.10	1	FLOW	9237.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	8500.
				TIME	7.60
HYDROGRAPH AT					
+	202	5.52	1	FLOW	3705.
				TIME	3.50
ROUTED TO					
+	203	5.52	1	FLOW	3102.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	3977.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	1666.
				TIME	3.60
3 COMBINRD AT					
+	.	14.23	1	FLOW	8128.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	7028.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	692.
				TIME	4.00
HYDROGRAPH AT					
+	210	9.42	1	FLOW	3184.
				TIME	4.00
3 COMBINED AT					
+	.	26.47	1	FLOW	10826.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	9676.
				TIME	4.60
HYDROGRAPH AT					
+	214	7.17	1	FLOW	2120.
				TIME	4.30
HYDROGRAPH AT					
+	215	9.98	1	FLOW	2761.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	3198.
				TIME	5.00
4 COMBINED AT					
+	.	59.88	1	FLOW	16873.
				TIME	4.60
ROUTED TO					
+	223	59.88	1	FLOW	16441.
				TIME	4.90

ROUTED TO					
+	V	59.88	1	FLOW	15762.
				TIME	5.50
ROUTED TO					
+	V	59.88	1	FLOW	14442.
				TIME	7.50
HYDROGRAPH AT					
+	223	35.36	1	FLOW	2022.
				TIME	7.50
3 COMBINED AT					
+	WTRIBUS	136.34	1	FLOW	24938.
				TIME	7.50
ROUTED TO					
+	DIV	136.34	1	FLOW	24922.
				TIME	7.60
ROUTED TO					
+	.	136.34	1	FLOW	24874.
				TIME	7.60
ROUTED TO					
+	ULWDB	136.34	1	FLOW	19217.
				TIME	8.70
			** PEAK STAGES IN FEET **		
			1	STAGE	2375.68
				TIME	8.70
ROUTED TO					
+	116	136.34	1	FLOW	18767.
				TIME	9.20
ROUTED TO					
+	109	136.34	1	FLOW	18346.
				TIME	9.60
ROUTED TO					
+	NLVIN	136.34	1	FLOW	17855.
				TIME	10.20
DIVERSION TO					
+	DIVDIKE	136.34	1	FLOW	6838.
				TIME	10.20
HYDROGRAPH AT					
+	.	136.34	1	FLOW	11017.
				TIME	10.20
ROUTED TO					
+	NLVDET	136.34	1	FLOW	6322.
				TIME	12.00
			** PEAK STAGES IN FEET **		
			1	STAGE	31.44
				TIME	12.00
HYDROGRAPH AT					
+	.	0.00	1	FLOW	6838.
				TIME	10.20
2 COMBINED AT					
+	.	136.34	1	FLOW	8988.
				TIME	10.20
ROUTED TO					
+	303	136.34	1	FLOW	8319.
				TIME	11.60
DIVERSION TO					
+	RRCHANNL	136.34	1	FLOW	2236.
				TIME	11.60
HYDROGRAPH AT					
+	RRBRIDGE	136.34	1	FLOW	6083.
				TIME	11.60
DIVERSION TO					
+	KCHAR	136.34	1	FLOW	4866.
				TIME	11.60
HYDROGRAPH AT					
+	I15	136.34	1	FLOW	1217.
				TIME	11.60
ROUTED TO					
+	NC1	136.34	1	FLOW	1217.
				TIME	11.60
ROUTED TO					
+	V	136.34	1	FLOW	1216.
				TIME	11.60
ROUTED TO					
+	NC2	136.34	1	FLOW	1216.
				TIME	11.60

ROUTED TO
+ NC3 136.34 1 FLOW 1216.
TIME 11.70

ROUTED TO
+ NC4 136.34 1 FLOW 1216.
TIME 11.70

ROUTED TO
+ NC5 136.34 1 FLOW 1216.
TIME 11.70

HYDROGRAPH AT
+ RRBRIDGE 0.00 1 FLOW 2236.
TIME 11.60

HYDROGRAPH AT
+ DUMMY_AR 0.00 1 FLOW 0.
TIME 4.50

2 COMBINED AT
+ DUMMY_CO 0.00 1 FLOW 2236.
TIME 11.60

ROUTED TO
+ RRCHANNL 0.00 1 FLOW 2215.
TIME 11.70

HYDROGRAPH AT
+ I-15 0.00 1 FLOW 4866.
TIME 11.60

HYDROGRAPH AT
+ DUMMY_AR 0.00 1 FLOW 0.
TIME 4.50

2 COMBINED AT
+ DUMMY_CO 0.00 1 FLOW 4866.
TIME 11.60

2 COMBINED AT
+ ACHANNL 0.00 1 FLOW 7079.
TIME 11.70

ROUTED TO
+ AC1 0.00 1 FLOW 7079.
TIME 11.70

ROUTED TO
+ AC2 0.00 1 FLOW 7077.
TIME 11.70

ROUTED TO
+ AC3 0.00 1 FLOW 7073.
TIME 11.70

ROUTED TO
+ AC4 0.00 1 FLOW 7065.
TIME 11.70

2 COMBINED AT
+ NCHANNL 136.34 1 FLOW 8281.
TIME 11.70

ROUTED TO
+ AC5 136.34 1 FLOW 8279.
TIME 11.70

ROUTED TO
+ AC6 136.34 1 FLOW 8269.
TIME 11.70

ROUTED TO
+ LKMEAD 136.34 1 FLOW 8254.
TIME 11.80

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 0.90									
DIV	MANE	2.55	24933.92	455.12	0.83	6.00	24922.11	456.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6039E+04 EXCESS=0.0000E+00 OUTFLOW=0.6038E+04 BASIN STORAGE=0.2946E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90									
	MANE	1.79	24906.38	460.11	0.83	6.00	24874.20	456.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6038E+04 EXCESS=0.0000E+00 OUTFLOW=0.6036E+04 BASIN STORAGE=0.2820E+01 PERCENT ERROR= 0.0

```
          FOR PLAN = 1  RATIO= 0.90
               NC1  MANE          0.26   1216.55    696.21       0.11       6.00   1216.54    696.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7662E+03 EXCESS=0.0000E+00 OUTFLOW=0.7658E+03 BASIN STORAGE=0.5428E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
                 V  MANE          0.86   1216.53    697.46       0.10       6.00   1216.45    696.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7656E+03 EXCESS=0.0000E+00 OUTFLOW=0.7631E+03 BASIN STORAGE=0.2697E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          0.63   1216.42    697.64       0.10       6.00   1216.33    696.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7627E+03 EXCESS=0.0000E+00 OUTFLOW=0.7610E+03 BASIN STORAGE=0.1630E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          1.67   1216.32    699.77       0.10       6.00   1216.29    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7609E+03 EXCESS=0.0000E+00 OUTFLOW=0.7564E+03 BASIN STORAGE=0.5047E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.60   1216.27    703.11       0.10       6.00   1216.23    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7553E+03 EXCESS=0.0000E+00 OUTFLOW=0.7540E+03 BASIN STORAGE=0.1446E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.35   1216.21    702.57       0.10       6.00   1216.18    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7538E+03 EXCESS=0.0000E+00 OUTFLOW=0.7532E+03 BASIN STORAGE=0.7795E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
           RRCHANNL  MANE          2.18   2229.79    699.53    3612.29       6.00   2215.00    702.00      3610.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1923E+03 EXCESS=0.0000E+00 OUTFLOW=0.1926E+03 BASIN STORAGE=0.1225E-01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.19   7078.95    702.18   30521.22       6.00   7078.89    702.00     30515.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3257E+04 EXCESS=0.0000E+00 OUTFLOW=0.3255E+04 BASIN STORAGE=0.2161E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.58   7077.55    702.41   30465.52       6.00   7077.00    702.00     30451.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3255E+04 EXCESS=0.0000E+00 OUTFLOW=0.3249E+04 BASIN STORAGE=0.6536E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.46   7075.17    702.75   30395.28       6.00   7072.84    702.00     30392.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3248E+04 EXCESS=0.0000E+00 OUTFLOW=0.3242E+04 BASIN STORAGE=0.6163E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          0.61   7069.70    703.21   30327.71       6.00   7065.24    702.00     30320.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3242E+04 EXCESS=0.0000E+00 OUTFLOW=0.3235E+04 BASIN STORAGE=0.7417E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.18   8280.37    702.25       0.55       6.00   8278.60    702.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3987E+04 EXCESS=0.0000E+00 OUTFLOW=0.3985E+04 BASIN STORAGE=0.2394E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.50   8276.12    703.08       0.55       6.00   8269.02    702.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3985E+04 EXCESS=0.0000E+00 OUTFLOW=0.3977E+04 BASIN STORAGE=0.7275E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
             LKMEAD  MANE          1.53   8267.90    705.06       0.54       6.00   8254.46    708.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3977E+04 EXCESS=0.0000E+00 OUTFLOW=0.3955E+04 BASIN STORAGE=0.2833E+02 PERCENT ERROR=  -0.1
```

*** NORMAL END OF HEC-1 ***

Paper Copy B
LC Lower Central Valley Storm

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY  1991             *
*             VERSION 4.0.1 (LOCAL)     *
*                                       *
*  RUN DATE  05/13/96  TIME  10:51:21   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX  XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
      LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                *DIAGRAM
        1       ID          FEMA FLOOD INSURANCE STUDY, 1996
        2       ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
        3       ID          LOWER CENTRAL VALLEY 10-YEAR STORM
        4       ID
        5       ID          Current (05/96) model based on a HEC-1 model prepared by James M
        6       ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
        7       ID          Study Hydrology Report dated 9/91.  Two modifications were made
        8       ID          to the source model.  First, Upper Las Vegas Detention Basin storage
        9       ID          and outflow characteristics were revised to reflect the as-built
       10       ID          configuration described by construction drawings dated 5/91 and HEC-1
       11       ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
       12       ID          relationship for the North Las Vegas Detention Basin was revised
       13       ID          to reflect the current three-pipe outlet condition (two of the five
       14       ID          pipes were blocked following construction of the upper basin) and the
       15       ID          hydraulic control created by the 4-foot high barrier wall located
       16       ID          upstream from the pipe inlets.
       17       ID
       18       ID          Remaining comments are from the original model dated 1/91.
       19       ID
       20       ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
       21       ID          Northern Las Vegas Wash - FIS FLOWS
       22       ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
       23       ID
       24       ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
       25       ID          Lower Central Valley 10-Year Storm, Existing Conditions
       26       ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
       27       ID          (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
       28       ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
       29       ID
       30       ID          All routing steps immediately d/s of a diversion converted to
       31       ID          Muskingum routing to avoid zero flow, 8/90
       32       ID
       33       ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
       34       ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
       35       ID          Channel and Hualapai Diversion included, 8/90
       36       ID
       37       ID          This data file models DARF's at certain locations where FIS flows are
       38       ID          required.  The original B&V data file used a factor of 0.62; ratios
       39       ID          of this factor are used in the JR card to model DA's at the points
       40       ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
       41       ID
       42       ID           PT OF                  AREA          DARF       DARF/0.62      RATIO
       43       ID          INTEREST               (SQ MI)
       44       ID
       45       ID     RRBRIDGE, NC5, & 30s     60.7 - 64.5       0.66         1.06          1
       46       ID          ACHANNL               111.6            0.59         0.95          2
       47       ID          NCHANNL               172.2            0.53         0.85          3
       48       ID
  *** FREE ***
       49       IT      6       0       0     200
       50       IO      5       0       0
       51       IN      5       0       0
       52       JR   PREC    1.06    0.95    0.85
```

1 HEC-1 INPUT PAGE 2

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      LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

       53       KK    112
       54       KM   RUNOFF FROM SUBBASIN 112
```

```
BA   5.333
PB    1.21
PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
PC    .997    .999   1.00
LS       0      82
UD    .462

KK     119
KM   RUNOFF FROM SUBBASIN 119
BA   2.739
PB    1.14
LS       0      82
UD    .346

KK
KM   COMBINE SUBBASINS 112 & 119
HC       2

KK     120
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
RM       3    0.27    0.15

KK  125UDB
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
RM       5    0.53    0.15

KK     117
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
RM       4    0.43    0.15

KK     118
KM   RUNOFF FROM SUBBASIN 118
BA   5.079
PB    1.06
LS       0      84
UD    .233

KK     117
KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
RM       1    0.13    0.15
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1 HEC-1 INPUT PAGE 3

```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK       V
RM       3    0.25    0.15

KK       V
RM       4    0.37    0.15

KK     117
KM   RUNOFF FROM SUBBASIN 117
BA   7.366
PB    0.98
LS       0      78
UD   1.699

KK
KM   COMBINE SUBBASINS 112, 117, 118, & 119
HC       3

KK   ULWDB
*  *** lines from 1/91 model removed 5/96
* KM      UPPER LAS VEGAS WASH DETENTION BASIN
* KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
* RS 1 STOR -1
* SV 0 40 75 110 250 500 920 1550 1700 1860
* SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
* SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
* SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
* SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
* SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
RS       1    STOR      -1
SV       0      12      80     170     320     560    1000    1610    1800    1980
SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

KK     116
KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
RM       5    0.50    0.15

KK     111
KM   RUNOFF FROM SUBBASIN 111
BA    4.08
PB    1.06
LS       0      84
UD    .239
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  126         KK    116
  127         KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
  128         RM       1    0.10    0.15

  129         KK       V
  130         RM       2    0.21    0.15

  131         KK    116
  132         KM   RUNOFF FROM SUBBASIN 116
  133         BA   5.189
  134         PB    0.98
  135         LS       0      78
  136         UD   1.418

  137         KK       .
  138         KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
  139         HC       3

  140         KK    109
  141         KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
  142         RM       4    0.42    0.15

  143         KK    110
  144         KM   RUNOFF FROM SUBBASIN 110
  145         BA   2.945
  146         PB    1.06
  147         LS       0      86
  148         UD    .237

  149         KK    109
  150         KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
  151         RM       1    0.09    0.15

  152         KK       V
  153         RM       2    0.19    0.15

  154         KK    109
  155         KM   RUNOFF FROM SUBBASIN 109
  156         BA   4.183
  157         PB    0.98
  158         LS       0      78
  159         UD   1.281

  160         KK       .
  161         KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  162         HC       3

  163         KK    101
  164         KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  165         KM   THRU SUBBASIN 101
  166         RM       5    0.54    0.15
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  167         KK    103
  168         KM   RUNOFF FROM SUBBASIN 103
  169         BA   6.195
  170         PB    1.21
  171         LS       0      84
  172         UD    .324

  173         KK    102
  174         KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
  175         RM       1    0.11    0.15

  176         KK    102
  177         KM   RUNOFF FROM SUBBASIN 102
  178         BA   8.455
  179         PB    1.06
  180         LS       0      83
  181         UD    .369

  182         KK       .
  183         KM   COMBINE SUBBASINS 102 & 103
  184         HC       2

  185         KK    101
  186         KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
  187         RM       1    0.11    0.15

  188         KK       V
  189         RM       2    0.22    0.15

  190         KK    101
  191         KM   RUNOFF FROM SUBBASIN 101
  192         BA   9.082
  193         PB    0.98
  194         LS       0      77
  195         UD   1.505

  196         KK   NLVIN
  197         KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
```

```
198          HC       3

199          KK
200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
201          DT DIVDIKE
202          DI        0     2000     6000     8000     8200     8910    10225    11935    13565    15635
203          DI    17775    20135    23000
204          DQ        0        0        0        0        0      410     1225     2435     3565     5135
205          DQ     6775     8635    11000

206          KK  NLVDET
207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
210          RS        1     STOR       -1
211          SV        0       25      100      190      430      665     1095     1285     1435     1540
```

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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

212          SV     1650     1825     1920     2000     2110     2200     2310     2430
213          SE        0        2        4        6       10       14       21       24       26       27
214          SE       28       30       31       32       33       34       35       36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
215          SQ        0       77      117      597     1310     1660     2110     2260     2360     2690
216          SQ     3050     4630     5710     7090     8610    10140    11670    13200

217          KK
218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
219          DR DIVDIKE

220          KK
221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
222          HC        2

223          KK      303
224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
225          RM       13     1.28     0.15

226          KKRRBRIDGE
227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
228          DTRRCHANNL
229          DI        0     6000    20000
230          DQ        0        0    13500

231          KK      I15
232          KM        DIVERT FLOW INTO KING CHARLES CHANNEL
233          DT    KCHAR
234          DI        0     1000    10000
235          DQ        0      800     8000

236          KK      NC1
237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
238          RK      700   0.0058    0.016        0     TRAP       10        2

239          KK        V
240          RK     2000   0.0100    0.035        0     TRAP       30        2

241          KK      NC2
242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
243          KM   TO GOWAN AVE.
244          RK     1300    .0056     .030        0     TRAP       12        2

245          KK      NC3
246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
247          KM   TO CHEYENNE AVE.
248          RK     2600    .0021     .030        0     TRAP       20      2.5
```

1 HEC-1 INPUT PAGE 7

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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

249          KK      NC4
250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
252          RK     1300     .003     .016        0     TRAP       18        2

253          KK      NC5
254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
255          KM   TO "A" CHANNEL (LINED CHANNEL)
256          RK      500     .001     .016        0     TRAP       18        2
257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

258          KK     AP.1
259          KM        Begin subareas tributary to Gowan-South Detention Basin
260          KM        Begin subareas tributary to Angel Park Detention Basin
261          KM        From Wallace Angel Park Model
262          BA    0.001
263          PB     1.29
264          LS        0       89
265          UD     0.62

266          KK        V
267          KM    Route AP.1
268          RM        7     0.67     0.15

269          KK     AP.2
```

```
270          KM   One-third of subbasin AP.2
271          KM   From Wallace Angel Park Model
272          BA   0.853
273          PB    1.14
274          LS       0       87
275          UD   0.363

276          KK
277          KM   Combine AP.1 & AP.2
278          HC       2

279          KK       V
280          RM      11    1.06     0.15

281          KK    AP.3
282          BA    1.62
283          PB    1.15
284          LS       0       89
285          UD    2.41

286          KK    AP.4
287          KM   From Wallace Angel Park Model
288          BA   0.001
289          PB    1.13
290          LS       0       89
291          UD    1.03
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

292          KK       .
293          KM   Combine AP.1, AP.2, AP.3, AP.4
294          HC       3

295          KK    AP.5
296          KM   From Wallace Angel Park Model
297          BA   0.001
298          PB    1.29
299          LS       0       89
300          UD    0.39

301          KK       V
302          KM   Route AP.5
303          RM       8    0.82     0.15

304          KK    AP.6
305          BA   0.001
306          PB    1.29
307          LS       0       88
308          UD    0.75

309          KK       .
310          KM   Combine AP.5 & AP.6
311          HC       2

312          KK       V
313          KM   Route AP.5 & AP.6
314          RM       7    0.66     0.15

315          KK    AP.7
316          KM      One-half of subbasin AP.7
317          BA    1.02
318          PB    1.35
319          LS       0       86
320          UD    0.59

321          KK   N_CHN
322          KM   COMBINE NORTH CHANNEL FLOWS
323          HC       2

324          KK    GD.1
325          KM   Begin subareas tributary to Hualapai Diversion
326          KM   From VTN (PB & CN from B&V-La Madre)
327          BA   0.001
328          PB    1.33
329          LS       0       87
330          UD    0.62

331          KK       V
332          KM   Route GD.1
333          RM       2    0.24     0.15
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

334          KK       V
335          KM   Routing Cont'd
336          RM       3    0.27     0.15

337          KK    GD.2
338          KM   From VTN
339          BA   0.001
340          PB    1.25
341          LS       0       89
342          UD    0.83

343          KK       .
```

```
          344          KM   Combine GD.1 & GD.2
          345          HC        2

          346          KK  TO_DIV
          347          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
          348          RM        3    0.34    0.15

          349          KK    GD.3(=AP.12)
          350          KM   From VTN
          351          BA    0.80
          352          PB    1.19
          353          LS       0      89
          354          UD    0.32

          355          KKHUALAPAI
          356          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
          357          HC        2

          358          KK     HUA& NO.CH
          359          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
          360          HC        2

          361          KK        V
          362          KM   Route Combined Flows
          363          RK    5500     .023      .04        0    TRAP      100        2

          364          KK        V
          365          KM   Routing Cont'd
          366          RK    4500     .004      .03        0    TRAP       30        4

          367          KK    AP.8
          368          BA    0.93
          369          PB    1.14
          370          LS       0      89
          371          UD    0.62

          372          KK     BOX
          373          KM   SUMMERLIN PARKWAY CULVERT
          374          HC        2
1                                                HEC-1 INPUT                                                PAGE 10

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          375          KK        V
          376          KM   ROUTE TO ANGEL PARK DETENTION BASIN
          377          RK    3000     .027      .04        0    TRAP      100        2

          378          KK    AP.9
          379          BA    0.68
          380          PB    1.14
          381          LS       0      89
          382          UD     .83

          383          KK  N_CHAN
          384          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
          385          HC        2

          386          KKANGEL.PK
          387          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
          388          HC        2

          389          KKSPILLWAY
          390          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
          391          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
          392          RS        1    STOR      -1
          393          SV        0       3      22      45      80     125     190     270     369     492
          394          SV      630     780     942    1115    1209
          395          SE     2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
          396          SE     2616    2618    2620    2622    2623
          397          SL   2592.5    3.14     0.6     0.5
          398          SS   2619.1    1275     3.2     1.5

          399          KKAP_TO_VEGAS/PIONEER
          400          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
          401          KM   From VTN
          402          RK    7500     0.03   0.012        0    CIRC        5        0

          403          KKBUFFALO_1
          404          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
          405          RK    1500     0.02    0.03        0    TRAP       20        4

          406          KK    GD.7
          407          KM   INTERSECTION OF LAKE MEAD & BUFFALO
          408          BA    1.13
          409          PB    1.14
          410          LS       0      89
          411          UD    1.38

          412          KKBUFFALO_1
          413          KM   Combine GD.7 W/ Buffalo Channel
          414          HC        2
1                                                HEC-1 INPUT                                                PAGE 11

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          415          KKBUFFALO_2
          416          KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
```

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417          RK    5000   0.005   0.025       0    TRAP      30       4

418          KK    GD.4
419          KM    From B&V-La Madre
420          BA    0.001
421          PB     1.25
422          LS        0       88
423          UD     0.62

424          KK        V
425          KM    ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
426          RM        7    0.74    0.15

427          KK    GD.5
428          BA     3.31
429          PB     1.20
430          LS        0       86
431          UD     1.38

432          KK        .
433          KM    Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
434          HC        2

435          KK        V
436          KM    ROUTE NORTH ALONG RAMPART
437          RM        4    0.43    0.15

438          KK    GD.6
439          KM    DEL WEBB-SUN CITY SUMMERLIN
440          BA      1.6
441          PB     1.14
442          LS        0       86
443          UD      .96

444          KK        .
445          KM    Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
446          HC        2

447          KK        V
448          KM    ROUTE TO BUFFALO along Cheyenne Channel
449          RK     5500    .015    .015       0    TRAP      20       2

450          KK    GD.8
451          KM    R.A. HOMES-DESERT SHORES
452          BA     1.53
453          PB     1.08
454          LS        0       85
455          UD     1.11
```

1 HEC-1 INPUT PAGE 12

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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

456          KK        .
457          KM    INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
458          HC        2

459          KK    GD.34
460          KM    AREA BETWEEN BUFFALO AND OK GRAGSON HWY
461          BA     3.84
462          PB     1.08
463          LS        0       84
464          UD     1.72

465          KKGOWAN_SOUTH
466          KM    TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
467          HC        3

468          KK  DET.GS
469          KM    Gowan-South Detention Basin data from VTN
470          RS        1    STOR      -1
471          SV        0     9.8     111     435     454     680
472          SE     2326    2330    2340  2349.6    2350    2354
473          SQ        0     112     328     455     459   30700

474          KK R.GSOUT
475          KM    ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
476          RK     3200   0.007   0.012       0    CIRC       5       0

477          KK    GD.9
478          KM    Begin subareas tributary to Gowan-North Detention Basin
479          KM    From B&V-LaMadre
480          BA    0.001
481          PB     1.29
482          LS        0       89
483          UD     0.30

484          KK        V
485          RM        5    0.52    0.15

486          KK    GD.10
487          KM    From B&V-LaMadre
488          BA    0.001
489          PB     1.20
490          LS        0       88
491          UD     0.90

492          KK        .
493          KM    Combine GD.9 & GD.10
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```
494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6     0.61     0.15
1                                        HEC-1 INPUT                                                    PAGE 13

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


498          KK       V
499          KM   Routing Cont'd
500          RM       7     0.74     0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB    1.14
505          LS       0       85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB    1.14
514          LS       0       89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0     1545     3129     4000     8000
521          DQ       0     1545     1545     2416     6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2     0.15     0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB    1.13
530          LS       0       86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0      900     2484     4000     8000
540          DQ       0      900      900     2416     6416
1                                        HEC-1 INPUT                                                    PAGE 14

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1     0.14     0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    1.35
550          LS       0       80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12     1.23     0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB    1.12
559          LS       0       81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0      520     1869     4000     8000
568          DQ       0      520      520     2631     6631
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```
569          KK       V
570          KM    ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
571          KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
572          RM       1     0.14     0.15

573          KK    GD.28
574          KM    From Wallace
575          BA    0.001
576          PB     1.14
577          LS        0       77
578          UD     2.52

579          KK        .
580          KM    Combine GD.28 & GD.30 - GD.33
581          HC        2
1                                        HEC-1 INPUT                                        PAGE 15

          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

582          KK  RANCHO
583          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
584          DTCENTNIAL
585          DI        0     1040     5456     8000
586          DQ        0     1040     1040     3585

587          KK       V
588          KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
589          KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
590          RM       1     0.07     0.15

591          KK    GD.25
592          KM    From Wallace
593          BA    0.001
594          PB     1.21
595          LS        0       89
596          UD     1.09

597          KK       V
598          RM       7     0.69     0.15

599          KK    GD.26
600          KM    From Wallace
601          BA    0.001
602          PB     1.17
603          LS        0       78
604          UD     1.20

605          KK        .
606          KM    Combine GD.25 & GD.26
607          HC        2

608          KK       V
609          KM    ROUTE WEST TO ANN ROAD AND HWY 95
610          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
611          RM       4     0.43     0.15

612          KK       V
613          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
614          RM       5     0.49     0.15

615          KK    GD.27
616          KM    From Wallace
617          BA     1.13
618          PB     1.10
619          LS        0       78
620          UD     1.61

621          KK        .
622          KM    Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
623          HC        3
1                                        HEC-1 INPUT                                        PAGE 16

          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

624          KK       V
625          KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
626          RK     3000    0.009    0.025        0    TRAP       50        3

627          KK       V
628          RK     3000    0.004    0.022        0    TRAP       25        8

629          KK    GD.29
630          KM    From Wallace
631          BA     0.76
632          PB     1.12
633          LS        0       77
634          UD     1.49

635          KK       V
636          RK     8000     0.01    0.025        0    TRAP       20        8

637          KK     PDGC
638          KM    PAINTED DESERT GOLF COURSE
639          KM    From Wallace
640          BA     0.53
641          PB     1.08
```

```
LS       0      80
UD     1.2

KK
KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
HC       3

KK  RANCHO
KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
DTP.DESERT
DI       0     233    1318    8000
DQ       0     233     233    6915

KK       V
KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
RM       1    0.14    0.15

KK   GD.21
KM   From Wallace
BA   0.001
PB    1.28
LS       0      89
UD    0.72

KK       V
RM       8    0.81    0.15
```



```
1
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK   GD.22
KM   From Wallace
BA   0.001
PB    1.21
LS       0      86
UD     1.5

KK   GD.23
KM   From Wallace
BA   0.001
PB    1.23
LS       0      86
UD    1.41

KK
KM   Combine GD.21 - GD.23
HC       3

KK       V
KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
RM       7    0.65    0.15

KK   GD.24
KM   From Wallace
BA    0.64
PB    1.14
LS       0      77
UD     1.2

KK
KM   Combine GD.21 - GD.24
HC       2

KK       V
KM   ROUTE WEST TO HWY 95
KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
RM       7    0.65    0.15

KK   GD.18
KM   From Wallace
BA   0.001
PB    1.26
LS       0      89
UD    0.31

KK       V
RM       6    0.62    0.15

KK   GD.19
KM   From Wallace
BA   0.001
PB    1.21
LS       0      82
UD    1.24
```



```
1
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK
KM   Combine GD.18 & GD.19
HC       2

KK       V
KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
RM       9    0.88    0.15
```

```
716          KK   GD.20
717          KM   From Wallace
718          BA    2.35
719          PB    1.09
720          LS       0       82
721          UD    2.51

722          KK         .
723          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724          HC         4

725          KK  HWY.95
726          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727          DT   CRAIG
728          DI         0      465     2056    10000
729          DQ         0      465      465     8409

730          KK         V
731          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733          RM         1     0.07     0.15

734          KK   GD.15
735          KM   From Wallace
736          BA   0.001
737          PB    1.29
738          LS       0       88
739          UD    0.48

740          KK         V
741          RM         7     0.74     0.15

742          KK   GD.16
743          KM   From Wallace
744          BA   0.001
745          PB    1.23
746          LS       0       82
747          UD    1.63

748          KK         .
749          HC         2
1                                        HEC-1 INPUT                                        PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

750          KK         V
751          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752          RM        10    1.01     0.15

753          KK   GD.17
754          KM   From Wallace
755          BA    0.56
756          PB    1.09
757          LS       0       80
758          UD     2.0

759          KK         .
760          KM   Combine GD.15 - GD.17
761          HC         3

762          KK   HWY95
763          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764          DTALEXANDR
765          DI         0      155     1746    10000
766          DQ         0      155      155     8409

767          KK         V
768          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770          RM         1     0.11     0.15

771          KK   GD.12
772          KM   From Wallace
773          BA   0.001
774          PB    1.26
775          LS       0       89
776          UD     0.3

777          KK         V
778          RM         4     0.42     0.15

779          KK   GD.13
780          KM   From Wallace
781          BA   0.001
782          PB    1.23
783          LS       0       86
784          UD    1.10

785          KK         .
786          KM   Combine GD.12 & GD.13
787          HC         2

788          KK         V
789          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790          RM         4     0.43     0.15
1                                        HEC-1 INPUT                                        PAGE 20
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 791      KK       V
 792      KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 793      RM      11    1.06    0.15

 794      KK  GD.14A
 795      KM   From Wallace
 796      BA    1.71
 797      PB    1.15
 798      LS       0       81
 799      UD    0.88

 800      KK       .
 801      KM   Combine GD.12, GD.13 & GD.14A
 802      HC       2

 803      KK       V
 804      KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 805      RM       5    0.53    0.15

 806      KK  GD.14B
 807      KM   From Wallace
 808      BA    0.68
 809      PB    1.12
 810      LS       0       83
 811      UD    1.67

 812      KK       .
 813      KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
 814      HC       3

 815      KK   GN_IN
 816      KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
 817      HC       3

 818      KK  DET.GN
 819      KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
 820      KM   From VTN
 821      RS       1    STOR      -1
 822      SV       0      28      46     113     774     885    1163
 823      SE    2308    2311    2312    2314    2324  2325.5    2329
 824      SQ       0       0     126     251     519     539   35800

 825      KKR.G-UPS.
 826      KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
 827      RX    2000   0.005   0.013       0    CIRC       6       0

 828      KK       V
 829      KM   Route Gowan outflow along Gowan Outfall Channel
 830      RK    7000   0.009   0.015       0    TRAP      10       0
1                                  HEC-1 INPUT                                  PAGE 21

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 831      KK       .
 832      KM   Recall flow diverted at Craig Road
 833      DR   CRAIG

 834      KK       V
 835      KM   Route to Rancho
 836      RM       4    0.42    0.15

 837      KK       .
 838      KM   Recall flow diverted at Alexander
 839      DRALEXANDR

 840      KK       V
 841      KM   Route to Rancho
 842      RM       9    0.92    0.15

 843      KK       .
 844      KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
 845      KM   at Rancho
 846      HC       3

 847      KK       V
 848      KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
 849      KM   App. F)
 850      RK    8400   0.007   0.015       0    TRAP      10       0

 851      KK       V
 852      KM   Routing Cont'd
 853      RK    4000   0.005   0.015       0    TRAP      10       0

 854      KK       V
 855      KM   Routing Cont'd
 856      RK    4000   0.005   0.015       0    TRAP      10       0

 857      KK       .
 858      KM   Begin modeling of subareas on the east side of Rancho Road
 859      KM   Recall flow diverted at Centenial
 860      DRCENTNIAL

 861      KK       .
 862      KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 863      RM      20    2.03    0.15
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 864          KK   EPT.1
 865          BA    3.76
 866          PB    1.03
 867          LS       0       85
 868          UD    3.36
1                                        HEC-1 INPUT                                                    PAGE 22

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


 869          KK
 870          KM   Combine EPT.1 & flow diverted at Centenial
 871          HC       2

 872          KK       V
 873          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 874          RM       8    0.76    0.15

 875          KK
 876          KM   Recall flow diverted at Painted Desert
 877          DRP.DESERT

 878          KK       V
 879          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 880          RM      20    2.03    0.15

 881          KK   EPT.3
 882          BA   4.391
 883          PB    1.01
 884          LS       0       88
 885          UD    3.67

 886          KK
 887          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
 888          HC       3

 889          KK   EPT.4
 890          BA   1.372
 891          PB    1.01
 892          LS       0       89
 893          UD     2.7

 894          KK       V
 895          RM       9    0.88    0.15

 896          KK
 897          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
 898          KM   Gowan Outfall Channel
 899          HC       2

 900          KK
 901          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
 902          KM   Alexander, Painted Desert & Centenial
 903          HC       2

 904          KK   EPT.5
 905          BA   3.005
 906          PB    1.01
 907          LS       0       87
 908          UD     4.7
1                                        HEC-1 INPUT                                                    PAGE 23

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


 909          KK
 910          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
 911          KM   Alexander, Painted Desert & Centenial
 912          HC       2

 913          KK       V
 914          RK   10000     .013    .015       0    TRAP      10       0

 915          KK   EPT.2
 916          BA   1.492
 917          PB    1.00
 918          LS       0       85
 919          UD    2.51

 920          KK  LVWASH
 921          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
 922          HC       2
 923          KM   ********************************* END GOWAN MODEL ********************************

 924          KKGOWANDIV
 925          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
 926          DRCULVERTS

 927          KK     301
 928          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
 929          RM      22    2.17    0.15

 930          KK     301
 931          KM   RUNOFF FROM SUBBASIN 301
 932          BA  18.616
 933          PB    0.98
 934          LS       0       85
 935          UD     4.3
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936          KK WTRIBUS
937          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
938          HC       2

939          KKWTRIBTOT
940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
941          HC       2

942          KK     304
943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
944          RM       3    0.28    0.15

945          KK     SNIC
946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
948          RK    3850    .0122    0.016        0    TRAP      20        2
                                        HEC-1 INPUT                                    PAGE 24
1

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


949          KK     LBC
950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
952          RK    2800     .002    0.016        0    TRAP      80        2

953          KK    310W
954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
955          BA      .8
956          PB    0.91
957          LS       0      87        0        0      87
958          UK     150    .010       .3       38
959          UK     300    .015      .25       62
960          RK    1000   .0075      .02     .013    TRAP      51        0
961          RK    2600   .0075      .02       .2    TRAP      80        0
962          RK    8700   .0150      .02        0    TRAP     100        0

963          KK   R310W
964          KM   ROUTE RUNOFF FROM 310W TO 310E
965          RK   10500    .015      .02        0    TRAP     100        0

966          KK    310E
967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
968          BA   1.238
969          PB    0.91
970          LS       0      86        0        0      83
971          UK     150     .01       .3       46
972          UK     300    .015      .25       54
973          RK    1000   .0075      .02     .019    TRAP      51        0
974          RK    2000   .0075      .02      .31    TRAP      80        0
975          RK   10500    .015      .02        0    TRAP     100        0

976          KK    310E
977          KM   COMBINE ROUTED 310W WITH 310E
978          HC       2

979          KK   R310E
980          KM   ROUTE FROM 310E TO 311W
981          RK    5300    .0132      .02        0    TRAP     100        0

982          KK    311W
983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
984          BA     .96
985          PB    0.91
986          LS       0      85        0        0      83
987          UK     150    .010       .3       60
988          UK     300    .0132     .25       40
989          RK     650    .0065     .02      .01    TRAP      51        0
990          RK    2200    .0065     .02      .14    TRAP      80        0
991          RK    5300    .0132     .02        0    TRAP     100        0
                                        HEC-1 INPUT                                    PAGE 25
1

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


992          KK    311W
993          KM   COMBINE ROUTED 310E WITH 311W
994          HC       2

995          KK   R311W
996          KM   ROUTE FROM 311W TO 311E
997          RK    7500    .0132      .02        0    TRAP     100        0

998          KK    311E
999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311E
1000         KM   CONVERT TO SCS RUNOFF
1001         BA     .77
1002         PB    0.91
1003         LS       0    74.3
1004         UD    0.49

1005         KK    311E
1006         KM   COMBINE ROUTED 311W WITH 311E
1007         HC       2

1008         KK    309W
1009         KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1010         BA     .81
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1011          PB    0.91
1012          LS      0      71       0       0      70
1013          UK    150     .01      .3      22
1014          UK    300    .0144     .25     78
1015          RK   1000     .007     .02    .013    TRAP      51       0
1016          RK   2600     .007     .02    .20     TRAP      80       0
1017          RK   8700    .0144     .02     0      TRAP     100       0
              *  lines removed; zero flow from 309W for 10-year storm
              *  causing crash at step R309W
              * KK R309W
              * KM ROUTE FROM 309W TO 309E
              * RK 21000 .0144 .02 0 TRAP 100 0

1018          KK    309E
1019          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1020          BA    1.19
1021          PB    0.91
1022          LS      0      87       0       0      80
1023          UK    150     .01      .3      52
1024          UK    300    .0144     .25     48
1025          RK   1000     .007     .02    .019    TRAP      51       0
1026          RK   2600     .007     .02    .30     TRAP      80       0
1027          RK  21000    .0144     .02     0      TRAP     100       0

1028          KK    309E
1029          KM   COMBINE ROUTED 309W WITH 309E
1030          HC      2
1                                    HEC-1 INPUT                                    PAGE 26

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1031          KK
1032          KM   COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1033          HC      2

1034          KK    FCP1
1035          KM   ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1036          KM   TO LAKE MEAD BLVD.
1037          RK    410   .0045    .016       0    CIRC       5       0

1038          KK    FCP2
1039          RK    740   .0048    .016       0    CIRC     5.5       0

1040          KK   FCBC1
1041          RK    800   .0056    .016       0    TRAP       8       0

1042          KK    FC1
1043          RK   1250   .0195    .016       0    TRAP       8       0

1044          KKFCBC2/FC2/FCBC3
1045          KM   COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1046          RK   1430     .03    .016       0    TRAP       7       0

1047          KK   307NW
1048          KM   RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1049          BA    1.33
1050          PB    0.91
1051          LS      0      85       0       0      87
1052          UK    150    .010      .3      32
1053          UK    300    .011     .25      68
1054          RK   1000   .0055     .02    .017    TRAP      51       0
1055          RK   2600   .0055     .02    .27     TRAP      80       0
1056          RK   6400    .011     .02       0    TRAP     100       0

1057          KK  R307NW
1058          KM   ROUTE FROM 307NW TO 307NE
1059          RK   4000    .011     .02       0    TRAP     100       0

1060          KK   307NE
1061          KM   RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1062          BA     .64
1063          PB    0.91
1064          LS      0      87       0       0      87
1065          UK    150    .010      .3      11
1066          UK    300    .011     .25      89
1067          RK   1000   .0055     .02    .013    TRAP      51       0
1068          RK   2600   .0055     .02    .21     TRAP      80       0
1069          RK   4000    .011     .02       0    TRAP     100       0

1070          KK   307NE
1071          KM   COMBINE ROUTED 307NW WITH 307NE
1072          HC      2
1                                    HEC-1 INPUT                                    PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1073          KK
1074          KM   COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1075          HC      2

1076          KK      V
1077          KM   ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1078          RM      4   0.37   0.15

1079          KK   307SW
1080          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1081          BA    1.1
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1082          PB    0.91
1083          LS      0      61       0       0      64
1084          UK    150    .010      .3      16
1085          UK    300    .011     .25      84
1086          RK   1000   .0055     .02     .01    TRAP      51
1087          RK   2200   .0055     .02     .16    TRAP      80
1088          RK   6100    .011     .02       0    TRAP     100       0
              *  lines removed; zero flow from 307SW for 10-year storm
              *  causing crash at step R307SW
              * KK R307SW
              * KM ROUTE FROM 307SW TO 307SE
              * RK 7300 .011 .02 0 TRAP 100 0

1089          KK   307SE
1090          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1091          BA    1.58
1092          PB    0.91
1093          LS      0      85       0       0      87
1094          UK    150     .01      .3      40
1095          UK    300    .011     .25      60
1096          RK   1000   .0055     .02     .01    TRAP      51       0
1097          RK   2200   .0055     .02     .17    TRAP      80       0
1098          RK   7300    .011     .02       0    TRAP     100       0

1099          KK   307SE
1100          KM   COMBINE ROUTED 307SW WITH 307SE
1101          HC       2

1102          KK       .
1103          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1104          HC       2

1105          KK       V
1106          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1107          RM       2    0.18    0.15

1108          KK    308W
1109          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1110          BA     .81
1111          PB    0.91
1112          LS      0      71       0       0      70
1113          UK    150     .01      .3      19
1114          UK    300   .0134     .25      81
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1115          RK   1000    .006     .02    .017    TRAP      51       0
1116          RK   2600    .006     .02     .27    TRAP      80       0
1117          RK   8700   .0134     .02       0    TRAP     100       0
              *  lines removed; zero flow from 308W for 10-year storm
              *  causing crash at step R308W
              * KK R308W
              * KM ROUTE FROM 308W TO 308E
              * RK 6500 .0134 .02 0 TRAP 100 0

1118          KK    308E
1119          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1120          BA     .72
1121          PB    0.91
1122          LS      0      85       0       0      87
1123          UK    150     .01      .3      59
1124          UK    300   .0134     .25      41
1125          RK   1000    .006     .02    .015    TRAP      51       0
1126          RK   2600    .006     .02     .24    TRAP      80       0
1127          RK   6500   .0134     .02       0    TRAP     100       0

1128          KK    308E
1129          KM   COMBINE ROUTED 308W WITH 308E
1130          HC       2

1131          KK       .
1132          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1133          HC       2

1134          KKR307/308
1135          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1136          RK   6100   .0132     .02       0    TRAP     100       0

1137          KK    312W
1138          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1139          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1140          BA     .77
1141          PB    0.91
1142          LS      0      81       0       0      80
1143          UK    150    .010      .3      20
1144          UK    300   .0132     .25      80
1145          RK   1000   .0065     .02    .012    TRAP      51       0
1146          RK   2600   .0065     .02    .175    TRAP      80       0
1147          RK   6100   .0132     .02       0    TRAP     100       0

1148          KK    312W
1149          KM   COMBINE ROUTED 307 & 308 WITH 312W
1150          HC       2

1151          KK   R312W
1152          KM   ROUTE FROM 312W TO 312E
1153          RK   6100   .0132     .02       0    TRAP     100       0
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1154      KK    312E
1155      KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1156      BA      .7
1157      PB    0.91
1158      LS       0      79       0       0      76
1159      UK     150    .010      .3      50
1160      UK     300   .0132     .25      50
1161      RK     500   .0065     .02    .012    TRAP      51       0
1162      RK    2600   .0065     .02    .175    TRAP      80       0
1163      RK    6100   .0132     .02       0    TRAP     100       0

1164      KK    312E
1165      KM   COMBINE ROUTED 312W WITH 312E
1166      HC       2

1167      KK     306
1168      KM   RUNOFF FROM SUBBASIN 306
1169      BA   5.073
1170      PB    0.91
1171      LS       0      84
1172      UD    3.02

1173      KK
1174      KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1175      HC       3

1176      KK     FC3
1177      KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1178      KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1179      RK     900   .0012     .016       0    TRAP      10      1.5

1180      KK FC4/FC5
1181      RK     600  0.0012   0.016       0    TRAP      24      1.5

1182      KK     FC6
1183      RK    5150   .0011     .016       0    TRAP      16      1.5

1184      KK     FC7
1185      RK    2400   .0010     .016       0    TRAP      20      1.5

1186      KKFCBC4/FC8
1187      KM   COMBINE FCBC4 & FC8 ROUTING STEPS
1188      RK    3475   .0012     .016       0    TRAP      20      1.5

1189      KK     302
1190      KM   RUNOFF SUBBASIN 302
1191      BA  12.113
1192      PB    0.91
1193      LS       0      86
1194      UD     3.1
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1195      KK     303
1196      KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
1197      RM       8    0.83    0.15

1198      KK     303
1199      KM   RUNOFF FROM 303
1200      BA  10.217
1201      PB    0.91
1202      LS       0      84
1203      UD    4.24

1204      KK
1205      KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1206      HC       2

1207      KK     304
1208      KM   RUNOFF FROM SUBBASIN 304
1209      BA   2.903
1210      PB    0.91
1211      LS       0      86
1212      UD    1.98

1213      KK     305
1214      KM   RUNOFF FROM SUBBASIN 305
1215      BA   3.298
1216      PB    0.91
1217      LS       0      87
1218      UD    1.49

1219      KK
1220      KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1221      HC       2

1222      KKRRBRIDGE
1223      DRRRCHANNL

1224      KKDUMMY_AREA
1225      KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
1226      BA   0.001
1227      PB    2.00
1228      LS       0      80
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          1229          UD     1.00

          1230          KKDUMMY_COMBINE
          1231          KM    Combine dummy subarea with recalled RRCHANNEL diversion
          1232          HC         2

          1233          KKRRCHANNL
          1234          RK     4900    .0041      .03        0     TRAP       40        2                                    PAGE 31
1                                                          HEC-1 INPUT

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          1235          KK     I-15
          1236          DR    KCHAR

          1237          KKDUMMY_AREA
          1238          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1239          BA    0.001
          1240          PB     2.00
          1241          LS        0       80
          1242          UD     1.00

          1243          KKDUMMY_COMBINE
          1244          KM    Combine dummy subarea with recalled KCHAR diversion
          1245          HC         2

          1246          KK ACHANNL
          1247          KM    COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1248          HC         5

          1249          KK AC1/AC2
          1250          KM    COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1251          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1252          RK     2350  0.0074    0.035        0     TRAP       30        2

          1253          KK       AC3
          1254          RK     1600    .0065     .030        0     TRAP       52      1.5

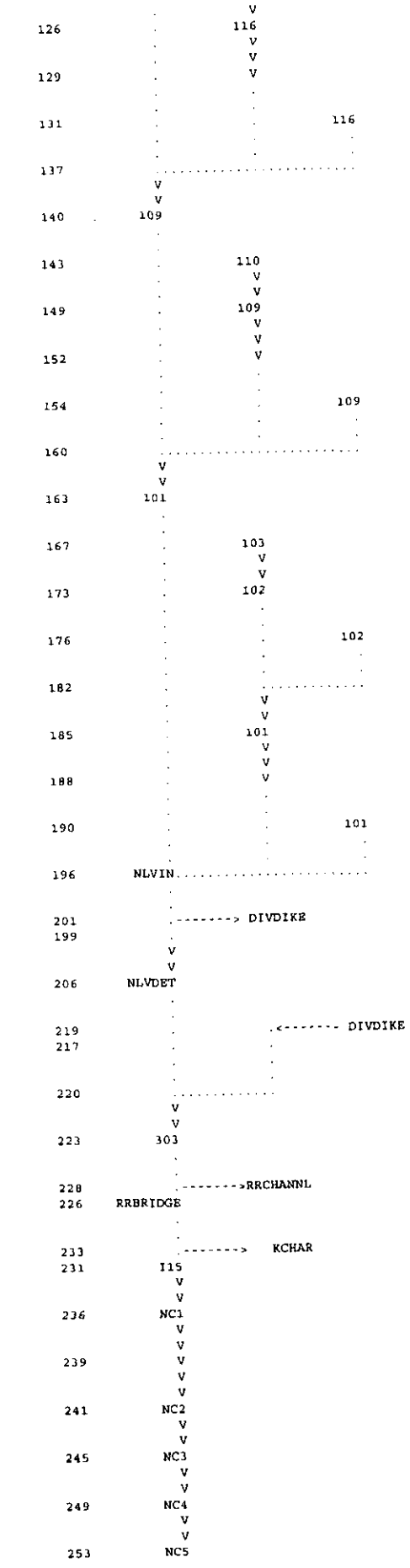
          1255          KK       AC4
          1256          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1257          RK     1650    .0053     .030        0     TRAP       70      1.5

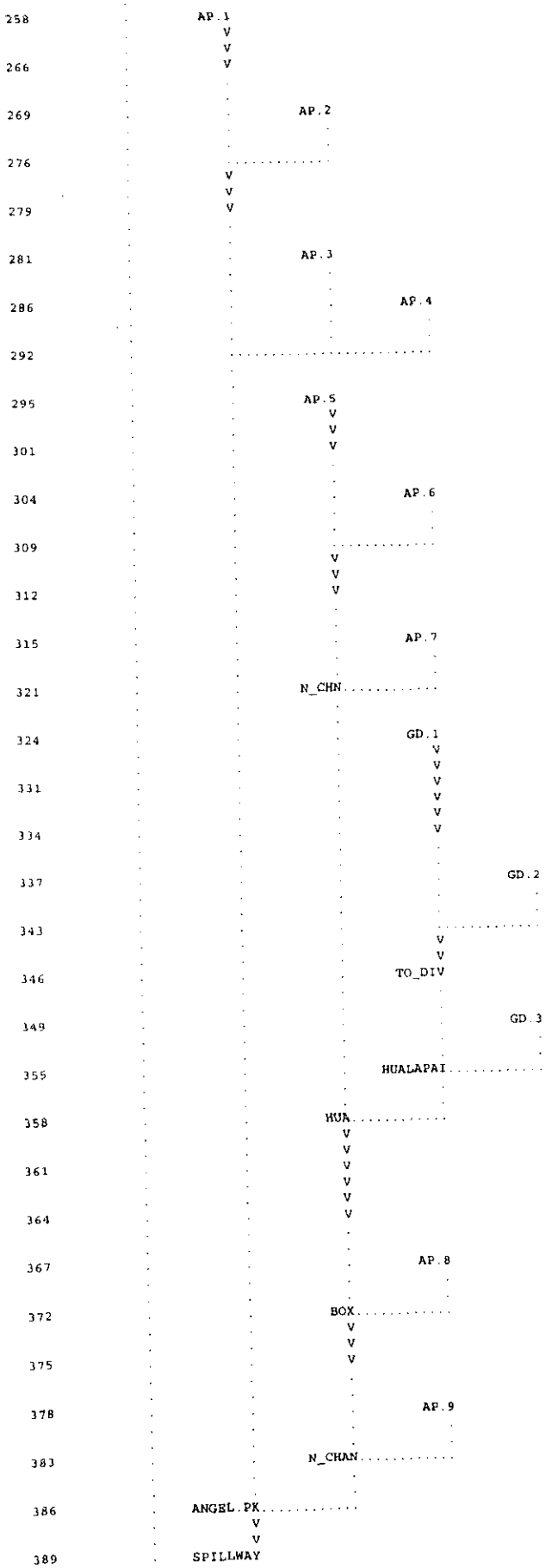
          1258          KK NCHANNL
          1259          KM    COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1260          HC         2
                        * Truncate this run at NCHANNL
          1261          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

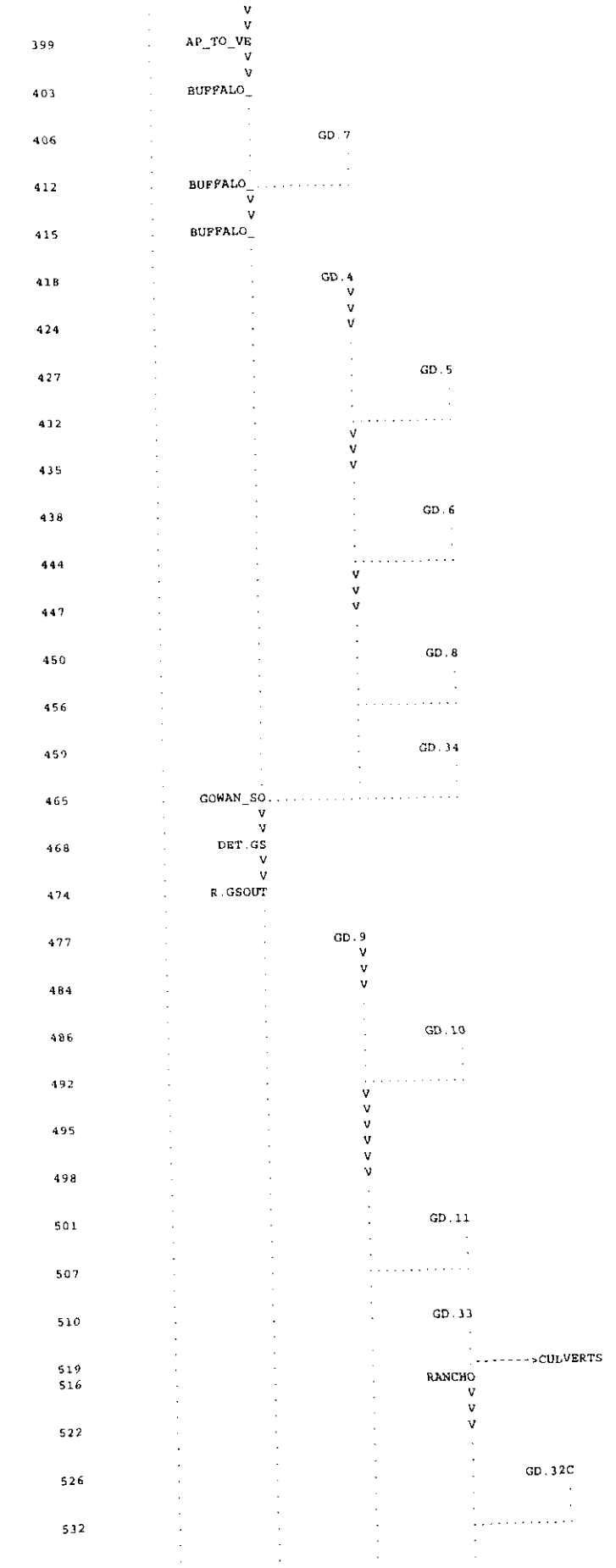
 INPUT
  LINE       (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

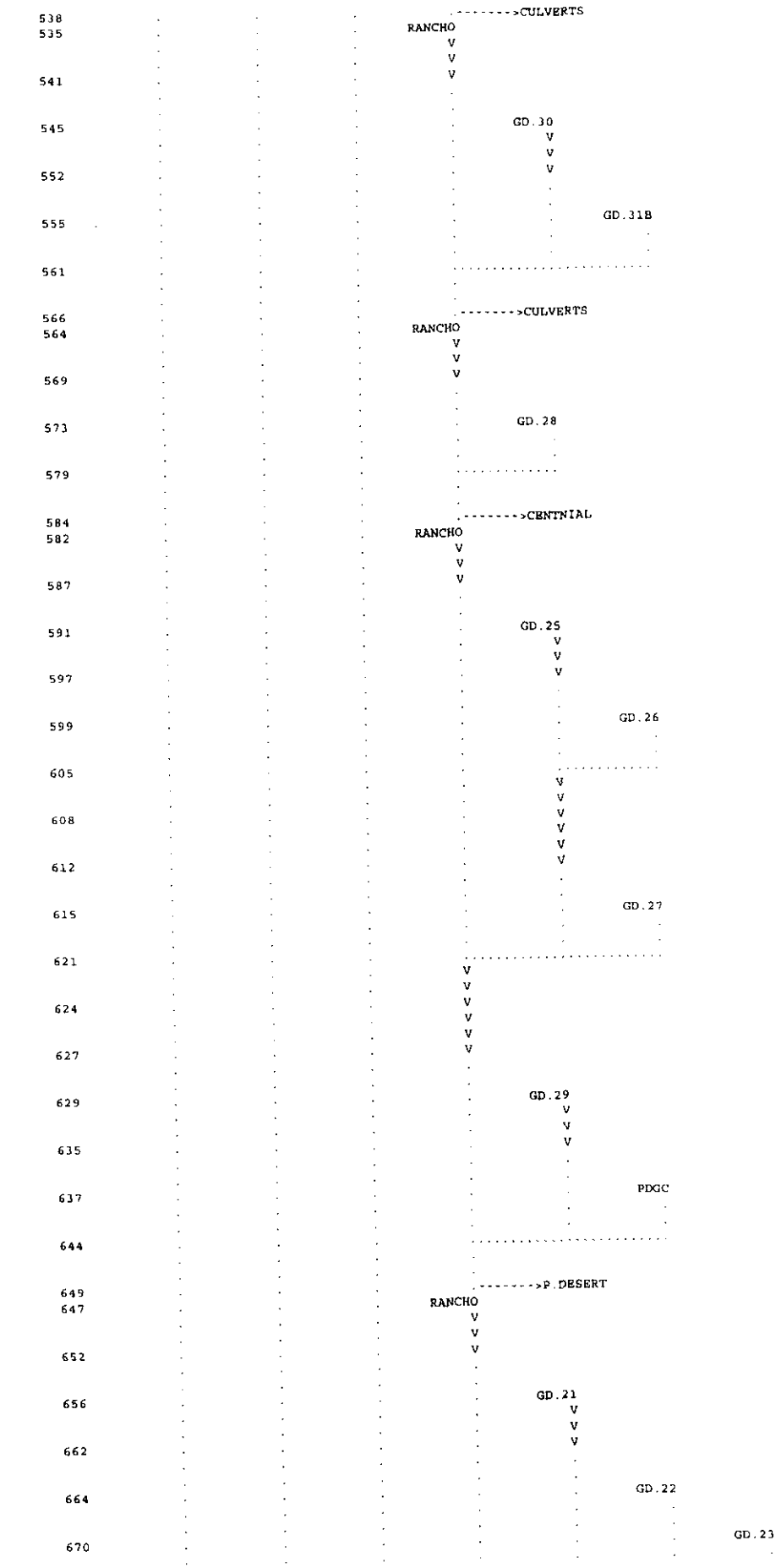
   NO.       (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

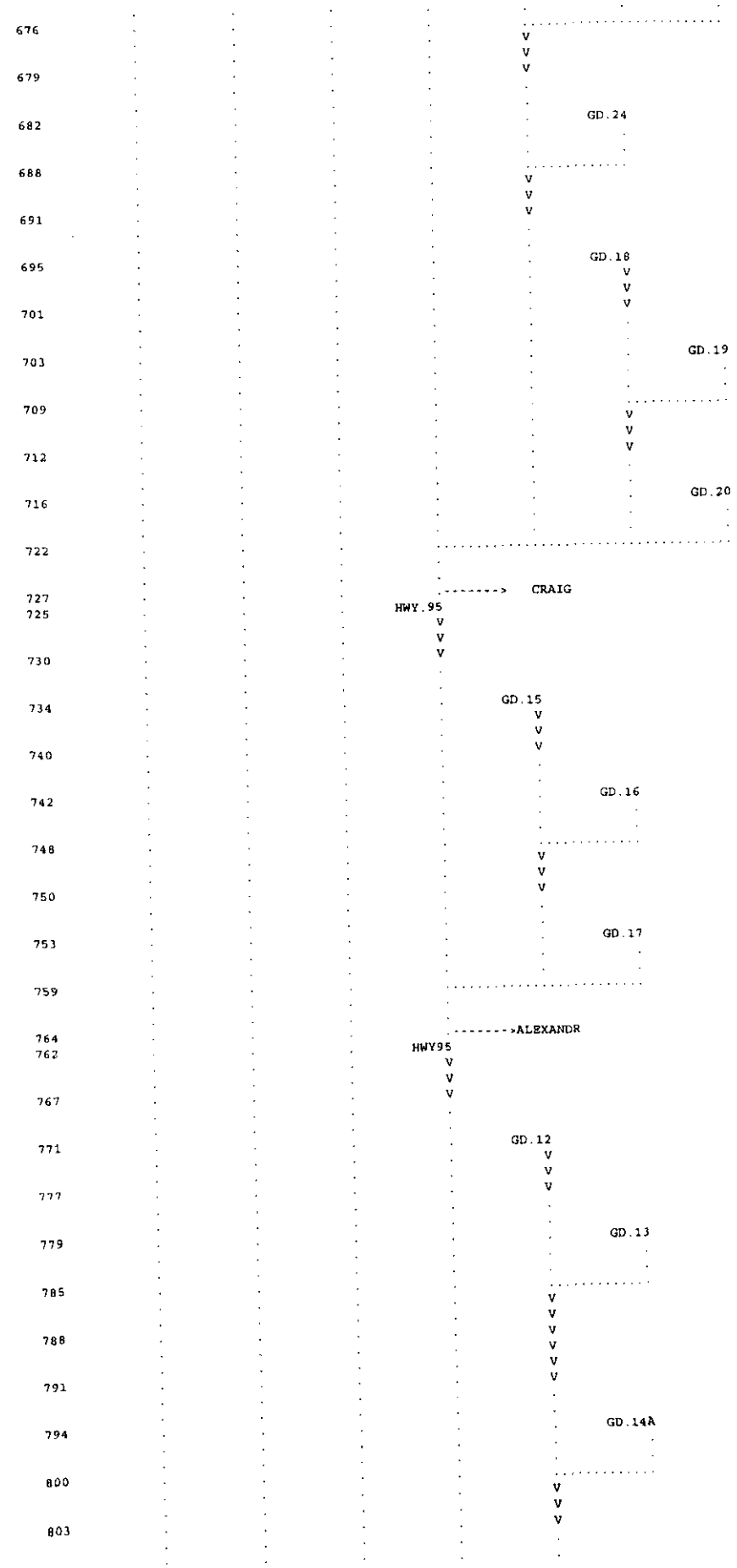
    53           112
                  .
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    67            .          119
                  .            .
                  .            .
    73            ..............
                  V
                  V
    76           120
                  V
                  V
    79         125UDB
                  V
                  V
    82           117
                  .
                  .
    85            .          118
                  .            V
                  .            V
    91            .          117
                  .            V
                  .            V
    94            .            V
                  .            V
                  .            V
    96            .            V
                  .            .
                  .            .
    98            .            .          117
                  .            .            .
                  .            .            .
   104            ..........................
                  V
                  V
   107          ULWDB
                  V
                  V
   117           116
                  .
                  .
   120            .          111
                  .            V
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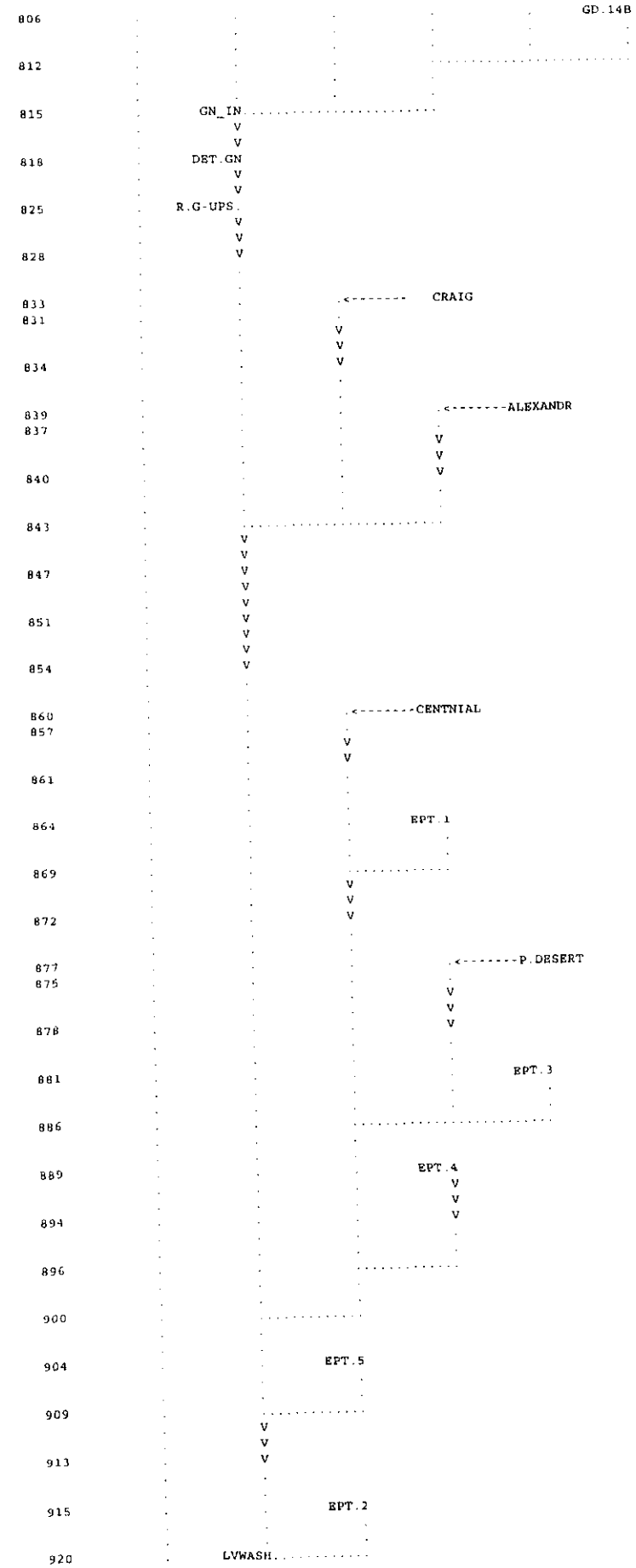

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DIVDIKE
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NLVDET
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DIVDIKE
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RRCHANNL
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RRBRIDGE
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KCHAR
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I15
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NC1
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NC3
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NC4
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NC5

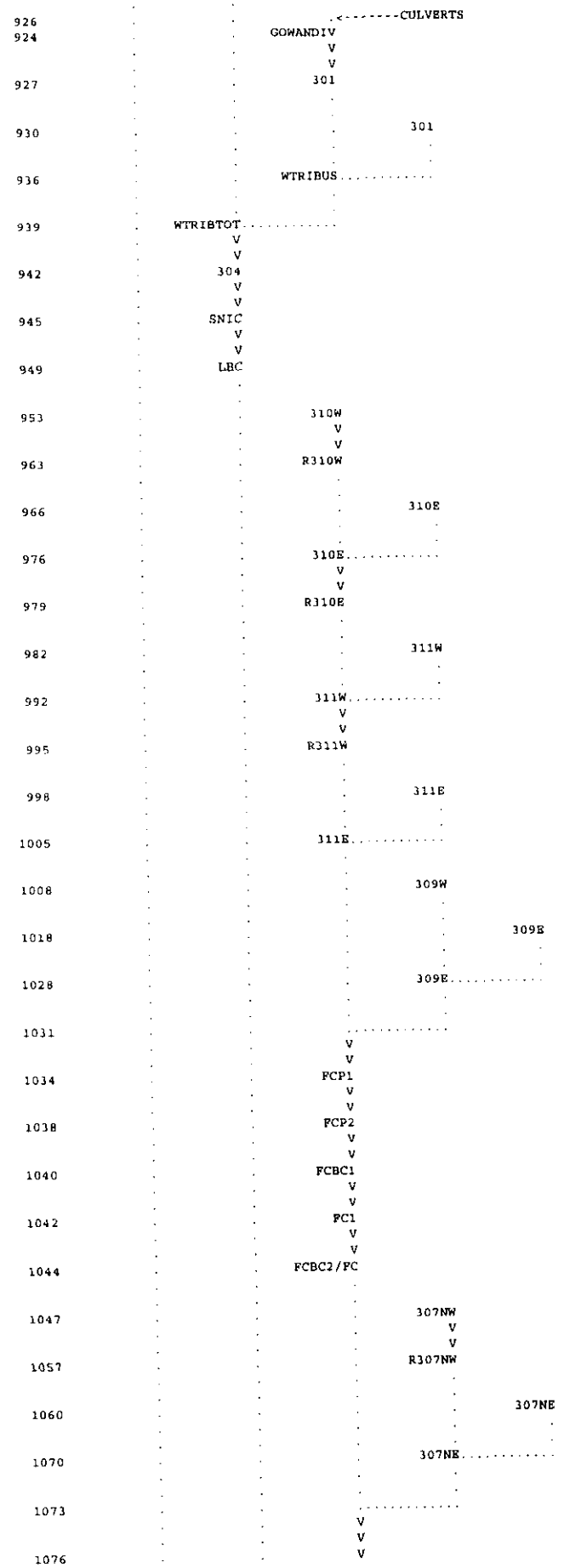

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AP.1
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AP.2
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AP.3
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AP.4
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AP.5
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AP.6
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312
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AP.7
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N_CHN
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GD.1
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334
337
GD.2
343
346
TO_DIV
349
GD.3
355
HUALAPAI
358
HUA
361
364
367
AP.8
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BOX
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378
AP.9
383
N_CHAN
386
ANGEL.PK
389
SPILLWAY

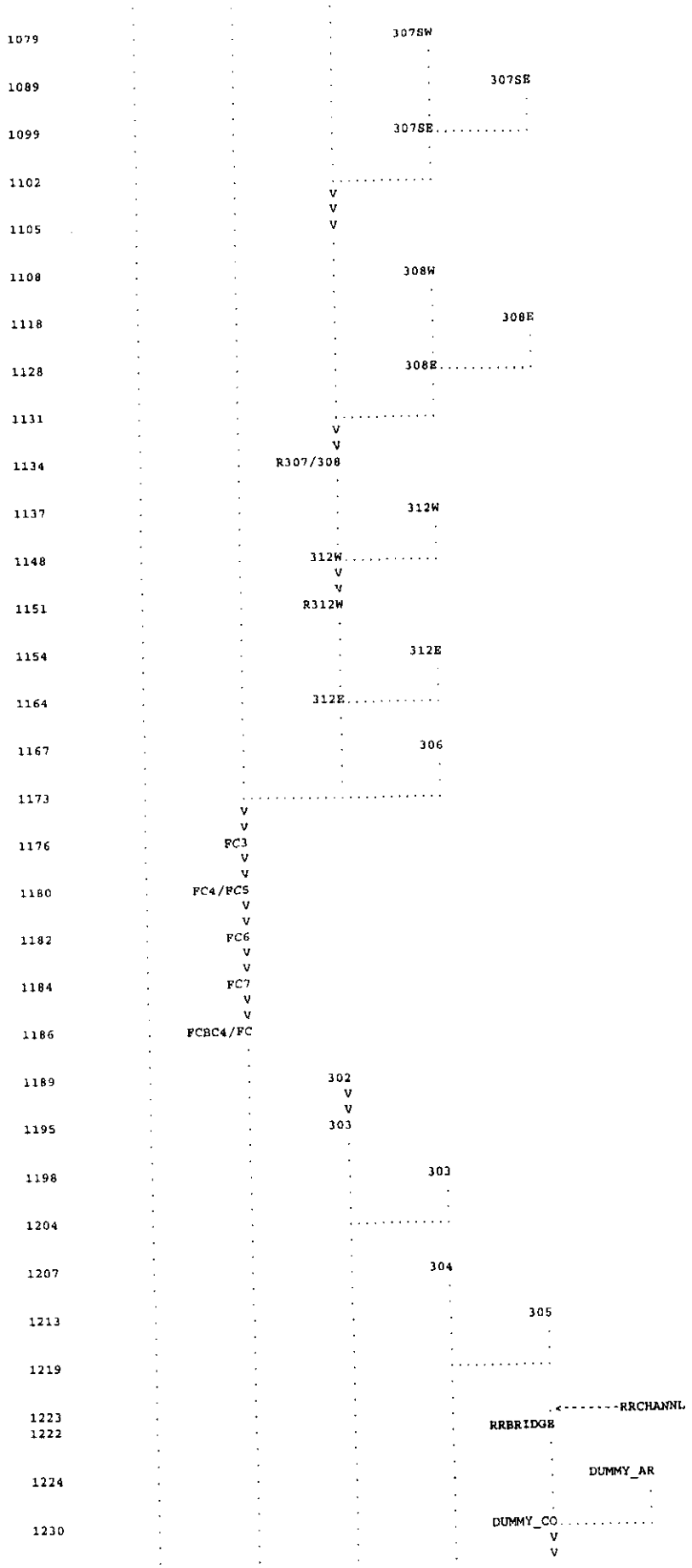

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AP_TO_VE
403
BUFFALO_
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GD.7
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BUFFALO_
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BUFFALO_
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GD.4
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GD.6
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GD.8
456
459
GD.34
465
GOWAN_SO
468
DET.GS
474
R.GSOUT
477
GD.9
484
486
GD.10
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GD.11
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GD.33
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CULVERTS
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RANCHO
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GD.32C
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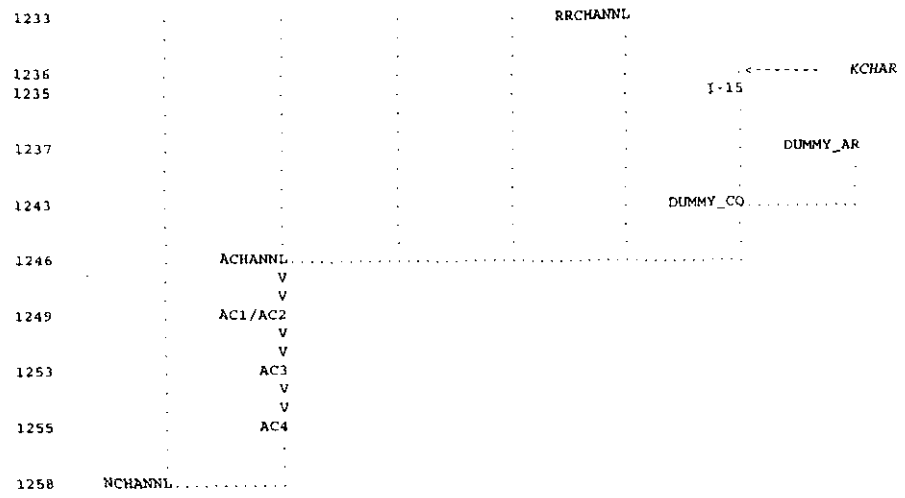

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CULVERTS
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GD.30
GD.31B
CULVERTS
RANCHO
GD.28
CENTNIAL
RANCHO
GD.25
GD.26
GD.27
GD.29
PDGC
P.DESERT
RANCHO
GD.21
GD.22
GD.23


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GD.24
GD.18
GD.19
GD.20
CRAIG
HWY.95
GD.15
GD.16
GD.17
ALEXANDR
HWY95
GD.12
GD.13
GD.14A


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GD.14B
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DET.GN
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R.G-UPS
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CRAIG
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CENTNIAL
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P.DESERT
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LVWASH


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<------CULVERTS
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307SE
1099
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1102
1105
1108
308W
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308E
1128
308E
1131
1134
R307/308
1137
312W
1148
312W
1151
R312W
1154
312E
1164
312E
1167
306
1173
1176
FC3
1180
FC4/FC5
1182
FC6
1184
FC7
1186
FCBC4/FC
1189
302
1195
303
1198
303
1204
1207
304
1213
305
1219
1223
1222
RRCHANNL
RRBRIDGE
1224
DUMMY_AR
1230
DUMMY_CO



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY  1991             *
*             VERSION 4.0.1 (LOCAL)     *
*                                       *
*  RUN DATE  05/13/96  TIME  10:51:21   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 10-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 10-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
50 IO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL        0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                    NMIN          6  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1   0  STARTING DATE
```

```
                    ITIME        0000  STARTING TIME
                       NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE       1    0  ENDING DATE
                    NDTIME        1954  ENDING TIME
                    ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL     0.10 HOURS
                     TOTAL TIME BASE    19.90 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

   JP       MULTI-PLAN OPTION
               NPLAN           1  NUMBER OF PLANS

   JR       MULTI-RATIO OPTION
              RATIOS OF PRECIPITATION
             1.06      0.95      0.85

      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5

      *** ROFGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KWSOLUTION. TO REDUCE ERRORS SHORTEN OVERLAND FLOW LENGTH PLANE 2

      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 4

      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.


      KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION     309W

      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.


      KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION     307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.
```

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5

*** ROFGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KWSOLUTION. TO REDUCE ERRORS SHORTEN OVERLAND FLOW LENGTH PLANE 2 .

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 4

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 308W

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

				RATIOS APPLIED TO PRECIPITATION		
OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIO 3
				1.06	0.95	0.85

HYDROGRAPH AT							
+	112	5.33	1	FLOW	434.	319.	245.
				TIME	3.90	5.10	5.10
HYDROGRAPH AT							
+	119	2.74	1	FLOW	214.	158.	121.
				TIME	3.80	5.00	5.00
2 COMBINED AT							
+	.	8.07	1	FLOW	639.	469.	360.
				TIME	3.90	5.10	5.10
ROUTED TO							
+	120	8.07	1	FLOW	605.	442.	338.
				TIME	4.20	5.30	5.30
ROUTED TO							
+	12SUDB	8.07	1	FLOW	543.	403.	307.
				TIME	4.80	5.80	5.80
ROUTED TO							
+	117	8.07	1	FLOW	513.	384.	292.
				TIME	5.20	6.20	6.20
HYDROGRAPH AT							
+	118	5.08	1	FLOW	504.	359.	262.
				TIME	3.60	3.70	4.90
ROUTED TO							
+	117	5.08	1	FLOW	462.	328.	242.
				TIME	3.80	3.80	5.00
ROUTED TO							
+	V	5.08	1	FLOW	418.	300.	221.
				TIME	4.10	4.10	5.30
ROUTED TO							
+	V	5.08	1	FLOW	380.	273.	201.
				TIME	4.50	4.50	5.60
HYDROGRAPH AT							
+	117	7.37	1	FLOW	114.	72.	41.
				TIME	6.10	6.20	6.30
3 COMBINED AT							
+	.	20.52	1	FLOW	880.	654.	470.
				TIME	5.60	5.60	5.70
ROUTED TO							
+	ULWDB	20.52	1	FLOW	782.	615.	451.
				TIME	6.00	5.90	5.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2340.82	2340.07	2338.76
				TIME	6.00	5.90	5.90
ROUTED TO							
+	116	20.52	1	FLOW	774.	610.	443.
				TIME	6.50	6.40	6.40
HYDROGRAPH AT							
+	111	4.08	1	FLOW	400.	287.	209.
				TIME	3.70	3.70	4.90
ROUTED TO							
+	116	4.08	1	FLOW	377.	269.	198.
				TIME	3.80	3.80	5.00
ROUTED TO							
+	V	4.08	1	FLOW	343.	244.	181.
				TIME	4.00	4.00	5.20
HYDROGRAPH AT							
+	116	5.19	1	FLOW	89.	57.	33.
				TIME	5.90	6.00	6.10
3 COMBINED AT							
+	.	29.79	1	FLOW	896.	687.	492.
				TIME	5.40	6.30	6.30
ROUTED TO							
+	109	29.79	1	FLOW	872.	681.	484.
				TIME	6.70	6.70	6.70
HYDROGRAPH AT							
+	110	2.94	1	FLOW	381.	284.	205.
				TIME	3.60	3.60	3.70
ROUTED TO							
+	109	2.94	1	FLOW	361.	269.	194.
				TIME	3.70	3.70	3.80
ROUTED TO							
+	V	2.94	1	FLOW	329.	245.	178.
				TIME	3.90	4.00	4.00
HYDROGRAPH AT							
+	109	4.18	1	FLOW	76.	49.	29.
				TIME	5.80	5.80	5.90

3 COMBINED AT							
+	.	36.91	1	FLOW	1000.	729.	509.
				TIME	5.80	6.40	6.60
ROUTED TO							
+	101	36.91	1	FLOW	980.	725.	504.
				TIME	6.40	6.90	7.10
HYDROGRAPH AT							
+	103	6.20	1	FLOW	770.	568.	405.
				TIME	3.70	3.70	3.80
ROUTED TO							
+	102	6.20	1	FLOW	728.	543.	388.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	102	8.45	1	FLOW	590.	442.	336.
				TIME	3.80	5.00	5.00
2 COMBINED AT							
+	.	14.65	1	FLOW	1312.	947.	698.
				TIME	3.80	3.90	5.10
ROUTED TO							
+	101	14.65	1	FLOW	1268.	916.	673.
				TIME	4.00	4.00	5.20
ROUTED TO							
+	V	14.65	1	FLOW	1193.	857.	633.
				TIME	4.20	4.20	5.40
HYDROGRAPH AT							
+	101	9.08	1	FLOW	128.	78.	42.
				TIME	6.00	6.10	6.20
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	1698.	1274.	936.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	1698.	1274.	936.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	818.	623.	400.
				TIME	8.00	7.80	8.00
			**	PEAK STAGES IN FEET **			
			1	STAGE	7.24	6.16	5.18
				TIME	8.00	7.80	8.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	818.	623.	400.
				TIME	8.00	7.80	8.00
ROUTED TO							
+	303	60.65	1	FLOW	814.	620.	395.
				TIME	9.20	9.10	9.30
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	814.	620.	395.
				TIME	9.20	9.10	9.30
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	163.	124.	79.
				TIME	9.20	9.10	9.30
ROUTED TO							
+	NC1	60.65	1	FLOW	163.	124.	79.
				TIME	9.20	9.10	9.30
ROUTED TO							
+	V	60.65	1	FLOW	163.	124.	79.
				TIME	9.30	9.20	9.40
ROUTED TO							
+	NC2	60.65	1	FLOW	163.	124.	79.
				TIME	9.30	9.20	9.40
ROUTED TO							
+	NC3	60.65	1	FLOW	163.	124.	79.
				TIME	9.40	9.30	9.60

ROUTED TO	NC4	60.65	1	FLOW	163.	124.	79.
+				TIME	9.50	9.40	9.60
ROUTED TO	NC5	60.65	1	FLOW	163.	124.	79.
+				TIME	9.50	9.40	9.60
HYDROGRAPH AT	AP.1	0.00	1	FLOW	0.	0.	0.
+				TIME	4.00	4.00	4.00
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.70	4.70	4.70
HYDROGRAPH AT	AP.2	0.85	1	FLOW	122.	95.	71.
+				TIME	3.80	3.80	3.80
2 COMBINED AT	.	0.85	1	FLOW	122.	95.	71.
+				TIME	3.80	3.80	3.80
ROUTED TO	V	0.85	1	FLOW	96.	75.	56.
+				TIME	4.90	4.90	4.90
HYDROGRAPH AT	AP.3	3.62	1	FLOW	255.	206.	164.
+				TIME	6.40	6.40	6.50
HYDROGRAPH AT	AP.4	0.00	1	FLOW	0.	0.	0.
+				TIME	4.50	4.50	4.50
3 COMBINED AT	.	4.47	1	FLOW	320.	259.	206.
+				TIME	6.10	6.10	6.10
HYDROGRAPH AT	AP.5	0.00	1	FLOW	0.	0.	0.
+				TIME	3.80	3.80	3.80
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.60	4.60	4.60
HYDROGRAPH AT	AP.6	0.00	1	FLOW	0.	0.	0.
+				TIME	4.20	4.20	4.20
2 COMBINED AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	4.50	4.50	4.50
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.20	5.20	5.20
HYDROGRAPH AT	AP.7	1.02	1	FLOW	151.	118.	91.
+				TIME	4.00	4.00	4.10
2 COMBINED AT	N_CHN	1.02	1	FLOW	151.	118.	91.
+				TIME	4.00	4.00	4.10
HYDROGRAPH AT	GD.1	0.00	1	FLOW	0.	0.	0.
+				TIME	4.00	4.00	4.10
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.30	4.30	4.30
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.60	4.60	4.60
HYDROGRAPH AT	GD.2	0.00	1	FLOW	0.	0.	0.
+				TIME	4.30	4.30	4.30
2 COMBINED AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	4.50	4.50	4.50
ROUTED TO	TO_DIV	0.00	1	FLOW	0.	0.	0.
+				TIME	4.80	4.80	4.80
HYDROGRAPH AT	GD.3	0.80	1	FLOW	134.	105.	80.
+				TIME	3.70	3.70	3.70
2 COMBINED AT	HUALAPAI	0.80	1	FLOW	134.	105.	80.
+				TIME	3.70	3.70	3.70

2 COMBINED AT							
+	HUA	1.82	1	FLOW	259.	203.	155.
				TIME	3.80	3.90	3.90
ROUTED TO							
+	V	1.82	1	FLOW	258.	202.	154.
				TIME	4.00	4.00	4.10
ROUTED TO							
+	V	1.82	1	FLOW	256.	201.	152.
				TIME	4.20	4.20	4.30
HYDROGRAPH AT							
+	AP.8	0.93	1	FLOW	126.	101.	79.
				TIME	4.10	4.10	4.10
2 COMBINED AT							
+	BOX	2.75	1	FLOW	379.	298.	228.
				TIME	4.10	4.20	4.20
ROUTED TO							
+	V	2.75	1	FLOW	378.	296.	227.
				TIME	4.20	4.30	4.30
HYDROGRAPH AT							
+	AP.9	0.68	1	FLOW	79.	63.	49.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	N_CHAN	3.43	1	FLOW	456.	359.	276.
				TIME	4.20	4.30	4.30
2 COMBINED AT							
+	ANGEL.PK	7.91	1	FLOW	619.	502.	401.
				TIME	5.40	5.40	5.50
ROUTED TO							
+	SPILLWAY	7.91	1	FLOW	56.	54.	51.
				TIME	9.60	9.40	9.10
			** PEAK STAGES IN FEET **				
			1	STAGE	2606.48	2605.27	2604.06
				TIME	9.60	9.40	9.10
ROUTED TO							
+	AP_TO_VE	7.91	1	FLOW	56.	54.	51.
				TIME	9.60	9.40	9.20
ROUTED TO							
+	BUFFALO_	7.91	1	FLOW	56.	54.	51.
				TIME	9.70	9.50	9.20
HYDROGRAPH AT							
+	GD.7	1.13	1	FLOW	103.	84.	67.
				TIME	5.30	5.40	5.40
2 COMBINED AT							
+	BUFFALO_	9.04	1	FLOW	152.	130.	111.
				TIME	5.40	5.50	5.60
ROUTED TO							
+	BUFFALO_	9.04	1	FLOW	152.	130.	111.
				TIME	5.60	5.60	5.70
HYDROGRAPH AT							
+	GD.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.5	3.31	1	FLOW	256.	203.	157.
				TIME	5.40	5.50	5.50
2 COMBINED AT							
+	.	3.31	1	FLOW	256.	203.	157.
				TIME	5.40	5.50	5.50
ROUTED TO							
+	V	3.31	1	FLOW	253.	200.	155.
				TIME	5.80	5.90	6.00
HYDROGRAPH AT							
+	GD.6	1.60	1	FLOW	123.	95.	75.
				TIME	4.50	5.40	5.40
2 COMBINED AT							
+	.	4.91	1	FLOW	362.	285.	220.
				TIME	5.60	5.60	5.70
ROUTED TO							
+	V	4.91	1	FLOW	362.	285.	219.
				TIME	5.60	5.70	5.70
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	90.	70.	53.
				TIME	5.40	5.50	5.50

2 COMBINED AT	.	6.44	1	FLOW	450.	354.	271.
+				TIME	5.60	5.60	5.70
HYDROGRAPH AT	GD.34	3.84	1	FLOW	176.	133.	97.
+				TIME	5.90	5.90	6.00
3 COMBINED AT	GOWAN_SO	19.32	1	FLOW	772.	612.	476.
+				TIME	5.60	5.70	5.80
ROUTED TO	DET.GS	19.32	1	FLOW	317.	262.	216.
+				TIME	7.50	7.50	7.50
			** PEAK STAGES IN FEET **				
			1	STAGE	2339.51	2336.95	2334.82
				TIME	7.40	7.50	7.50
ROUTED TO	R.GSOUT	19.32	1	FLOW	317.	262.	216.
+				TIME	7.50	7.50	7.50
HYDROGRAPH AT	GD.9	0.00	1	FLOW	0.	0.	0.
+				TIME	3.70	3.70	3.70
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.20	4.20	4.20
HYDROGRAPH AT	GD.10	0.00	1	FLOW	0.	0.	0.
+				TIME	4.30	4.30	4.40
2 COMBINED AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	4.20	4.30	4.30
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.90	4.90	4.90
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.70	5.70	5.70
HYDROGRAPH AT	GD.11	3.17	1	FLOW	148.	114.	86.
+				TIME	6.50	6.60	6.60
2 COMBINED AT	.	3.17	1	FLOW	148.	114.	86.
+				TIME	6.50	6.60	6.60
HYDROGRAPH AT	GD.33	0.00	1	FLOW	0.	0.	0.
+				TIME	7.20	7.30	7.10
DIVERSION TO	CULVERTS	0.00	1	FLOW	0.	0.	0.
+				TIME	7.20	7.30	7.10
HYDROGRAPH AT	RANCHO	0.00	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
HYDROGRAPH AT	GD.32C	0.37	1	FLOW	53.	40.	30.
+				TIME	3.70	3.70	3.70
2 COMBINED AT	.	0.37	1	FLOW	53.	40.	30.
+				TIME	3.70	3.70	3.70
DIVERSION TO	CULVERTS	0.37	1	FLOW	53.	40.	30.
+				TIME	3.70	3.70	3.70
HYDROGRAPH AT	RANCHO	0.37	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
ROUTED TO	V	0.37	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
HYDROGRAPH AT	GD.30	0.00	1	FLOW	0.	0.	0.
+				TIME	6.80	6.60	6.90
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	7.90	8.00	8.00

HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
3 COMBINED AT							
+	.	1.03	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.50
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.60	5.60	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.60	5.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.90	5.90	6.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	27.	18.	12.
				TIME	6.00	6.00	6.10
3 COMBINED AT							
+	.	2.16	1	FLOW	27.	19.	12.
				TIME	6.00	6.10	6.20
ROUTED TO							
+	V	2.16	1	FLOW	27.	19.	12.
				TIME	6.10	6.20	6.40
ROUTED TO							
+	V	2.16	1	FLOW	27.	18.	12.
				TIME	6.30	6.40	6.60
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	18.	12.	7.
				TIME	5.90	6.00	6.10
ROUTED TO							
+	V	0.76	1	FLOW	18.	12.	7.
				TIME	6.40	6.60	6.70
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	18.	13.	9.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	3.45	1	FLOW	59.	40.	25.
				TIME	6.20	6.30	6.40
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	59.	40.	25.
				TIME	6.20	6.30	6.40

HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.00	5.00	5.00
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.60	5.60
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.50	5.50
3 COMBINED AT							
+		0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.90
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	18.	12.	8.
				TIME	5.70	5.70	5.80
2 COMBINED AT							
+		0.64	1	FLOW	18.	12.	8.
				TIME	5.70	5.70	5.80
ROUTED TO							
+	V	0.64	1	FLOW	17.	12.	8.
				TIME	6.30	6.40	6.50
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.50	5.50
2 COMBINED AT							
+		0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	69.	50.	35.
				TIME	6.70	6.80	6.90
4 COMBINED AT							
+		6.45	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.70	4.70
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
2 COMBINED AT							
+		0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40
3 COMBINED AT							
+	.	7.01	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.80	5.30
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	86.	65.	47.
				TIME	5.40	5.40	5.40
2 COMBINED AT							
+	.	1.71	1	FLOW	86.	65.	47.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	V	1.71	1	FLOW	83.	62.	45.
				TIME	5.90	5.90	5.90
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	31.	23.	17.
				TIME	5.80	5.90	6.00
3 COMBINED AT							
+	.	9.40	1	FLOW	114.	86.	62.
				TIME	5.90	5.90	5.90
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	526.	421.	334.
				TIME	6.40	6.50	6.50
ROUTED TO							
+	DET.GN	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	9.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2314.25	2313.71	2313.12
				TIME	10.50	10.10	9.90
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	10.00
ROUTED TO							
+	V	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	10.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
ROUTED TO							
+	V	0.00	1	FLOW	85.	61.	42.
				TIME	7.00	7.10	7.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40

ROUTED TO	V	0.00	1	FLOW	15.	10.	7.
+				TIME	7.20	7.30	7.40
3 COMBINED AT	.	31.90	1	FLOW	330.	271.	223.
+				TIME	7.80	7.90	8.00
ROUTED TO	V	31.90	1	FLOW	330.	271.	223.
+				TIME	7.80	7.90	8.10
ROUTED TO	V	31.90	1	FLOW	330.	271.	223.
+				TIME	7.90	8.00	8.10
ROUTED TO	V	31.90	1	FLOW	330.	271.	223.
+				TIME	7.90	8.00	8.10
HYDROGRAPH AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	6.60	6.50	6.60
ROUTED TO	.	0.00	1	FLOW	0.	0.	0.
+				TIME	8.60	8.70	8.40
HYDROGRAPH AT	EPT.1	3.76	1	FLOW	107.	81.	59.
+				TIME	7.50	7.50	7.60
2 COMBINED AT	.	3.76	1	FLOW	107.	81.	59.
+				TIME	7.50	7.50	7.60
ROUTED TO	V	3.76	1	FLOW	107.	80.	59.
+				TIME	8.20	8.30	8.30
HYDROGRAPH AT	.	0.00	1	FLOW	59.	40.	25.
+				TIME	6.20	6.30	6.40
ROUTED TO	V	0.00	1	FLOW	55.	37.	23.
+				TIME	8.20	8.40	8.50
HYDROGRAPH AT	EPT.3	4.39	1	FLOW	156.	122.	94.
+				TIME	7.70	7.70	7.80
3 COMBINED AT	.	8.15	1	FLOW	314.	236.	172.
+				TIME	8.10	8.10	8.20
HYDROGRAPH AT	EPT.4	1.37	1	FLOW	69.	55.	43.
+				TIME	6.70	6.70	6.80
ROUTED TO	V	1.37	1	FLOW	68.	54.	43.
+				TIME	7.60	7.60	7.70
2 COMBINED AT	.	9.52	1	FLOW	380.	288.	213.
+				TIME	8.00	8.00	8.10
2 COMBINED AT	.	41.42	1	FLOW	710.	559.	436.
+				TIME	7.90	8.00	8.10
HYDROGRAPH AT	EPT.5	3.01	1	FLOW	77.	60.	45.
+				TIME	8.70	8.70	8.80
2 COMBINED AT	.	44.42	1	FLOW	784.	616.	479.
+				TIME	8.00	8.10	8.20
ROUTED TO	V	44.42	1	FLOW	783.	616.	478.
+				TIME	8.00	8.10	8.20
HYDROGRAPH AT	EPT.2	1.49	1	FLOW	50.	37.	27.
+				TIME	6.70	6.70	6.80
2 COMBINED AT	LVWASH	45.92	1	FLOW	817.	641.	497.
+				TIME	8.00	8.00	8.10
HYDROGRAPH AT	GOWANDIV	0.00	1	FLOW	0.	0.	0.
+				TIME	7.20	7.30	7.10
ROUTED TO	301	0.00	1	FLOW	0.	0.	0.
+				TIME	9.30	9.50	9.40

HYDROGRAPH AT	301	18.62	1	FLOW	379.	282.	204.
+				TIME	8.40	8.40	8.50
2 COMBINED AT	WTRIBUS	18.62	1	FLOW	379.	282.	204.
+				TIME	8.40	8.40	8.50
2 COMBINED AT	WTRIBTOT	64.53	1	FLOW	1192.	920.	698.
+				TIME	8.10	8.20	8.20
ROUTED TO	304	64.53	1	FLOW	1188.	918.	697.
+				TIME	8.40	8.50	8.50
ROUTED TO	SNIC	64.53	1	FLOW	1188.	918.	697.
+				TIME	8.40	8.50	8.60
ROUTED TO	LBC	64.53	1	FLOW	1188.	918.	696.
+				TIME	8.40	8.50	8.60
HYDROGRAPH AT	310W	0.80	1	FLOW	39.	28.	18.
+				TIME	5.60	5.90	6.30
ROUTED TO	R310W	0.80	1	FLOW	39.	28.	18.
+				TIME	6.20	6.60	7.20
HYDROGRAPH AT	310E	1.24	1	FLOW	40.	26.	16.
+				TIME	5.80	6.20	6.70
2 COMBINED AT	310E	2.04	1	FLOW	76.	52.	32.
+				TIME	6.10	6.50	7.10
ROUTED TO	R310E	2.04	1	FLOW	76.	50.	32.
+				TIME	6.30	6.90	7.40
HYDROGRAPH AT	311W	0.96	1	FLOW	32.	21.	12.
+				TIME	5.70	6.00	6.40
2 COMBINED AT	311W	3.00	1	FLOW	101.	66.	42.
+				TIME	6.30	6.80	7.40
ROUTED TO	R311W	3.00	1	FLOW	99.	65.	41.
+				TIME	6.60	7.20	7.80
HYDROGRAPH AT	311E	0.77	1	FLOW	9.	4.	1.
+				TIME	5.20	5.20	5.40
2 COMBINED AT	311E	3.77	1	FLOW	100.	65.	41.
+				TIME	6.60	7.20	7.80
HYDROGRAPH AT	309W	0.81	1	FLOW	0.	0.	0.
+				TIME	19.80	0.10	0.10
HYDROGRAPH AT	309E	1.19	1	FLOW	27.	17.	10.
+				TIME	6.80	7.50	8.30
2 COMBINED AT	309E	2.00	1	FLOW	27.	17.	10.
+				TIME	6.80	7.50	8.30
2 COMBINED AT		5.77	1	FLOW	125.	81.	50.
+				TIME	6.60	7.20	7.80
ROUTED TO	FCP1	5.77	1	FLOW	125.	81.	50.
+				TIME	6.60	7.20	7.80
ROUTED TO	FCP2	5.77	1	FLOW	125.	81.	50.
+				TIME	6.70	7.20	7.90
ROUTED TO	FCBC1	5.77	1	FLOW	125.	80.	50.
+				TIME	6.70	7.20	7.90
ROUTED TO	FC1	5.77	1	FLOW	124.	80.	50.
+				TIME	6.70	7.30	7.90
ROUTED TO	FCBC2/FC	5.77	1	FLOW	124.	80.	50.
+				TIME	6.70	7.30	7.90

HYDROGRAPH AT	307NW	1.33	1	FLOW	61.	42.	27.
+				TIME	5.60	5.90	6.30
ROUTED TO	R307NW	1.33	1	FLOW	60.	42.	27.
+				TIME	5.80	6.10	6.60
HYDROGRAPH AT	307NE	0.64	1	FLOW	31.	22.	14.
+				TIME	5.60	5.90	6.30
2 COMBINED AT	307NE	1.97	1	FLOW	91.	63.	40.
+				TIME	5.70	6.00	6.50
2 COMBINED AT	.	7.74	1	FLOW	183.	118.	73.
+				TIME	6.60	7.20	7.90
ROUTED TO	V	7.74	1	FLOW	179.	115.	71.
+				TIME	7.00	7.60	8.30
HYDROGRAPH AT	307SW	1.10	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
HYDROGRAPH AT	307SE	1.58	1	FLOW	70.	48.	31.
+				TIME	5.70	6.00	6.40
2 COMBINED AT	307SE	2.68	1	FLOW	70.	48.	31.
+				TIME	5.70	6.00	6.40
2 COMBINED AT	.	10.42	1	FLOW	216.	138.	85.
+				TIME	6.90	7.50	8.20
ROUTED TO	V	10.42	1	FLOW	215.	137.	84.
+				TIME	7.10	7.70	8.40
HYDROGRAPH AT	308W	0.81	1	FLOW	0.	0.	0.
+				TIME	19.90	0.10	0.10
HYDROGRAPH AT	308E	0.72	1	FLOW	31.	21.	14.
+				TIME	5.70	6.00	6.40
2 COMBINED AT	308E	1.53	1	FLOW	31.	21.	14.
+				TIME	5.70	6.00	6.40
2 COMBINED AT	.	11.95	1	FLOW	230.	147.	90.
+				TIME	7.00	7.60	8.40
ROUTED TO	R307/308	11.95	1	FLOW	229.	147.	90.
+				TIME	7.20	7.80	8.60
HYDROGRAPH AT	312W	0.77	1	FLOW	10.	5.	2.
+				TIME	7.00	7.90	9.30
2 COMBINED AT	312W	12.72	1	FLOW	239.	151.	91.
+				TIME	7.10	7.80	8.60
ROUTED TO	R312W	12.72	1	FLOW	239.	151.	91.
+				TIME	7.30	7.90	8.80
HYDROGRAPH AT	312E	0.70	1	FLOW	5.	2.	1.
+				TIME	7.30	8.50	10.50
2 COMBINED AT	312E	13.42	1	FLOW	244.	153.	92.
+				TIME	7.30	8.00	8.80
HYDROGRAPH AT	306	5.07	1	FLOW	100.	72.	49.
+				TIME	7.20	7.30	7.40
3 COMBINED AT	.	83.02	1	FLOW	1450.	1118.	825.
+				TIME	8.00	8.30	8.60
ROUTED TO	FC3	83.02	1	FLOW	1450.	1118.	825.
+				TIME	8.10	8.30	8.60
ROUTED TO	FC4/FC5	83.02	1	FLOW	1450.	1118.	825.
+				TIME	8.10	8.30	8.60

ROUTED TO							
+	FC6	83.02	1	FLOW	1450.	1117.	825.
				TIME	8.10	8.40	8.70
ROUTED TO							
+	FC7	83.02	1	FLOW	1449.	1117.	824.
				TIME	8.20	8.40	8.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	1449.	1117.	824.
				TIME	8.20	8.50	8.80
HYDROGRAPH AT							
+	302	12.11	1	FLOW	306.	228.	165.
				TIME	7.20	7.30	7.30
ROUTED TO							
+	303	12.11	1	FLOW	303.	226.	164.
				TIME	8.10	8.10	8.20
HYDROGRAPH AT							
+	303	10.22	1	FLOW	151.	108.	74.
				TIME	8.40	8.50	8.50
2 COMBINED AT							
+	.	22.33	1	FLOW	452.	333.	237.
				TIME	8.20	8.20	8.30
HYDROGRAPH AT							
+	304	2.90	1	FLOW	101.	76.	55.
				TIME	6.10	6.20	6.30
HYDROGRAPH AT							
+	305	3.30	1	FLOW	150.	115.	86.
				TIME	5.60	5.70	5.70
2 COMBINED AT							
+	.	6.20	1	FLOW	245.	186.	138.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	2582.	1967.	1380.
				TIME	8.20	8.40	8.80
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	2581.	1967.	1379.
				TIME	8.30	8.50	8.80
ROUTED TO							
+	AC3	111.56	1	FLOW	2581.	1967.	1379.
				TIME	8.30	8.50	8.80
ROUTED TO							
+	AC4	111.56	1	FLOW	2580.	1966.	1379.
				TIME	8.30	8.50	8.90
2 COMBINED AT							
+	NCHANNL	172.20	1	FLOW	2733.	2083.	1452.
				TIME	8.30	8.50	8.90

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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.06									
NC1	MANE	0.50	162.87	552.67	0.03	6.00	162.86	552.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8932E+02 EXCESS=0.0000E+00 OUTFLOW=0.8927E+02 BASIN STORAGE=0.4698E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC1	MANE	0.50	123.95	546.77	0.02	6.00	123.95	546.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6302E+02 EXCESS=0.0000E+00 OUTFLOW=0.6296E+02 BASIN STORAGE=0.4533E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC1	MANE	0.57	79.07	558.73	0.01	6.00	79.06	558.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4233E+02 EXCESS=0.0000E+00 OUTFLOW=0.4229E+02 BASIN STORAGE=0.4397E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.71	162.86	555.21	0.03	6.00	162.85	558.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8927E+02 EXCESS=0.0000E+00 OUTFLOW=0.8902E+02 BASIN STORAGE=0.2702E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.98	123.94	549.64	0.02	6.00	123.92	552.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6297E+02 EXCESS=0.0000E+00 OUTFLOW=0.6272E+02 BASIN STORAGE=0.2613E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.24	79.05	563.08	0.01	6.00	79.04	564.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4228E+02 EXCESS=0.0000E+00 OUTFLOW=0.4203E+02 BASIN STORAGE=0.2541E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	1.17	162.84	560.41	0.03	6.00	162.83	558.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8897E+02 EXCESS=0.0000E+00 OUTFLOW=0.8883E+02 BASIN STORAGE=0.1437E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	1.15	123.92	554.38	0.02	6.00	123.91	552.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6268E+02 EXCESS=0.0000E+00 OUTFLOW=0.6257E+02 BASIN STORAGE=0.1386E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	1.35	79.03	566.45	0.01	6.00	79.00	564.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4200E+02 EXCESS=0.0000E+00 OUTFLOW=0.4186E+02 BASIN STORAGE=0.1346E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	3.31	162.80	566.75	0.03	6.00	162.80	564.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8881E+02 EXCESS=0.0000E+00 OUTFLOW=0.8832E+02 BASIN STORAGE=0.4683E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	3.65	123.89	558.01	0.02	6.00	123.89	558.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6252E+02 EXCESS=0.0000E+00 OUTFLOW=0.6202E+02 BASIN STORAGE=0.4527E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	4.20	78.98	575.17	0.01	6.00	78.96	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4185E+02 EXCESS=0.0000E+00 OUTFLOW=0.4147E+02 BASIN STORAGE=0.4387E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	1.02	162.80	566.68	0.03	6.00	162.78	570.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8829E+02 EXCESS=0.0000E+00 OUTFLOW=0.8816E+02 BASIN STORAGE=0.1318E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	1.10	123.88	560.39	0.02	6.00	123.86	564.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6201E+02 EXCESS=0.0000E+00 OUTFLOW=0.6191E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	1.29	78.95	576.49	0.01	6.00	78.95	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4136E+02 EXCESS=0.0000E+00 OUTFLOW=0.4122E+02 BASIN STORAGE=0.1238E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC5	MANE	0.62	162.78	570.41	0.03	6.00	162.78	570.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8814E+02 EXCESS=0.0000E+00 OUTFLOW=0.8807E+02 BASIN STORAGE=0.7332E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC5	MANE	0.54	123.86	565.15	0.02	6.00	123.86	564.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6187E+02 EXCESS=0.0000E+00 OUTFLOW=0.6179E+02 BASIN STORAGE=0.7086E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC5	MANE	0.74	78.95	577.35	0.01	6.00	78.93	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4122E+02 EXCESS=0.0000E+00 OUTFLOW=0.4116E+02 BASIN STORAGE=0.6882E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.78	258.69	241.04	0.42	6.00	258.00	240.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4052E+02 EXCESS=0.0000E+00 OUTFLOW=0.4059E+02 BASIN STORAGE=0.8477E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V	MANE	5.26	202.76	244.60	0.33	6.00	202.15	240.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3204E+02 EXCESS=0.0000E+00 OUTFLOW=0.3214E+02 BASIN STORAGE=0.8357E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.85

V	MANE	5.80	154.07	247.35	0.26	6.00	154.01	246.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2489E+02 EXCESS=0.0000E+00 OUTFLOW=0.2498E+02 BASIN STORAGE=0.6105E-02 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.39	257.22	248.26	0.42	6.00	255.86	252.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4059E+02 EXCESS=0.0000E+00 OUTFLOW=0.4057E+02 BASIN STORAGE=0.7386E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	4.89	201.49	252.88	0.33	6.00	201.02	252.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3218E+02 EXCESS=0.0000E+00 OUTFLOW=0.3221E+02 BASIN STORAGE=0.8044E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	5.32	153.38	255.39	0.26	6.00	152.38	258.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2498E+02 EXCESS=0.0000E+00 OUTFLOW=0.2503E+02 BASIN STORAGE=0.8100E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 1.06

V	MANE	2.10	378.84	250.75	0.42	6.00	378.43	252.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6144E+02 EXCESS=0.0000E+00 OUTFLOW=0.6143E+02 BASIN STORAGE=0.1091E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	2.37	297.40	255.18	0.33	6.00	296.25	258.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4889E+02 EXCESS=0.0000E+00 OUTFLOW=0.4888E+02 BASIN STORAGE=0.1135E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.66	227.28	257.20	0.26	6.00	226.99	258.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3817E+02 EXCESS=0.0000E+00 OUTFLOW=0.3816E+02 BASIN STORAGE=0.1139E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AP_TO_VE	MANE	1.85	56.48	579.62	0.19	6.00	56.48	582.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8051E+02 EXCESS=0.0000E+00 OUTFLOW=0.8029E+02 BASIN STORAGE=0.2664E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

AP_TO_VE	MANE	1.85	53.95	567.53	0.18	6.00	53.95	564.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7682E+02 EXCESS=0.0000E+00 OUTFLOW=0.7654E+02 BASIN STORAGE=0.2558E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AP_TO_VE	MANE	1.85	51.38	553.81	0.17	6.00	51.38	552.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7300E+02 EXCESS=0.0000E+00 OUTFLOW=0.7281E+02 BASIN STORAGE=0.2440E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	1.44	56.48	582.76	0.19	6.00	56.48	582.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8018E+02 EXCESS=0.0000E+00 OUTFLOW=0.7993E+02 BASIN STORAGE=0.2575E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	1.34	53.95	566.97	0.18	6.00	53.95	570.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7650E+02 EXCESS=0.0000E+00 OUTFLOW=0.7624E+02 BASIN STORAGE=0.2602E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	1.42	51.38	555.15	0.17	6.00	51.38	558.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7269E+02 EXCESS=0.0000E+00 OUTFLOW=0.7250E+02 BASIN STORAGE=0.2427E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	4.89	151.69	336.99	0.22	6.00	151.68	336.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1052E+03 EXCESS=0.0000E+00 OUTFLOW=0.1040E+03 BASIN STORAGE=0.1435E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	5.03	130.41	339.16	0.20	6.00	130.31	336.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9653E+02 EXCESS=0.0000E+00 OUTFLOW=0.9553E+02 BASIN STORAGE=0.1375E+01 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	5.36	111.27	346.64	0.18	6.00	111.25	342.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8845E+02 EXCESS=0.0000E+00 OUTFLOW=0.8733E+02 BASIN STORAGE=0.1226E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.73	361.80	338.91	0.34	6.00	361.71	336.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8794E+02 EXCESS=0.0000E+00 OUTFLOW=0.8794E+02 BASIN STORAGE=0.2515E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.89	284.88	340.69	0.26	6.00	284.65	342.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6848E+02 EXCESS=0.0000E+00 OUTFLOW=0.6849E+02 BASIN STORAGE=0.2917E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.00	219.53	345.25	0.20	6.00	219.49	342.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5222E+02 EXCESS=0.0000E+00 OUTFLOW=0.5223E+02 BASIN STORAGE=0.3310E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

R.GSOUT	MANE	1.02	317.43	449.68	0.24	6.00	317.43	450.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2514E+03 EXCESS=0.0000E+00 OUTFLOW=0.2511E+03 BASIN STORAGE=0.2214E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.GSOUT	MANE	1.01	262.18	451.53	0.20	6.00	262.17	450.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2078E+03 EXCESS=0.0000E+00 OUTFLOW=0.2076E+03 BASIN STORAGE=0.1994E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.GSOUT	MANE	1.01	216.20	451.11	0.17	6.00	216.20	450.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1707E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1857E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.82	27.32	365.87	0.06	6.00	27.32	366.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6412E+01 EXCESS=0.0000E+00 OUTFLOW=0.6415E+01 BASIN STORAGE=0.9782E-03 PERCENT ERROR= -0.1

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.50     18.53    372.87      0.04      6.00     18.51    372.00          0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4247E+01 EXCESS=0.0000E+00 OUTFLOW=0.4250E+01 BASIN STORAGE=0.8856E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          6.00     11.77    382.02      0.02      6.00     11.75    384.00          0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2617E+01 EXCESS=0.0000E+00 OUTFLOW=0.2619E+01 BASIN STORAGE=0.7901E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          5.21     27.31    377.57      0.06      6.00     27.31    378.00          0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6416E+01 EXCESS=0.0000E+00 OUTFLOW=0.6416E+01 BASIN STORAGE=0.9939E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.80     18.49    387.85      0.04      6.00     18.47    384.00          0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4250E+01 EXCESS=0.0000E+00 OUTFLOW=0.4251E+01 BASIN STORAGE=0.9160E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          6.00     11.75    396.38      0.02      6.00     11.75    396.00          0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2619E+01 EXCESS=0.0000E+00 OUTFLOW=0.2618E+01 BASIN STORAGE=0.1011E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          6.00     17.68    382.10      0.10      6.00     17.66    384.00          0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3942E+01 EXCESS=0.0000E+00 OUTFLOW=0.3943E+01 BASIN STORAGE=0.8031E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.79     11.82    395.04      0.06      6.00     11.80    396.00          0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2555E+01 EXCESS=0.0000E+00 OUTFLOW=0.2556E+01 BASIN STORAGE=0.7932E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          5.75      7.34    404.41      0.04      6.00      7.32    402.00          0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1525E+01 EXCESS=0.0000E+00 OUTFLOW=0.1525E+01 BASIN STORAGE=0.7336E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          R.G-UPS.  MANE          0.76    257.83    636.74      0.17      6.00    257.83    636.00          0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2851E+03 EXCESS=0.0000E+00 OUTFLOW=0.2847E+03 BASIN STORAGE=0.3704E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          R.G-UPS.  MANE          0.77    232.57    606.97      0.14      6.00    232.57    606.00          0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2418E+03 EXCESS=0.0000E+00 OUTFLOW=0.2414E+03 BASIN STORAGE=0.3077E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          R.G-UPS.  MANE          0.76    196.15    596.09      0.12      6.00    196.15    600.00          0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1996E+03 EXCESS=0.0000E+00 OUTFLOW=0.1994E+03 BASIN STORAGE=0.1929E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.66    257.83    639.01      0.17      6.00    257.83    636.00          0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2846E+03 EXCESS=0.0000E+00 OUTFLOW=0.2831E+03 BASIN STORAGE=0.1420E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.81    232.56    609.24      0.14      6.00    232.55    606.00          0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2414E+03 EXCESS=0.0000E+00 OUTFLOW=0.2404E+03 BASIN STORAGE=0.1233E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.93    196.14    602.41      0.12      6.00    196.14    600.00          0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1993E+03 EXCESS=0.0000E+00 OUTFLOW=0.1984E+03 BASIN STORAGE=0.8759E+00 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 1.06
               V  MANE          2.07    330.06    471.05      0.18      6.00    330.02    468.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3130E+03 EXCESS=0.0000E+00 OUTFLOW=0.3114E+03 BASIN STORAGE=0.1842E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          2.19    270.69    477.42      0.15      6.00    270.66    474.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2613E+03 EXCESS=0.0000E+00 OUTFLOW=0.2597E+03 BASIN STORAGE=0.1606E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          2.32    222.99    483.79      0.12      6.00    222.97    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2129E+03 EXCESS=0.0000E+00 OUTFLOW=0.2119E+03 BASIN STORAGE=0.1145E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.05    330.02    470.74      0.18      6.00    329.99    474.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3110E+03 EXCESS=0.0000E+00 OUTFLOW=0.3100E+03 BASIN STORAGE=0.9753E+00 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.13    270.66    477.25      0.15      6.00    270.65    480.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2596E+03 EXCESS=0.0000E+00 OUTFLOW=0.2590E+03 BASIN STORAGE=0.8475E+00 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.32    222.97    486.89      0.12      6.00    222.97    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2116E+03 EXCESS=0.0000E+00 OUTFLOW=0.2111E+03 BASIN STORAGE=0.6103E+00 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.04    329.99    475.62      0.18      6.00    329.96    474.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3100E+03 EXCESS=0.0000E+00 OUTFLOW=0.3091E+03 BASIN STORAGE=0.9770E+00 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.18    270.64    481.67      0.15      6.00    270.62    480.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2587E+03 EXCESS=0.0000E+00 OUTFLOW=0.2579E+03 BASIN STORAGE=0.8504E+00 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.32    222.96    488.67      0.12      6.00    222.93    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+03 EXCESS=0.0000E+00 OUTFLOW=0.2105E+03 BASIN STORAGE=0.6143E+00 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.38    783.39    483.39      0.21      6.00    783.05    480.00      0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5012E+03 EXCESS=0.0000E+00 OUTFLOW=0.4993E+03 BASIN STORAGE=0.1873E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.51    615.76    488.53      0.17      6.00    615.56    486.00      0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4048E+03 EXCESS=0.0000E+00 OUTFLOW=0.4032E+03 BASIN STORAGE=0.1629E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.82    478.50    494.75      0.13      6.00    478.46    492.00      0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3201E+03 EXCESS=0.0000E+00 OUTFLOW=0.3191E+03 BASIN STORAGE=0.1192E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 1.06
            SNIC  MANE          0.91   1188.44    505.56      0.20      6.00   1188.37    504.00      0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7001E+03 EXCESS=0.0000E+00 OUTFLOW=0.6991E+03 BASIN STORAGE=0.1142E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
            SNIC  MANE          0.95    917.94    511.81      0.16      6.00    917.93    510.00      0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5522E+03 EXCESS=0.0000E+00 OUTFLOW=0.5514E+03 BASIN STORAGE=0.9771E+00 PERCENT ERROR=  0.0
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          FOR PLAN = 1  RATIO= 0.85
              SNIC  MANE          1.12    696.77    512.73      0.12      6.00    696.59    516.00        0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4265E+03 EXCESS=0.0000E+00 OUTFLOW=0.4258E+03 BASIN STORAGE=0.7209E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               LBC  MANE          1.58   1188.18    506.20      0.20      6.00   1187.73    504.00        0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6989E+03 EXCESS=0.0000E+00 OUTFLOW=0.6966E+03 BASIN STORAGE=0.2351E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               LBC  MANE          1.80    917.80    512.69      0.16      6.00    917.54    510.00        0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5511E+03 EXCESS=0.0000E+00 OUTFLOW=0.5492E+03 BASIN STORAGE=0.2033E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               LBC  MANE          1.91    696.55    518.26      0.12      6.00    696.49    516.00        0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4257E+03 EXCESS=0.0000E+00 OUTFLOW=0.4241E+03 BASIN STORAGE=0.1548E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          5.76     32.86    346.78      0.17      6.00     32.79    348.00        0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7569E+01 OUTFLOW=0.7254E+01 BASIN STORAGE=0.1577E+00 PERCENT ERROR=   2.1

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          6.00     39.09    337.72      0.20      6.00     38.96    336.00        0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8754E+01 OUTFLOW=0.8426E+01 BASIN STORAGE=0.1568E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 0.95
              310W  MANE          6.00     27.72    352.45      0.15      6.00     27.71    354.00        0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6627E+01 OUTFLOW=0.6330E+01 BASIN STORAGE=0.1579E+00 PERCENT ERROR=   2.1

          FOR PLAN = 1  RATIO= 0.85
              310W  MANE          6.00     18.43    379.26      0.11      6.00     18.37    378.00        0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4882E+01 OUTFLOW=0.4620E+01 BASIN STORAGE=0.1487E+00 PERCENT ERROR=   2.3

          FOR PLAN = 1  RATIO= 1.06
             R310W  MANE          5.89     38.80    375.49      0.19      6.00     38.76    372.00        0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8421E+01 EXCESS=0.0000E+00 OUTFLOW=0.8289E+01 BASIN STORAGE=0.2026E+00 PERCENT ERROR=  -0.8

          FOR PLAN = 1  RATIO= 0.95
             R310W  MANE          5.92     27.57    399.44      0.15      6.00     27.55    396.00        0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6328E+01 EXCESS=0.0000E+00 OUTFLOW=0.6274E+01 BASIN STORAGE=0.2043E+00 PERCENT ERROR=  -2.4

          FOR PLAN = 1  RATIO= 0.85
             R310W  MANE          6.00     18.30    431.36      0.11      6.00     18.27    432.00        0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4611E+01 EXCESS=0.0000E+00 OUTFLOW=0.4616E+01 BASIN STORAGE=0.2009E+00 PERCENT ERROR=  -4.5

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          6.00     32.18    357.98      0.12      6.00     32.16    360.00        0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8191E+01 OUTFLOW=0.7814E+01 BASIN STORAGE=0.1980E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          6.00     40.22    352.53      0.14      6.00     40.19    348.00        0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9689E+01 OUTFLOW=0.9305E+01 BASIN STORAGE=0.1855E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 0.95
              310E  MANE          5.84     26.07    370.31      0.10      6.00     26.03    372.00        0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7018E+01 OUTFLOW=0.6664E+01 BASIN STORAGE=0.1919E+00 PERCENT ERROR=   2.3

          FOR PLAN = 1  RATIO= 0.85
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310E MANE	6.00	15.58	398.26	0.07	6.00	15.56	402.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4892E+01 OUTFLOW=0.4551E+01 BASIN STORAGE=0.1936E+00 PERCENT ERROR= 3.0

FOR PLAN = 1 RATIO= 1.06

R310E MANE	5.43	75.65	377.39	0.16	6.00	75.64	378.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1757E+02 EXCESS=0.0000E+00 OUTFLOW=0.1744E+02 BASIN STORAGE=0.1337E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R310E MANE	6.00	60.93	410.58	0.12	6.00	60.24	414.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1293E+02 EXCESS=0.0000E+00 OUTFLOW=0.1277E+02 BASIN STORAGE=0.1344E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.85

R310E MANE	5.74	32.36	444.88	0.08	6.00	32.36	444.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9157E+01 EXCESS=0.0000E+00 OUTFLOW=0.9016E+01 BASIN STORAGE=0.1526E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

311W MANE	5.89	25.54	348.61	0.11	6.00	25.51	348.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6117E+01 OUTFLOW=0.5862E+01 BASIN STORAGE=0.1186E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

311W MANE	5.46	31.96	340.42	0.14	6.00	31.88	342.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7259E+01 OUTFLOW=0.6993E+01 BASIN STORAGE=0.1243E+00 PERCENT ERROR= 2.0

FOR PLAN = 1 RATIO= 0.95

311W MANE	6.00	20.66	355.93	0.10	6.00	20.63	360.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5224E+01 OUTFLOW=0.4979E+01 BASIN STORAGE=0.1178E+00 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 0.85

311W MANE	6.00	12.39	384.83	0.07	6.00	12.37	384.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3610E+01 OUTFLOW=0.3392E+01 BASIN STORAGE=0.1150E+00 PERCENT ERROR= 2.9

FOR PLAN = 1 RATIO= 1.06

R311W MANE	6.00	99.94	393.41	0.15	6.00	99.31	396.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2441E+02 EXCESS=0.0000E+00 OUTFLOW=0.2415E+02 BASIN STORAGE=0.2405E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R311W MANE	6.00	65.42	430.18	0.11	6.00	64.99	432.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1772E+02 EXCESS=0.0000E+00 OUTFLOW=0.1744E+02 BASIN STORAGE=0.2760E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R311W MANE	6.00	41.43	467.93	0.08	6.00	41.43	468.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1239E+02 EXCESS=0.0000E+00 OUTFLOW=0.1212E+02 BASIN STORAGE=0.2939E+00 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 1.06

309W MANE	6.00	0.00	1206.01	0.00	6.00	0.00	1194.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4141E-01 OUTFLOW=0.4307E-05 BASIN STORAGE=0.1519E-01 PERCENT ERROR= 63.3

FOR PLAN = 1 RATIO= 1.06

309W MANE	6.00	0.03	1200.16	0.00	6.00	0.02	1194.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1375E+00 OUTFLOW=0.5556E-02 BASIN STORAGE=0.7553E-01 PERCENT ERROR= 41.0

FOR PLAN = 1 RATIO= 0.95

309W MANE	4479.84	0.00	4479.84	0.00	6.00	0.00	1194.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5635E-02 OUTFLOW=0.1072E-08 BASIN STORAGE=0.1231E-02 PERCENT ERROR= 78.2

FOR PLAN = 1 RATIO= 0.85

309W MANE	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	21.32	428.87	0.11	6.00	21.17	426.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7614E+01 OUTFLOW=0.7043E+01 BASIN STORAGE=0.4065E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	27.30	409.12	0.13	6.00	27.19	408.00	0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8990E+01 OUTFLOW=0.8395E+01 BASIN STORAGE=0.4121E+00 PERCENT ERROR= 2.0

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	16.94	448.55	0.09	6.00	16.86	450.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6539E+01 OUTFLOW=0.5989E+01 BASIN STORAGE=0.3996E+00 PERCENT ERROR= 2.3

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	9.82	499.14	0.06	6.00	9.81	498.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4598E+01 OUTFLOW=0.4057E+01 BASIN STORAGE=0.4066E+00 PERCENT ERROR= 2.9

FOR PLAN = 1 RATIO= 1.06

FCP1	MANE	0.33	125.43	396.70	0.11	6.00	124.90	396.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3331E+02 EXCESS=0.0000E+00 OUTFLOW=0.3330E+02 BASIN STORAGE=0.3160E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP1	MANE	0.33	80.94	432.59	0.08	6.00	80.87	432.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2372E+02 BASIN STORAGE=0.3125E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP1	MANE	0.36	50.32	468.64	0.05	6.00	50.15	468.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1623E+02 EXCESS=0.0000E+00 OUTFLOW=0.1622E+02 BASIN STORAGE=0.3122E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCP2	MANE	0.43	124.87	397.24	0.11	6.00	124.59	402.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3331E+02 EXCESS=0.0000E+00 OUTFLOW=0.3330E+02 BASIN STORAGE=0.5498E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP2	MANE	0.53	80.81	432.89	0.08	6.00	80.61	432.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2371E+02 BASIN STORAGE=0.5440E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP2	MANE	0.58	50.13	469.30	0.05	6.00	49.95	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1622E+02 EXCESS=0.0000E+00 OUTFLOW=0.1622E+02 BASIN STORAGE=0.5439E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC1	MANE	0.34	124.56	402.40	0.11	6.00	124.53	402.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3330E+02 EXCESS=0.0000E+00 OUTFLOW=0.3329E+02 BASIN STORAGE=0.1379E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC1	MANE	0.48	80.58	432.98	0.08	6.00	80.30	432.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2370E+02 BASIN STORAGE=0.1366E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC1	MANE	0.55	49.93	474.78	0.05	6.00	49.91	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1622E+02 EXCESS=0.0000E+00 OUTFLOW=0.1621E+02 BASIN STORAGE=0.1366E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC1	MANE	0.34	124.47	402.49	0.11	6.00	124.37	402.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3329E+02 EXCESS=0.0000E+00 OUTFLOW=0.3328E+02 BASIN STORAGE=0.1487E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC1	MANE	0.38	80.30	432.83	0.08	6.00	80.13	438.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2370E+02 EXCESS=0.0000E+00 OUTFLOW=0.2369E+02 BASIN STORAGE=0.1476E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC1	MANE	0.49	49.90	474.91	0.05	6.00	49.79	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1621E+02 EXCESS=0.0000E+00 OUTFLOW=0.1619E+02 BASIN STORAGE=0.1477E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC2/FC	MANE	0.41	124.29	402.69	0.11	6.00	124.15	402.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3328E+02 EXCESS=0.0000E+00 OUTFLOW=0.3327E+02 BASIN STORAGE=0.1425E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC2/FC	MANE	0.37	80.11	438.33	0.08	6.00	80.10	438.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2369E+02 EXCESS=0.0000E+00 OUTFLOW=0.2368E+02 BASIN STORAGE=0.1414E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC2/FC	MANE	0.51	49.77	475.26	0.05	6.00	49.59	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1619E+02 EXCESS=0.0000E+00 OUTFLOW=0.1618E+02 BASIN STORAGE=0.1411E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	5.80	49.92	347.88	0.16	6.00	49.90	348.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1159E+02 OUTFLOW=0.1112E+02 BASIN STORAGE=0.2165E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	5.33	60.86	334.76	0.18	6.00	60.80	336.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1347E+02 OUTFLOW=0.1297E+02 BASIN STORAGE=0.2155E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.95

307NW	MANE	6.00	41.86	354.06	0.14	6.00	41.86	354.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1010E+02 OUTFLOW=0.9661E+01 BASIN STORAGE=0.2149E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 0.85

307NW	MANE	5.91	26.79	378.72	0.10	6.00	26.75	378.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7356E+01 OUTFLOW=0.6938E+01 BASIN STORAGE=0.2107E+00 PERCENT ERROR= 2.8

FOR PLAN = 1 RATIO= 1.06

R307NW	MANE	4.85	60.61	344.51	0.18	6.00	60.44	348.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1297E+02 EXCESS=0.0000E+00 OUTFLOW=0.1287E+02 BASIN STORAGE=0.7215E-01 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R307NW	MANE	5.52	41.79	366.05	0.13	6.00	41.79	366.00	0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9657E+01 EXCESS=0.0000E+00 OUTFLOW=0.9569E+01 BASIN STORAGE=0.6988E-01 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.85

R307NW	MANE	6.00	26.68	394.95	0.10	6.00	26.63	396.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6932E+01 EXCESS=0.0000E+00 OUTFLOW=0.6839E+01 BASIN STORAGE=0.6962E-01 PERCENT ERROR= 0.3

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	6.00	25.83	343.52	0.17	6.00	25.72	342.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6055E+01 OUTFLOW=0.5810E+01 BASIN STORAGE=0.1115E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	5.64	31.08	335.86	0.20	6.00	31.07	336.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7004E+01 OUTFLOW=0.6748E+01 BASIN STORAGE=0.1044E+00 PERCENT ERROR= 2.2

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          FOR PLAN = 1  RATIO= 0.95
             307NE  MANE         5.08     21.61    351.56      0.15      6.00     21.57    354.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5302E+01 OUTFLOW=0.5070E+01 BASIN STORAGE=0.1119E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 0.85
             307NE  MANE         5.94     14.07    375.51      0.11      6.00     14.04    378.00      0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3905E+01 OUTFLOW=0.3690E+01 BASIN STORAGE=0.1096E+00 PERCENT ERROR=   2.7

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE         0.00      0.00      0.00      0.00      6.00      0.00      0.00      0.00

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE         0.00      0.00      0.00      0.00      6.00      0.00      0.00      0.00

          FOR PLAN = 1  RATIO= 0.95
             307SW  MANE         0.00      0.00      0.00      0.00      6.00      0.00      0.00      0.00

          FOR PLAN = 1  RATIO= 0.85
             307SW  MANE         0.00      0.00      0.00      0.00      6.00      0.00      0.00      0.00

          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE         6.00     57.43    352.89      0.15      6.00     57.25    354.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1347E+02 OUTFLOW=0.1291E+02 BASIN STORAGE=0.2745E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE         5.77     69.67    339.36      0.18      6.00     69.54    342.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1568E+02 OUTFLOW=0.1508E+02 BASIN STORAGE=0.2833E+00 PERCENT ERROR=   2.1

          FOR PLAN = 1  RATIO= 0.95
             307SE  MANE         5.42     47.82    359.86      0.13      6.00     47.81    360.00      0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1173E+02 OUTFLOW=0.1119E+02 BASIN STORAGE=0.2782E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 0.85
             307SE  MANE         5.38     30.64    387.64      0.09      6.00     30.54    390.00      0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8513E+01 OUTFLOW=0.8003E+01 BASIN STORAGE=0.2809E+00 PERCENT ERROR=   2.7

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE         6.00      0.00   1212.78      0.00      6.00      0.00   1194.00      0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3956E-01 OUTFLOW=0.4500E-05 BASIN STORAGE=0.1386E-01 PERCENT ERROR=  65.0

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE         6.00      0.02   1194.84      0.00      6.00      0.02   1194.00      0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1343E+00 OUTFLOW=0.5063E-02 BASIN STORAGE=0.7091E-01 PERCENT ERROR=  43.4

          FOR PLAN = 1  RATIO= 0.95
             308W  MANE      5192.54      0.00   5192.54      0.00      6.00      0.00   1194.00      0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4941E-02 OUTFLOW=0.9070E-09 BASIN STORAGE=0.1083E-02 PERCENT ERROR=  78.1

          FOR PLAN = 1  RATIO= 0.85
             308W  MANE         0.00      0.00      0.00      0.00      6.00      0.00      0.00      0.00

          FOR PLAN = 1  RATIO= 1.06
             308E  MANE         5.89     25.63    347.36      0.15      6.00     25.61    348.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5821E+01 OUTFLOW=0.5589E+01 BASIN STORAGE=0.1184E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 1.06
             308E  MANE         5.34     31.07    339.51      0.17      6.00     30.93    342.00      0.17
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6797E+01 OUTFLOW=0.6546E+01 BASIN STORAGE=0.1195E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 0.95

308E	MANE	6.00	21.34	360.16	0.13	6.00	21.33	360.00	0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5050E+01 OUTFLOW=0.4827E+01 BASIN STORAGE=0.1181E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.85

308E	MANE	6.00	13.58	382.29	0.09	6.00	13.58	384.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3635E+01 OUTFLOW=0.3425E+01 BASIN STORAGE=0.1212E+00 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 1.06

R307/308	MANE	4.09	229.63	429.56	0.12	6.00	229.47	432.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7433E+02 EXCESS=0.0000E+00 OUTFLOW=0.7388E+02 BASIN STORAGE=0.3828E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R307/308	MANE	4.87	146.59	467.92	0.08	6.00	146.59	468.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5414E+02 EXCESS=0.0000E+00 OUTFLOW=0.5375E+02 BASIN STORAGE=0.1759E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R307/308	MANE	5.98	89.92	514.51	0.06	6.00	89.82	516.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3794E+02 EXCESS=0.0000E+00 OUTFLOW=0.3757E+02 BASIN STORAGE=0.3740E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312W	MANE	6.00	6.77	443.48	0.05	6.00	6.77	444.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2471E+01 OUTFLOW=0.2239E+01 BASIN STORAGE=0.1391E+00 PERCENT ERROR= 3.7

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.93	9.62	418.20	0.07	6.00	9.61	420.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3102E+01 OUTFLOW=0.2865E+01 BASIN STORAGE=0.1389E+00 PERCENT ERROR= 3.1

FOR PLAN = 1 RATIO= 0.95

312W	MANE	6.00	4.82	476.69	0.04	6.00	4.82	474.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1992E+01 OUTFLOW=0.1768E+01 BASIN STORAGE=0.1392E+00 PERCENT ERROR= 4.3

FOR PLAN = 1 RATIO= 0.85

312W	MANE	6.00	2.05	561.13	0.02	6.00	2.05	558.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1173E+01 OUTFLOW=0.9576E+00 BASIN STORAGE=0.1375E+00 PERCENT ERROR= 6.6

FOR PLAN = 1 RATIO= 1.06

R312W	MANE	4.09	238.96	436.94	0.11	6.00	238.86	438.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7669E+02 EXCESS=0.0000E+00 OUTFLOW=0.7624E+02 BASIN STORAGE=0.4196E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R312W	MANE	4.79	151.28	478.43	0.08	6.00	151.14	474.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5543E+02 EXCESS=0.0000E+00 OUTFLOW=0.5504E+02 BASIN STORAGE=0.4116E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	5.93	91.30	527.75	0.06	6.00	91.28	528.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3843E+02 EXCESS=0.0000E+00 OUTFLOW=0.3800E+02 BASIN STORAGE=0.4160E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	3.06	469.95	0.03	6.00	3.05	474.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1301E+01 OUTFLOW=0.1142E+01 BASIN STORAGE=0.9629E-01 PERCENT ERROR= 4.9

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	4.66	437.52	0.04	6.00	4.66	438.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1725E+01 OUTFLOW=0.1556E+01 BASIN STORAGE=0.9653E-01 PERCENT ERROR= 4.2

FOR PLAN = 1 RATIO= 0.95

312E	MANE	6.00	2.02	506.29	0.02	6.00	2.02	510.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9900E+00 OUTFLOW=0.8367E+00 BASIN STORAGE=0.9342E-01 PERCENT ERROR= 6.1

FOR PLAN = 1 RATIO= 0.85

312E	MANE	6.00	0.70	634.64	0.01	6.00	0.69	630.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4904E+00 OUTFLOW=0.3478E+00 BASIN STORAGE=0.8868E-01 PERCENT ERROR= 11.0

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.48	1450.15	480.99	0.18	6.00	1450.01	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8110E+03 EXCESS=0.0000E+00 OUTFLOW=0.8106E+03 BASIN STORAGE=0.5073E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.56	1117.86	498.25	0.14	6.00	1117.85	498.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6312E+03 EXCESS=0.0000E+00 OUTFLOW=0.6308E+03 BASIN STORAGE=0.4346E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.59	825.07	516.97	0.11	6.00	824.95	516.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4805E+03 EXCESS=0.0000E+00 OUTFLOW=0.4802E+03 BASIN STORAGE=0.3276E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.35	1449.99	486.33	0.18	6.00	1449.99	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8105E+03 EXCESS=0.0000E+00 OUTFLOW=0.8101E+03 BASIN STORAGE=0.4078E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.32	1117.82	498.63	0.14	6.00	1117.77	498.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6307E+03 EXCESS=0.0000E+00 OUTFLOW=0.6304E+03 BASIN STORAGE=0.3521E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.37	824.94	516.80	0.11	6.00	824.82	516.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4802E+03 EXCESS=0.0000E+00 OUTFLOW=0.4799E+03 BASIN STORAGE=0.2697E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	2.37	1449.86	490.20	0.18	6.00	1449.60	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8101E+03 EXCESS=0.0000E+00 OUTFLOW=0.8074E+03 BASIN STORAGE=0.3283E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	2.51	1117.50	501.65	0.14	6.00	1117.39	504.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6304E+03 EXCESS=0.0000E+00 OUTFLOW=0.6277E+03 BASIN STORAGE=0.2829E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	2.79	824.76	523.65	0.11	6.00	824.71	522.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4799E+03 EXCESS=0.0000E+00 OUTFLOW=0.4779E+03 BASIN STORAGE=0.2178E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	1.25	1449.57	488.70	0.18	6.00	1449.41	492.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8064E+03 EXCESS=0.0000E+00 OUTFLOW=0.8049E+03 BASIN STORAGE=0.1677E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	1.26	1117.32	506.10	0.14	6.00	1117.13	504.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6272E+03 EXCESS=0.0000E+00 OUTFLOW=0.6259E+03 BASIN STORAGE=0.1447E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	1.43	824.64	524.52	0.11	6.00	824.47	528.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4774E+03 EXCESS=0.0000E+00 OUTFLOW=0.4763E+03 BASIN STORAGE=0.1136E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
FCBC4/FC MANE 1.56 1449.24 494.11 0.18 6.00 1448.94 492.00 0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8046E+03 EXCESS=0.0000E+00 OUTFLOW=0.8021E+03 BASIN STORAGE=0.2307E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
FCBC4/FC MANE 1.64 1117.07 507.11 0.14 6.00 1116.63 510.00 0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6256E+03 EXCESS=0.0000E+00 OUTFLOW=0.6237E+03 BASIN STORAGE=0.1989E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
FCBC4/FC MANE 1.84 824.44 531.37 0.11 6.00 824.30 528.00 0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4762E+03 EXCESS=0.0000E+00 OUTFLOW=0.4746E+03 BASIN STORAGE=0.1580E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
RRCHANNL MANE 5.97 0.16 463.63 0.87 6.00 0.16 462.00 0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95
RRCHANNL MANE 5.97 0.12 484.09 0.71 6.00 0.12 486.00 0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85
RRCHANNL MANE 6.00 0.09 550.79 0.57 6.00 0.09 552.00 0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06
AC1/AC2 MANE 0.99 2581.40 493.84 0.24 6.00 2580.71 498.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1414E+04 EXCESS=0.0000E+00 OUTFLOW=0.1412E+04 BASIN STORAGE=0.2022E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
AC1/AC2 MANE 1.06 1967.03 506.79 0.18 6.00 1966.68 510.00 0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1063E+04 EXCESS=0.0000E+00 OUTFLOW=0.1061E+04 BASIN STORAGE=0.1806E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
AC1/AC2 MANE 1.19 1379.57 528.97 0.13 6.00 1379.49 528.00 0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7776E+03 EXCESS=0.0000E+00 OUTFLOW=0.7760E+03 BASIN STORAGE=0.1546E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
AC3 MANE 0.58 2580.70 498.73 0.24 6.00 2580.68 498.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1412E+04 EXCESS=0.0000E+00 OUTFLOW=0.1410E+04 BASIN STORAGE=0.1527E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
AC3 MANE 0.68 1966.61 511.19 0.18 6.00 1966.51 510.00 0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1061E+04 EXCESS=0.0000E+00 OUTFLOW=0.1060E+04 BASIN STORAGE=0.1367E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
AC3 MANE 0.73 1379.48 529.47 0.13 6.00 1379.16 528.00 0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7759E+03 EXCESS=0.0000E+00 OUTFLOW=0.7747E+03 BASIN STORAGE=0.1182E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
AC4 MANE 0.79 2580.55 498.74 0.24 6.00 2580.43 498.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1410E+04 EXCESS=0.0000E+00 OUTFLOW=0.1408E+04 BASIN STORAGE=0.1867E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
AC4 MANE 0.78 1966.44 511.36 0.18 6.00 1966.05 510.00 0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1060E+04 EXCESS=0.0000E+00 OUTFLOW=0.1058E+04 BASIN STORAGE=0.1673E+01 PERCENT ERROR= 0.0

```
          FOR PLAN = 1  RATIO= 0.85
              AC4  MANE          0.87   1379.11    530.13      0.13      6.00   1378.72    534.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7746E+03 EXCESS=0.0000E+00 OUTFLOW=0.7732E+03 BASIN STORAGE=0.1453E+01 PERCENT ERROR=   0.0


*** NORMAL END OF HEC-1 ***
```

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991          *
*            VERSION 4.0.1 (LOCAL)      *
*                                   *
*  RUN DATE  05/10/96  TIME  16:18:56   *
*                                   *
*************************************
```


```
*************************************
*                                   *
*     U.S. ARMY CORPS OF ENGINEERS      *
*     HYDROLOGIC ENGINEERING CENTER     *
*           609 SECOND STREET           *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748              *
*                                   *
*************************************
```


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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X       XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID          FEMA FLOOD INSURANCE STUDY, 1996
    2         ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
    3         ID          LOWER CENTRAL VALLEY 50-YEAR STORM
    4         ID
    5         ID          Current (05/96) model based on a HEC-1 model prepared by James M
    6         ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
    7         ID          Study Hydrology Report dated 9/91.  Two modifications were made
    8         ID          to the source model.  First, Upper Las Vegas Detention Basin storage
    9         ID          and outflow characteristics were revised to reflect the as-built
   10         ID          configuration described by construction drawings dated 5/91 and HEC-1
   11         ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
   12         ID          relationship for the North Las Vegas Detention Basin was revised
   13         ID          to reflect the current three-pipe outlet condition (two of the five
   14         ID          pipes were blocked following construction of the upper basin) and the
   15         ID          hydraulic control created by the 4-foot high barrier wall located
   16         ID          upstream from the pipe inlets.
   17         ID
   18         ID          Remaining comments are from the original model dated 1/91.
   19         ID
   20         ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
   21         ID          Northern Las Vegas Wash - FIS FLOWS
   22         ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
   23         ID
   24         ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
   25         ID          Lower Central Valley 50-Year Storm, Existing Conditions
   26         ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
   27         ID          (EPT.H1); VTN, 1/90 (1900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
   28         ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
   29         ID
   30         ID          All routing steps immediately d/s of a diversion converted to
   31         ID          Muskingum routing to avoid zero flow, 8/90
   32         ID
   33         ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
   34         ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
   35         ID          Channel and Hualapai Diversion included, 8/90
   36         ID
   37         ID          This data file models DARF's at certain locations where FIS flows are
   38         ID          required.  The original B&V data file used a factor of 0.62; ratios
   39         ID          of this factor are used in the JR card to model DA's at the points
   40         ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
   41         ID
   42         ID           PT OF                  AREA          DARF      DARF/0.62     RATIO
   43         ID          INTEREST               (SQ MI)
   44         ID
   45         ID     RRBRIDGE, NC5, & 304     60.7 - 64.5       0.66        1.06         1
   46         ID          ACHANNL                111.6          0.59        0.95         2
   47         ID          NCHANNL                172.2          0.53        0.85         3
   48         ID
*** FREE ***
   49         IT       6        0        0      200
   50         IO       5        0        0
   51         IN       5        0        0
   52         JR    PREC     1.06     0.95     0.85
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   53         KK     112
   54         KM   RUNOFF FROM SUBBASIN 112
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```
55          BA   5.333
56          PB    1.86
57          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
58          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
59          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
60          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
61          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
62          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
63          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
64          PC    .997    .999   1.00
65          LS       0      82
66          UD    .462

67          KK     119
68          KM   RUNOFF FROM SUBBASIN 119
69          BA   2.739
70          PB    1.95
71          LS       0      82
72          UD    .346

73          KK
74          KM   COMBINE SUBBASINS 112 & 119
75          HC       2

76          KK     120
77          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
78          RM       3    0.27    0.15

79          KK  125UDB
80          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
81          RM       5    0.53    0.15

82          KK     117
83          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
84          RM       4    0.43    0.15

85          KK     118
86          KM   RUNOFF FROM SUBBASIN 118
87          BA   5.079
88          PB    1.69
89          LS       0      84
90          UD    .233

91          KK     117
92          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
93          RM       1    0.13    0.15
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

94          KK       V
95          RM       3    0.25    0.15

96          KK       V
97          RM       4    0.37    0.15

98          KK     117
99          KM   RUNOFF FROM SUBBASIN 117
100         BA   7.366
101         PB    1.61
102         LS       0      78
103         UD   1.699

104         KK
105         KM   COMBINE SUBBASINS 112, 117, 118, & 119
106         HC       3

107         KK   ULWDB
            *  *** lines from 1/91 model removed 5/96
            * KM      UPPER LAS VEGAS WASH DETENTION BASIN
            * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
            * RS 1 STOR -1
            * SV 0 40 75 110 250 500 920 1550 1700 1860
            * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
            * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
            * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
            * SQ 0 585 1465 2370 2910 3300 3660 4140 4206 4272
            * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
108         KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
109         KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
110         RS       1    STOR      -1
111         SV       0      12      80     170     320     560    1000    1610    1800    1980
112         SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
113         SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
114         SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
115         SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
116         SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

117         KK     116
118         KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
119         RM       5    0.50    0.15

120         KK     111
121         KM   RUNOFF FROM SUBBASIN 111
122         BA   4.08
123         PB   1.69
124         LS       0      84
125         UD    .239
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  126     KK     116
  127     KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
  128     RM       1     0.10     0.15

  129     KK       V
  130     RM       2     0.21     0.15

  131     KK     116
  132     KM   RUNOFF FROM SUBBASIN 116
  133     BA   5.189
  134     PB    1.44
  135     LS       0       78
  136     UD   1.418

  137     KK       .
  138     KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
  139     HC       3

  140     KK     109
  141     KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
  142     RM       4     0.42     0.15

  143     KK     110
  144     KM   RUNOFF FROM SUBBASIN 110
  145     BA   2.945
  146     PB    1.61
  147     LS       0       86
  148     UD    .237

  149     KK     109
  150     KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
  151     RM       1     0.09     0.15

  152     KK       V
  153     RM       2     0.19     0.15

  154     KK     109
  155     KM   RUNOFF FROM SUBBASIN 109
  156     BA   4.183
  157     PB    1.44
  158     LS       0       78
  159     UD   1.281

  160     KK       .
  161     KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  162     HC       3

  163     KK     101
  164     KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  165     KM   THRU SUBBASIN 101
  166     RM       5     0.54     0.15
```



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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  167     KK     103
  168     KM   RUNOFF FROM SUBBASIN 103
  169     BA   6.195
  170     PB    1.78
  171     LS       0       84
  172     UD    .324

  173     KK     102
  174     KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
  175     RM       1     0.11     0.15

  176     KK     102
  177     KM   RUNOFF FROM SUBBASIN 102
  178     BA   8.455
  179     PB    1.61
  180     LS       0       83
  181     UD    .369

  182     KK       .
  183     KM   COMBINE SUBBASINS 102 & 103
  184     HC       2

  185     KK     101
  186     KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
  187     RM       1     0.11     0.15

  188     KK       V
  189     RM       2     0.22     0.15

  190     KK     101
  191     KM   RUNOFF FROM SUBBASIN 101
  192     BA   9.082
  193     PB    1.44
  194     LS       0       77
  195     UD   1.505

  196     KK   NLVIN
  197     KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
```

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198          HC       3

199          KK
200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
201          DT DIVDIKE
202          DI        0    2000    6000    8000    8200    8910   10225   11935   13565   15635
203          DI    17775   20135   23000
204          DQ        0       0       0       0       0     410    1225    2435    3565    5135
205          DQ     6775    8635   11000

206          KK  NLVDET
207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
210          RS        1    STOR      -1
211          SV        0      25     100     190     430     665    1095    1285    1435    1540
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

212          SV     1650    1825    1920    2000    2110    2200    2310    2430
213          SE        0       2       4       6      10      14      21      24      26      27
214          SE       28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
215          SQ        0      77     117     597    1310    1660    2110    2260    2360    2690
216          SQ     3050    4630    5710    7090    8610   10140   11670   13200

217          KK
218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
219          DR DIVDIKE

220          KK
221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
222          HC        2

223          KK      303
224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
225          RM       13    1.28    0.15

226          KKRRBRIDGE
227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
228          DTRRCHANNL
229          DI        0    6000   20000
230          DQ        0       0   13500

231          KK      I15
232          KM        DIVERT FLOW INTO KING CHARLES CHANNEL
233          DT    KCHAR
234          DI        0    1000   10000
235          DQ        0     800    8000

236          KK      NC1
237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
238          RK      700  0.0058   0.016       0    TRAP      10       2

239          KK        V
240          RK     2000  0.0100   0.035       0    TRAP      30       2

241          KK      NC2
242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
243          KM   TO GOWAN AVE.
244          RK     1300    .0056    .030       0    TRAP      12       2

245          KK      NC3
246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
247          KM   TO CHEYENNE AVE.
248          RK     2600    .0021    .030       0    TRAP      20     2.5
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


249          KK      NC4
250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
252          RK     1300    .003    .016       0    TRAP      18       2

253          KK      NC5
254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
255          KM   TO "A" CHANNEL (LINED CHANNEL)
256          RK      500    .001    .016       0    TRAP      18       2
257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

258          KK    AP.1
259          KM       Begin subareas tributary to Gowan-South Detention Basin
260          KM       Begin subareas tributary to Angel Park Detention Basin
261          KM       From Wallace Angel Park Model
262          BA   0.001
263          PB    1.93
264          LS       0      89
265          UD    0.62

266          KK        V
267          KM   Route AP.1
268          RM        7    0.67    0.15

269          KK    AP.2
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270          KM   One-third of subbasin AP.2
271          KM   From Wallace Angel Park Model
272          BA   0.853
273          PB    1.65
274          LS       0       87
275          UD   0.363

276          KK        .
277          KM   Combine AP.1 & AP.2
278          HC        2

279          KK        V
280          RM       11    1.06     0.15

281          KK    AP.3
282          BA    3.62
283          PB    1.67
284          LS       0       89
285          UD    2.41

286          KK    AP.4
287          KM   From Wallace Angel Park Model
288          BA   0.001
289          PB    1.63
290          LS       0       89
291          UD    1.03
1                                        HEC-1 INPUT                                        PAGE   8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


292          KK        .
293          KM   Combine AP.1, AP.2, AP.3, AP.4
294          HC        3

295          KK    AP.5
296          KM   From Wallace Angel Park Model
297          BA   0.001
298          PB    1.93
299          LS       0       89
300          UD    0.39

301          KK        V
302          KM   Route AP.5
303          RM        8    0.82     0.15

304          KK    AP.6
305          BA   0.001
306          PB    1.93
307          LS       0       88
308          UD    0.75

309          KK        .
310          KM   Combine AP.5 & AP.6
311          HC        2

312          KK        V
313          KM   Route AP.5 & AP.6
314          RM        7    0.66     0.15

315          KK    AP.7
316          KM      One-half of subbasin AP.7
317          BA    1.02
318          PB    1.80
319          LS       0       86
320          UD    0.59

321          KK   N_CHN
322          KM   COMBINE NORTH CHANNEL FLOWS
323          HC        2

324          KK    GD.1
325          KM   Begin subareas tributary to Hualapai Diversion
326          KM   From VTN (PB & CN from B&V-La Madre)
327          BA   0.001
328          PB    1.96
329          LS       0       87
330          UD    0.62

331          KK        V
332          KM   Route GD.1
333          RM        2    0.24     0.15
1                                        HEC-1 INPUT                                        PAGE   9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


334          KK        V
335          KM   Routing Cont'd
336          RM        3    0.27     0.15

337          KK    GD.2
338          KM   From VTN
339          BA   0.001
340          PB    1.89
341          LS       0       89
342          UD    0.83

343          KK        .
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344          KM   Combine GD.1 & GD.2
345          HC       2

346          KK  TO_DIV
347          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
348          RM       3    0.34    0.15

349          KK   GD.3(=AP.12)
350          KM   From VTN
351          BA    0.80
352          PB    1.79
353          LS       0      87
354          UD    0.32

355          KKHUALAPAI
356          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
357          HC       2

358          KK     HUAL NO.CH
359          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
360          HC       2

361          KK       V
362          KM   Route Combined Flows
363          RK    5500    .023     .04       0    TRAP     100       2

364          KK       V
365          KM   Routing Cont'd
366          RK    4500    .004     .03       0    TRAP      30       4

367          KK    AP.8
368          BA    0.93
369          PB    1.65
370          LS       0      89
371          UD    0.62

372          KK     BOX
373          KM   SUMMERLIN PARKWAY CULVERT
374          HC       2
1                                        HEC-1 INPUT                                    PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

375          KK       V
376          KM   ROUTE TO ANGEL PARK DETENTION BASIN
377          RK    3000    .027     .04       0    TRAP     100       2

378          KK    AP.9
379          BA    0.68
380          PB    1.65
381          LS       0      89
382          UD     .83

383          KK  N_CHAN
384          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
385          HC       2

386          KKANGEL.PK
387          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
388          HC       2

389          KKSPILLWAY
390          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
391          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
392          RS       1    STOR      -1
393          SV       0       3      22      45      80     125     190     270     369     492
394          SV     630     780     942    1115    1209
395          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
396          SE    2616    2618    2620    2622    2623
397          SL  2592.5    3.14     0.6     0.5
398          SS  2619.1    1275     3.2     1.5

399          KKAP_TO_VEGAS/PIONEER
400          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
401          KM   From VTN
402          RK    7500    0.03   0.012       0    CIRC      5       0

403          KKBUFFALO_1
404          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
405          RK    1500    0.02    0.03       0    TRAP     20       4

406          KK    GD.7
407          KM   INTERSECTION OF LAKE MEAD & BUFFALO
408          BA    1.13
409          PB    1.65
410          LS       0      89
411          UD    1.38

412          KKBUFFALO_1
413          KM   Combine GD.7 W/ Buffalo Channel
414          HC       2
1                                        HEC-1 INPUT                                    PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

415          KKBUFFALO_2
416          KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
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417          RK    5000   0.005   0.025       0    TRAP      30       4

418          KK    GD.4
419          KM   From B&V-La Madre
420          BA   0.001
421          PB    1.89
422          LS       0       88
423          UD    0.62

424          KK       V
425          KM   ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
426          RM       7    0.74    0.15

427          KK    GD.5
428          BA    3.31
429          PB    1.73
430          LS       0       86
431          UD    1.38

432          KK       .
433          KM   Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
434          HC       2

435          KK       V
436          KM   ROUTE NORTH ALONG RAMPART
437          RM       4    0.43    0.15

438          KK    GD.6
439          KM   DEL WEBB-SUN CITY SUMMERLIN
440          BA     1.6
441          PB    1.59
442          LS       0       86
443          UD     .96

444          KK       .
445          KM   Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
446          HC       2

447          KK       V
448          KM   ROUTE TO BUFFALO along Cheyenne Channel
449          RK    5500    .015    .015       0    TRAP      20       2

450          KK    GD.8
451          KM   R.A. HOMES-DESERT SHORES
452          BA    1.53
453          PB    1.57
454          LS       0       85
455          UD    1.11
1                                        HEC-1 INPUT                                    PAGE 12

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

456          KK       .
457          KM   INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
458          HC       2

459          KK   GD.34
460          KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
461          BA    3.84
462          PB    1.57
463          LS       0       84
464          UD    1.72

465          KKGOWAN_SOUTH
466          KM   TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
467          HC       3

468          KK  DET.GS
469          KM   Gowan-South Detention Basin data from VTN
470          RS       1    STOR      -1
471          SV       0     9.8     113     435     454     680
472          SE    2326    2330    2340  2349.6    2350    2354
473          SQ       0     112     328     455     459   30700

474          KK R.GSOUT
475          KM   ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
476          RK    3200   0.007   0.012       0    CIRC       5       0

477          KK    GD.9
478          KM   Begin subareas tributary to Gowan-North Detention Basin
479          KM   From B&V-LaMadre
480          BA   0.001
481          PB    1.93
482          LS       0       89
483          UD    0.30

484          KK       V
485          RM       5    0.52    0.15

486          KK   GD.10
487          KM   From B&V-LaMadre
488          BA   0.001
489          PB    1.73
490          LS       0       88
491          UD    0.90

492          KK       .
493          KM   Combine GD.9 & GD.10
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494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6    0.61    0.15
1                                   HEC-1 INPUT                                    PAGE 13

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

498          KK       V
499          KM   Routing Cont'd
500          RM       7    0.74    0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB    1.59
505          LS       0      85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB    1.64
514          LS       0      89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0    1545    3129    4000    8000
521          DQ       0    1545    1545    2416    6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2    0.15    0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB    1.57
530          LS       0      86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0     900    2484    4000    8000
540          DQ       0     900     900    2416    6416
2                                   HEC-1 INPUT                                    PAGE 14

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1    0.14    0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    1.98
550          LS       0      80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12    1.23    0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB    1.55
559          LS       0      81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0     520    1889    4000    8000
568          DQ       0     520     520    2631    6631
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569          KK       V
570          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
571          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
572          RM       1    0.14    0.15

573          KK   GD.28
574          KM   From Wallace
575          BA   0.001
576          PB    1.55
577          LS       0       77
578          UD    2.52

579          KK       .
580          KM   Combine GD.28 & GD.30 - GD.33
581          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

582          KK  RANCHO
583          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
584          DTCENTNIAL
585          DI       0    1040    5456    8000
586          DQ       0    1040    1040    3585

587          KK       V
588          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
589          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
590          RM       1    0.07    0.15

591          KK   GD.25
592          KM   From Wallace
593          BA   0.001
594          PB    1.72
595          LS       0       89
596          UD    1.09

597          KK       V
598          RM       7    0.69    0.15

599          KK   GD.26
600          KM   From Wallace
601          BA   0.001
602          PB    1.59
603          LS       0       78
604          UD    1.23

605          KK       .
606          KM   Combine GD.25 & GD.26
607          HC       2

608          KK       V
609          KM   ROUTE WEST TO ANN ROAD AND HWY 95
610          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
611          RM       4    0.43    0.15

612          KK       V
613          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
614          RM       5    0.49    0.15

615          KK   GD.27
616          KM   From Wallace
617          BA    1.13
618          PB    1.55
619          LS       0       78
620          UD    1.61

621          KK       .
622          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
623          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

624          KK       V
625          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
626          RK    3000   0.009   0.025       0    TRAP      50       3

627          KK       V
628          RK    3000   0.004   0.022       0    TRAP      25       8

629          KK   GD.29
630          KM   From Wallace
631          BA    0.76
632          PB    1.55
633          LS       0       77
634          UD    1.49

635          KK       V
636          RK    8000    0.01   0.025       0    TRAP      20       8

637          KK    PDGC
638          KM   PAINTED DESERT GOLF COURSE
639          KM   From Wallace
640          BA    0.53
641          PB    1.55
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642          LS        0       80
643          UD      1.2

644          KK         .
645          KM    Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
646          HC         3

647          KK  RANCHO
648          KM    DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
649          DTP,DESERT
650          DI         0      233     1318     8000
651          DQ         0      233      233     6915

652          KK         V
653          KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
654          KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
655          RM         1     0.14     0.15

656          KK    GD.21
657          KM    From Wallace
658          BA    0.001
659          PB     1.93
660          LS        0       89
661          UD     0.72

662          KK         V
663          RM         8     0.81     0.15
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1                                    HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

664          KK    GD.22
665          KM    From Wallace
666          BA    0.001
667          PB     1.66
668          LS        0       86
669          UD      1.5

670          KK    GD.23
671          KM    From Wallace
672          BA    0.001
673          PB     1.71
674          LS        0       86
675          UD     1.41

676          KK         .
677          KM    Combine GD.21 - GD.23
678          HC         3

679          KK         V
680          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
681          RM         7     0.65     0.15

682          KK    GD.24
683          KM    From Wallace
684          BA     0.64
685          PB     1.55
686          LS        0       77
687          UD      1.2

688          KK         .
689          KM    Combine GD.21 - GD.24
690          HC         2

691          KK         V
692          KM    ROUTE WEST TO HWY 95
693          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
694          RM         7     0.65     0.15

695          KK    GD.18
696          KM    From Wallace
697          BA    0.001
698          PB     1.81
699          LS        0       89
700          UD     0.31

701          KK         V
702          RM         6     0.62     0.15

703          KK    GD.19
704          KM    From Wallace
705          BA    0.001
706          PB     1.70
707          LS        0       82
708          UD     1.24
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1                                    HEC-1 INPUT

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

709          KK         .
710          KM    Combine GD.18 & GD.19
711          HC         2

712          KK         V
713          KM    ROUTE WEST TO HWY 95 AT CRAIG ROAD
714          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
715          RM         9     0.88     0.15
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716         KK   GD.20
717         KM   From Wallace
718         BA    2.35
719         PB    1.56
720         LS       0      82
721         UD    2.51

722         KK       .
723         KM   Combine GD.18 - GD.31 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724         HC       4

725         KK  HWY.95
726         KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727         DT   CRAIG
728         DI       0     465    2056   10000
729         DQ       0     465     465    8409

730         KK       V
731         KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732         KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733         RM       1    0.07    0.15

734         KK   GD.15
735         KM   From Wallace
736         BA   0.001
737         PB    1.93
738         LS       0      88
739         UD    0.48

740         KK       V
741         RM       7    0.74    0.15

742         KK   GD.16
743         KM   From Wallace
744         BA   0.001
745         PB    1.70
746         LS       0      82
747         UD    1.63

748         KK       .
749         HC       2
1                                        HEC-1 INPUT                                        PAGE 19

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

750         KK       V
751         KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752         RM      10    1.01    0.15

753         KK   GD.17
754         KM   From Wallace
755         BA    0.56
756         PB    1.56
757         LS       0      80
758         UD     2.0

759         KK       .
760         KM   Combine GD.15 - GD.17
761         HC       3

762         KK   HWY95
763         KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764         DTALEXANDR
765         DI       0     155    1746   10000
766         DQ       0     155     155    8409

767         KK       V
768         KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769         KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770         RM       1    0.11    0.15

771         KK   GD.12
772         KM   From Wallace
773         BA   0.001
774         PB    1.85
775         LS       0      89
776         UD     0.3

777         KK       V
778         RM       4    0.42    0.15

779         KK   GD.13
780         KM   From Wallace
781         BA   0.001
782         PB    1.78
783         LS       0      86
784         UD    1.10

785         KK       .
786         KM   Combine GD.12 & GD.13
787         HC       2

788         KK       V
789         KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790         RM       4    0.43    0.15
1                                        HEC-1 INPUT                                        PAGE 20
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  791     KK       V
  792     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  793     RM      11    1.06    0.15

  794     KK  GD.14A
  795     KM   From Wallace
  796     BA    1.71
  797     PB    1.63
  798     LS       0       81
  799     UD    0.88

  800     KK       .
  801     KM   Combine GD.12, GD.13 & GD.14A
  802     HC       2

  803     KK       V
  804     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  805     RM       5    0.53    0.15

  806     KK  GD.14B
  807     KM   From Wallace
  808     BA    0.68
  809     PB    1.59
  810     LS       0       83
  811     UD    1.67

  812     KK       .
  813     KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
  814     HC       3

  815     KK   GN_IN
  816     KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
  817     HC       3

  818     KK  DET.GN
  819     KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
  820     KM   From VTN
  821     RS       1     STOR      -1
  822     SV       0       28       46      113      774      885     1163
  823     SE    2308     2311     2312     2314     2324  2325.5     2329
  824     SQ       0        0      126      251      519      539    35800

  825     KKR.G-UPS.
  826     KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
  827     RK    2000   0.005   0.013        0    CIRC        6        0

  828     KK       V
  829     KM   Route Gowan outflow along Gowan Outfall Channel
  830     RK    7000   0.009   0.015        0    TRAP       10        0

1                                  HEC-1 INPUT                                  PAGE 21

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  831     KK       .
  832     KM   Recall flow diverted at Craig Road
  833     DR   CRAIG

  834     KK       V
  835     KM   Route to Rancho
  836     RM       4    0.42    0.15

  837     KK       .
  838     KM   Recall flow diverted at Alexander
  839     DRALEXANDR

  840     KK       V
  841     KM   Route to Rancho
  842     RM       9    0.92    0.15

  843     KK       .
  844     KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
  845     KM   at Rancho
  846     HC       3

  847     KK       V
  848     KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
  849     KM   App. F)
  850     RK    8400   0.007   0.015        0    TRAP       10        0

  851     KK       V
  852     KM   Routing Cont'd
  853     RK    4000   0.005   0.015        0    TRAP       10        0

  854     KK       V
  855     KM   Routing Cont'd
  856     RK    4000   0.005   0.015        0    TRAP       10        0

  857     KK       .
  858     KM   Begin modeling of subareas on the east side of Rancho Road
  859     KM   Recall flow diverted at Centenial
  860     DRCENTNIAL

  861     KK       .
  862     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  863     RM      20    2.03    0.15
```

```
 864          KK   EPT.1
 865          BA    3.76
 866          PB    1.55
 867          LS       0       85
 868          UD    3.36
                                        HEC-1 INPUT                                                    PAGE 22
1
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


 869          KK       .
 870          KM   Combine EPT.1 & flow diverted at Centenial
 871          HC       2

 872          KK       V
 873          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 874          RM       8    0.76    0.15

 875          KK       .
 876          KM   Recall flow diverted at Painted Desert
 877          DRP,DESERT

 878          KK       V
 879          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 880          RM      20    2.03    0.15

 881          KK   EPT 3
 882          BA   4.391
 883          PB    1.55
 884          LS       0       88
 885          UD    3.67

 886          KK       .
 887          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
 888          HC       3

 889          KK   EPT.4
 890          BA   1.372
 891          PB    1.55
 892          LS       0       89
 893          UD     2.7

 894          KK       V
 895          RM       9    0.88    0.15

 896          KK       .
 897          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
 898          KM   Gowan Outfall Channel
 899          HC       2

 900          KK       .
 901          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
 902          KM   Alexander, Painted Desert & Centenial
 903          HC       2

 904          KK   EPT.5
 905          BA   3.005
 906          PB    1.55
 907          LS       0       87
 908          UD     4.7
                                        HEC-1 INPUT                                                    PAGE 23
1
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


 909          KK       .
 910          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
 911          KM   Alexander, Painted Desert & Centenial
 912          HC       2

 913          KK       V
 914          RK   10000    .013    .015       0    TRAP      10       0

 915          KK   EPT.2
 916          BA   1.492
 917          PB    1.55
 918          LS       0       85
 919          UD    2.51

 920          KK  LVWASH
 921          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
 922          HC       2
 923          KM   ********************************* END GOWAN MODEL ********************************

 924          KKGOWANDIV
 925          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
 926          DRCULVERTS

 927          KK     301
 928          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
 929          RM      22    2.17    0.15

 930          KK     301
 931          KM   RUNOFF FROM SUBBASIN 301
 932          BA  18.616
 933          PB    1.44
 934          LS       0       85
 935          UD     4.3
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 916          KK WTRIBUS
 917          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
 918          HC       2

 919          KKWTRIBTOT
 940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
 941          HC       2

 942          KK     304
 943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
 944          RM       3    0.28    0.15

 945          KK    SNIC
 946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
 947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
 948          RK    3850   .0122   0.016        0    TRAP      20       2
1                                        HEC-1 INPUT                                    PAGE 24

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 949          KK     LBC
 950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
 951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
 952          RK    2800     .002   0.016        0    TRAP      80       2

 953          KK    310W
 954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
 955          BA      .8
 956          PB    1.44
 957          LS       0      87       0        0      87
 958          UK     150    .010      .3       38
 959          UK     300    .015     .25       62
 960          RK    1000   .0075     .02     .013    TRAP      51       0
 961          RK    2600   .0075     .02       .2    TRAP      80       0
 962          RK    8700   .0150     .02        0    TRAP     100       0

 963          KK    R310W
 964          KM   ROUTE RUNOFF FROM 310W TO 310E
 965          RK   10500    .015     .02        0    TRAP     100       0

 966          KK    310E
 967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
 968          BA   1.238
 969          PB    1.44
 970          LS       0      86       0        0      83
 971          UK     150     .01      .3       46
 972          UK     300    .015     .25       54
 973          RK    1000   .0075     .02     .019    TRAP      51       0
 974          RK    2000   .0075     .02      .31    TRAP      80       0
 975          RK   10500    .015     .02        0    TRAP     100       0

 976          KK    310E
 977          KM   COMBINE ROUTED 310W WITH 310E
 978          HC       2

 979          KK    R310E
 980          KM   ROUTE FROM 310E TO 311W
 981          RK    5300   .0132     .02        0    TRAP     100       0

 982          KK    311W
 983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
 984          BA     .96
 985          PB    1.44
 986          LS       0      85       0        0      83
 987          UK     150    .010      .3       60
 988          UK     300   .0132     .25       40
 989          RK     650   .0065     .02      .01    TRAP      51       0
 990          RK    2200   .0065     .02      .14    TRAP      80       0
 991          RK    5300   .0132     .02        0    TRAP     100       0
1                                        HEC-1 INPUT                                    PAGE 25

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 992          KK    311W
 993          KM   COMBINE ROUTED 310E WITH 311W
 994          HC       2

 995          KK    R311W
 996          KM   ROUTE FROM 311W TO 311E
 997          RK    7500   .0132     .02        0    TRAP     100       0

 998          KK    311E
 999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311E
1000          KM   CONVERT TO SCS RUNOFF
1001          BA     .77
1002          PB    1.44
1003          LS       0    74.3
1004          UD    0.49

1005          KK    311E
1006          KM   COMBINE ROUTED 311W WITH 311E
1007          HC       2

1008          KK    309W
1009          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1010          BA     .81
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1011          PB    1.44
1012          LS       0      71       0       0      70
1013          UK     150     .01      .3      22
1014          UK     300   .0144     .25      78
1015          RK    1000    .007     .02    .013    TRAP      51       0
1016          RK    2600    .007     .02     .20    TRAP      80       0
1017          RK    8700   .0144     .02       0    TRAP     100       0

1018          KK    R309W
1019          KM    ROUTE FROM 309W TO 309E
1020          RK   21000   .0144     .02       0    TRAP     100       0

1021          KK    309E
1022          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1023          BA    1.19
1024          PB    1.44
1025          LS       0      87       0       0      80
1026          UK     150     .01      .3      52
1027          UK     300   .0144     .25      48
1028          RK    1000    .007     .02    .019    TRAP      51       0
1029          RK    2600    .007     .02     .30    TRAP      80       0
1030          RK   21000   .0144     .02       0    TRAP     100       0

1031          KK    309E
1032          KM    COMBINE ROUTED 309W WITH 309E
1033          HC       2
1                                        HEC-1 INPUT                                        PAGE 26

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1034          KK
1035          KM    COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1036          HC       2

1037          KK    FCP1
1038          KM    ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1039          KM    TO LAKE MEAD BLVD.
1040          RK     410   .0045     .016       0    CIRC       5       0

1041          KK    FCP2
1042          RK     740   .0048     .016       0    CIRC     5.5       0

1043          KK    FCBC1
1044          RK     800   .0056     .016       0    TRAP       8       0

1045          KK    FC1
1046          RK    1250   .0195     .016       0    TRAP       8       0

1047          KKFCBC2/FC2/FCBC3
1048          KM    COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1049          RK    1430     .03     .016       0    TRAP       7       0

1050          KK    307NW
1051          KM    RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1052          BA    1.33
1053          PB    1.44
1054          LS       0      85       0       0      87
1055          UK     150    .010      .3      32
1056          UK     300    .011     .25      68
1057          RK    1000    .0055    .02    .017    TRAP      51       0
1058          RK    2600    .0055    .02     .27    TRAP      80       0
1059          RK    6400    .011     .02       0    TRAP     100       0

1060          KK   R307NW
1061          KM    ROUTE FROM 307NW TO 307NE
1062          RK    4000    .011     .02       0    TRAP     100       0

1063          KK    307NE
1064          KM    RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1065          BA     .64
1066          PB    1.44
1067          LS       0      87       0       0      87
1068          UK     150    .010      .3      11
1069          UK     300    .011     .25      89
1070          RK    1000    .0055    .02    .013    TRAP      51       0
1071          RK    2600    .0055    .02     .21    TRAP      80       0
1072          RK    4000    .011     .02       0    TRAP     100       0

1073          KK    307NE
1074          KM    COMBINE ROUTED 307NW WITH 307NE
1075          HC       2
1                                        HEC-1 INPUT                                        PAGE 27

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1076          KK
1077          KM    COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1078          HC       2

1079          KK       V
1080          KM    ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1081          RM       4    0.37    0.15

1082          KK    307SW
1083          KM    RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1084          KM    CONVERT TO SCS RUNOFF
1085          BA     1.1
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1086          PB    1.44
1087          LS       0    63.5
1088          UD    0.30

1089          KK  R307SW
1090          KM   ROUTE FROM 307SW TO 307SE
1091          RK    7300     .011      .02        0    TRAP      100        0

1092          KK   307SE
1093          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1094          BA    1.58
1095          PB    1.44
1096          LS       0       85        0        0      87
1097          UK     150      .01        .3       40
1098          UK     300     .011       .25       60
1099          RK    1000    .0055       .02      .01    TRAP       51        0
1100          RK    2200    .0055       .02      .17    TRAP       80        0
1101          RK    7300     .011       .02        0    TRAP      100        0

1102          KK   307SE
1103          KM   COMBINE ROUTED 307SW WITH 307SE
1104          HC       2

1105          KK        .
1106          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1107          HC       2

1108          KK        V
1109          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1110          RM       2    0.18    0.15

1111          KK    308W
1112          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1113          BA     .81
1114          PB    1.44
1115          LS       0       71        0        0      70
1116          UK     150      .01        .3       19
1117          UK     300    .0134       .25       81
1118          RK    1000     .006       .02     .017    TRAP       51        0
1119          RK    2600     .006       .02      .27    TRAP       80        0
1120          RK    8700    .0134       .02        0    TRAP      100        0
I                                        HEC-1 INPUT                                                    PAGE 28

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1121          KK   R308W
1122          KM   ROUTE FROM 308W TO 308E
1123          RK    6500    .0134      .02        0    TRAP      100        0

1124          KK    308E
1125          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1126          BA     .72
1127          PB    1.44
1128          LS       0       85        0        0      87
1129          UK     150      .01        .3       59
1130          UK     300    .0134       .25       41
1131          RK    1000     .006       .02     .015    TRAP       51        0
1132          RK    2600     .006       .02      .24    TRAP       80        0
1133          RK    6500    .0134       .02        0    TRAP      100        0

1134          KK    308E
1135          KM   COMBINE ROUTED 308W WITH 308E
1136          HC       2

1137          KK        .
1138          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1139          HC       2

1140          KKR307/308
1141          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1142          RK    6100    .0132      .02        0    TRAP      100        0

1143          KK    312W
1144          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1145          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1146          BA     .77
1147          PB    1.44
1148          LS       0       81        0        0      80
1149          UK     150     .010        .3       20
1150          UK     300    .0132       .25       80
1151          RK    1000     .0065       .02     .012    TRAP       51        0
1152          RK    2600     .0065       .02     .175    TRAP       80        0
1153          RK    6100    .0132       .02        0    TRAP      100        0

1154          KK    312W
1155          KM   COMBINE ROUTED 307 & 308 WITH 312W
1156          HC       2

1157          KK   R312W
1158          KM   ROUTE FROM 312W TO 312E
1159          RK    6100    .0132      .02        0    TRAP      100        0

1160          KK    312E
1161          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1162          BA       .7
1163          PB    1.44
1164          LS       0       79        0        0      76
1165          UK     150     .010        .3       50
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          1166          UK     300    .0132     .25      50
1                                        HEC-1 INPUT                                                    PAGE 29

          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          1167          RK     500    .0065     .02     .012    TRAP      51       0
          1168          RK    2600    .0065     .02     .175    TRAP      80       0
          1169          RK    6100    .0132     .02        0    TRAP     100       0

          1170          KK    312E
          1171          KM    COMBINE ROUTED 312W WITH 312E
          1172          HC       2

          1173          KK     306
          1174          KM    RUNOFF FROM SUBBASIN 306
          1175          BA    5.073
          1176          PB     1.44
          1177          LS        0      84
          1178          UD     3.02

          1179          KK        .
          1180          KM    COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
          1181          HC       3

          1182          KK     FC3
          1183          KM    ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
          1184          KM    TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
          1185          RK     900    .0012     .016        0    TRAP      10      1.5

          1186          KK FC4/FC5
          1187          RK     600  0.0012   0.016        0    TRAP      24      1.5

          1188          KK     FC6
          1189          RK    5150    .0011     .016        0    TRAP      16      1.5

          1190          KK     FC7
          1191          RK    2400    .0010     .016        0    TRAP      20      1.5

          1192          KKFCBC4/FC8
          1193          KM    COMBINE FCBC4 & FC8 ROUTING STEPS
          1194          RK    3475    .0012     .016        0    TRAP      20      1.5

          1195          KK     302
          1196          KM    RUNOFF SUBBASIN 302
          1197          BA  12.213
          1198          PB     1.44
          1199          LS        0      86
          1200          UD      3.1

          1201          KK     303
          1202          KM    ROUTE SUBBASIN 302 THRU SUBBASIN 303
          1203          RM       8    0.83    0.15

          1204          KK     303
          1205          KM    RUNOFF FROM 303
          1206          BA  10.217
          1207          PB     1.44
          1208          LS        0      84
          1209          UD     4.24
1                                        HEC-1 INPUT                                                    PAGE 30

          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          1210          KK        .
          1211          KM    COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
          1212          HC       2

          1213          KK     304
          1214          KM    RUNOFF FROM SUBBASIN 304
          1215          BA    2.903
          1216          PB     1.44
          1217          LS        0      86
          1218          UD     1.98

          1219          KK     305
          1220          KM    RUNOFF FROM SUBBASIN 305
          1221          BA    3.298
          1222          PB     1.44
          1223          LS        0      87
          1224          UD     1.49

          1225          KK        .
          1226          KM    COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
          1227          HC       2

          1228          KKRRBRIDGE
          1229          DRRRCHANNL

          1230          KKDUMMY_AREA
          1231          KM    Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
          1232          BA    0.001
          1233          PB     2.00
          1234          LS        0      80
          1235          UD     1.00

          1236          KKDUMMY_COMBINE
          1237          KM    Combine dummy subarea with recalled RRCHANNEL diversion
          1238          HC       2
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          1239          KKRRCHANNL
          1240          RK    4900    .0041     .03       0    TRAP      40       2

          1241          KK    I-15
          1242          DR    KCHAR

          1243          KKDUMMY_AREA
          1244          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1245          BA    0.001
          1246          PB    2.00
          1247          LS       0       80
          1248          UD    1.00
1                                                  HEC-1 INPUT                                                  PAGE 31

          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          1249          KKDUMMY_COMBINE
          1250          KM    Combine dummy subarea with recalled KCHAR diversion
          1251          HC       2

          1252          KK ACHANNL
          1253          KM    COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1254          HC       5

          1255          KK AC1/AC2
          1256          KM    COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1257          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1258          RK     2350  0.0074   0.035       0    TRAP      30       2

          1259          KK      AC3
          1260          RK     1600   .0065    .030       0    TRAP      52     1.5

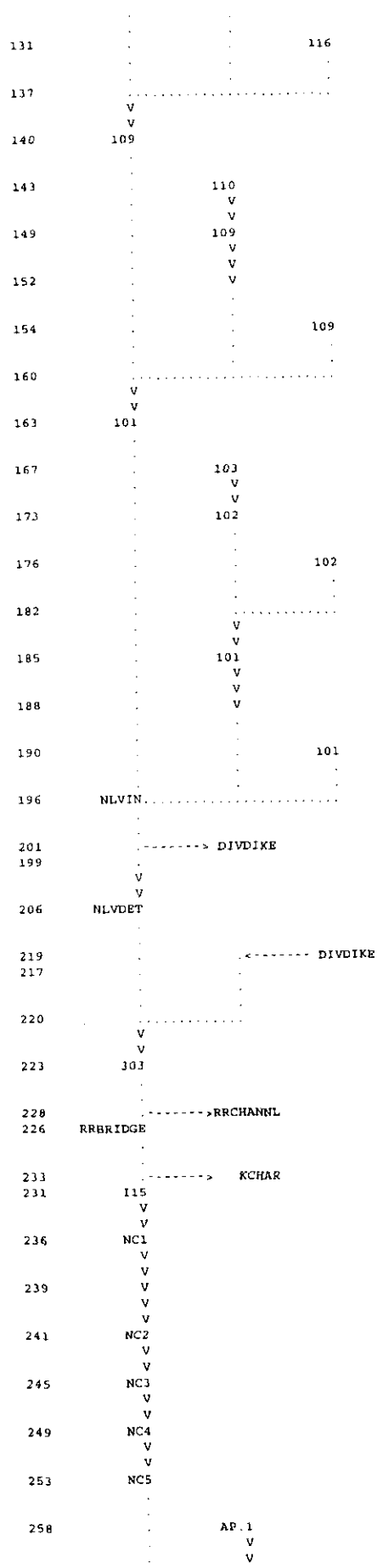
          1261          KK      AC4
          1262          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1263          RK     1650   .0053    .030       0    TRAP      70     1.5

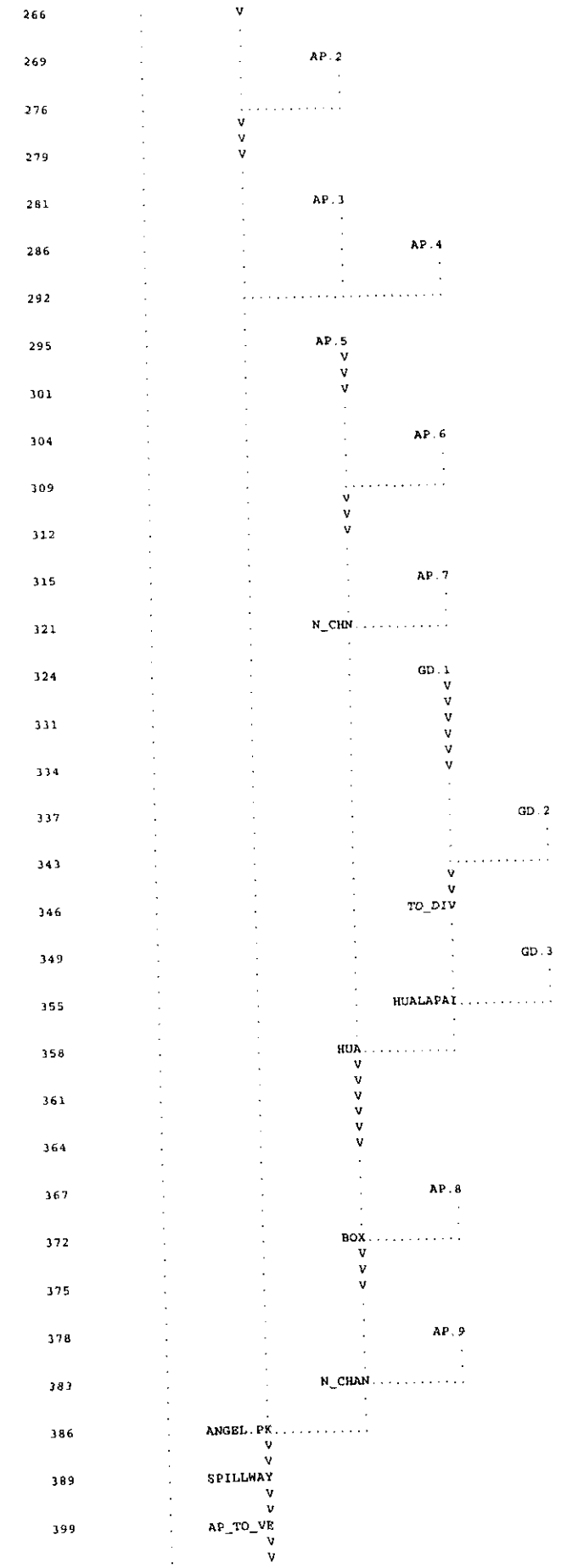
          1264          KK NCHANNL
          1265          KM    COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1266          HC       2
                        * Truncate this run at NCHANNL
          1267          ZZ
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                SCHEMATIC DIAGRAM OF STREAM NETWORK

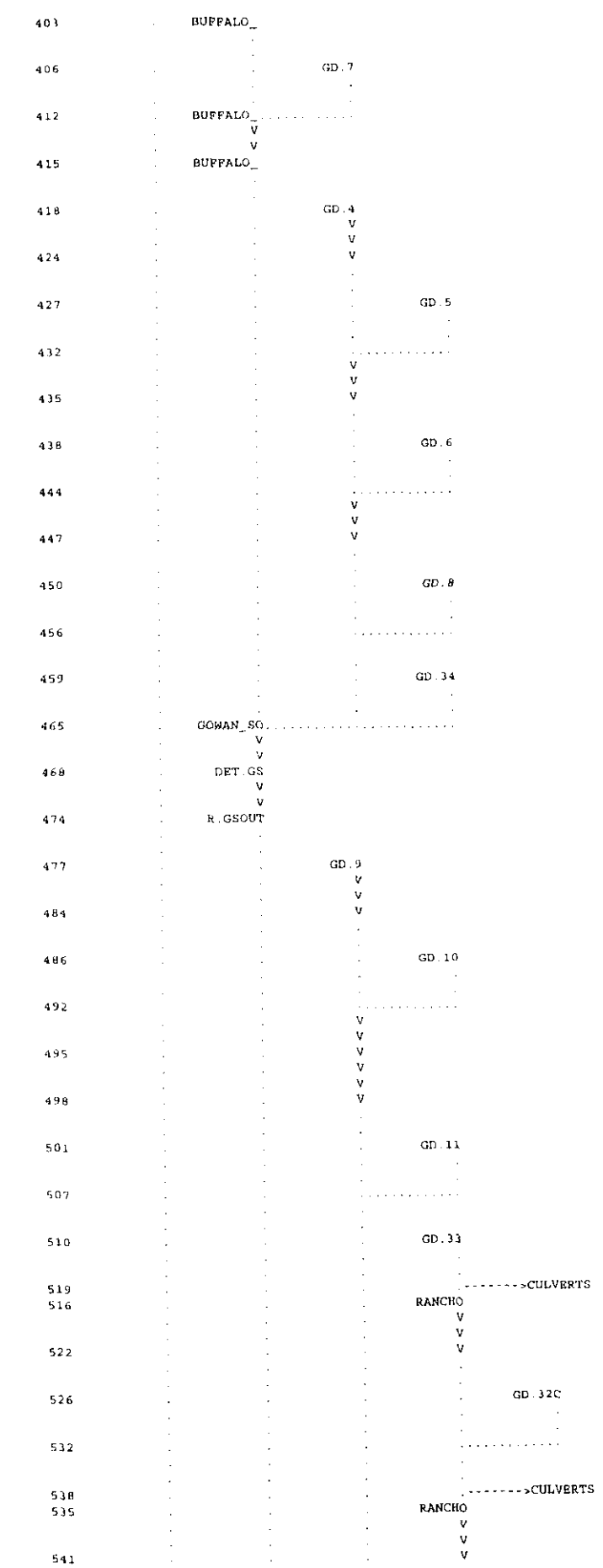
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  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

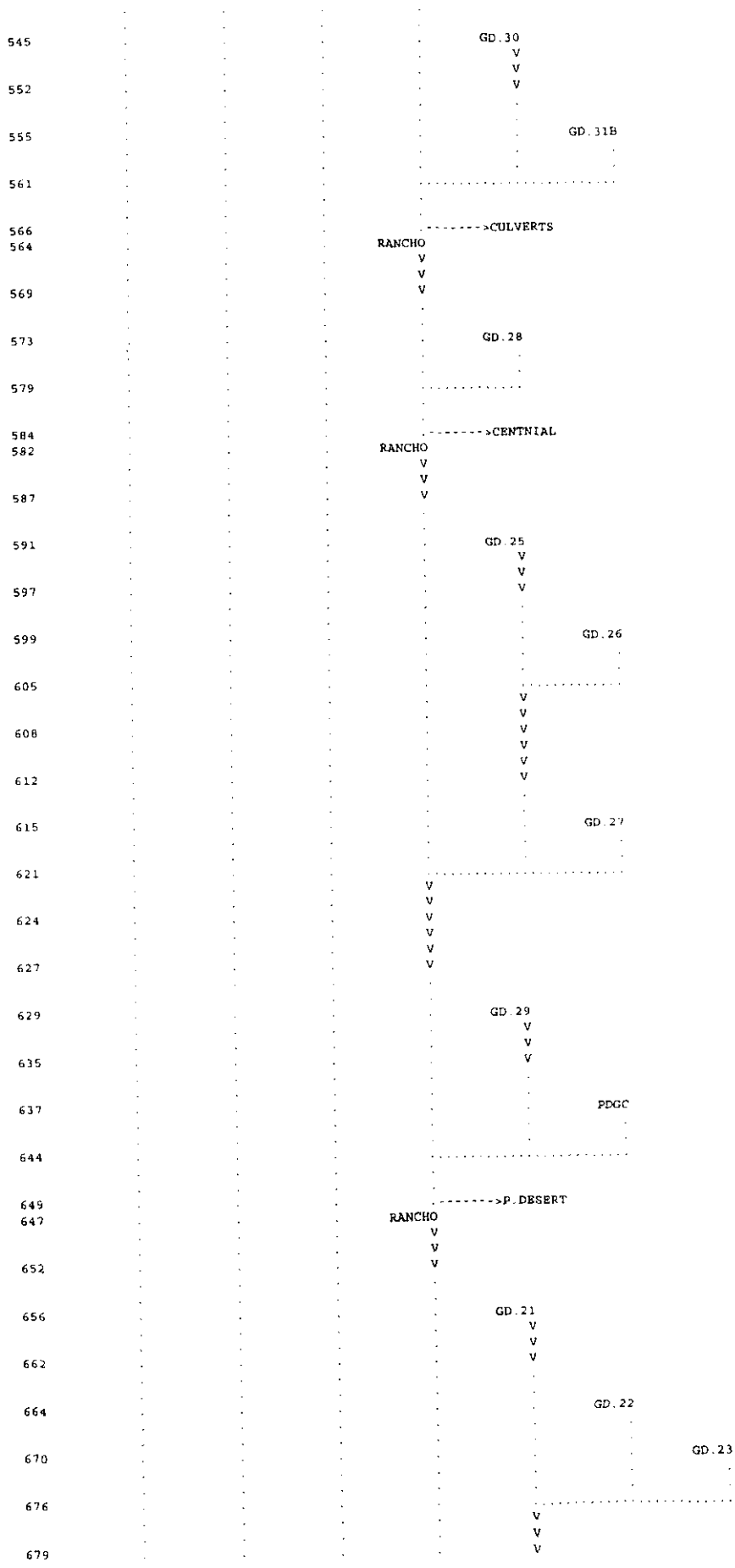
   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

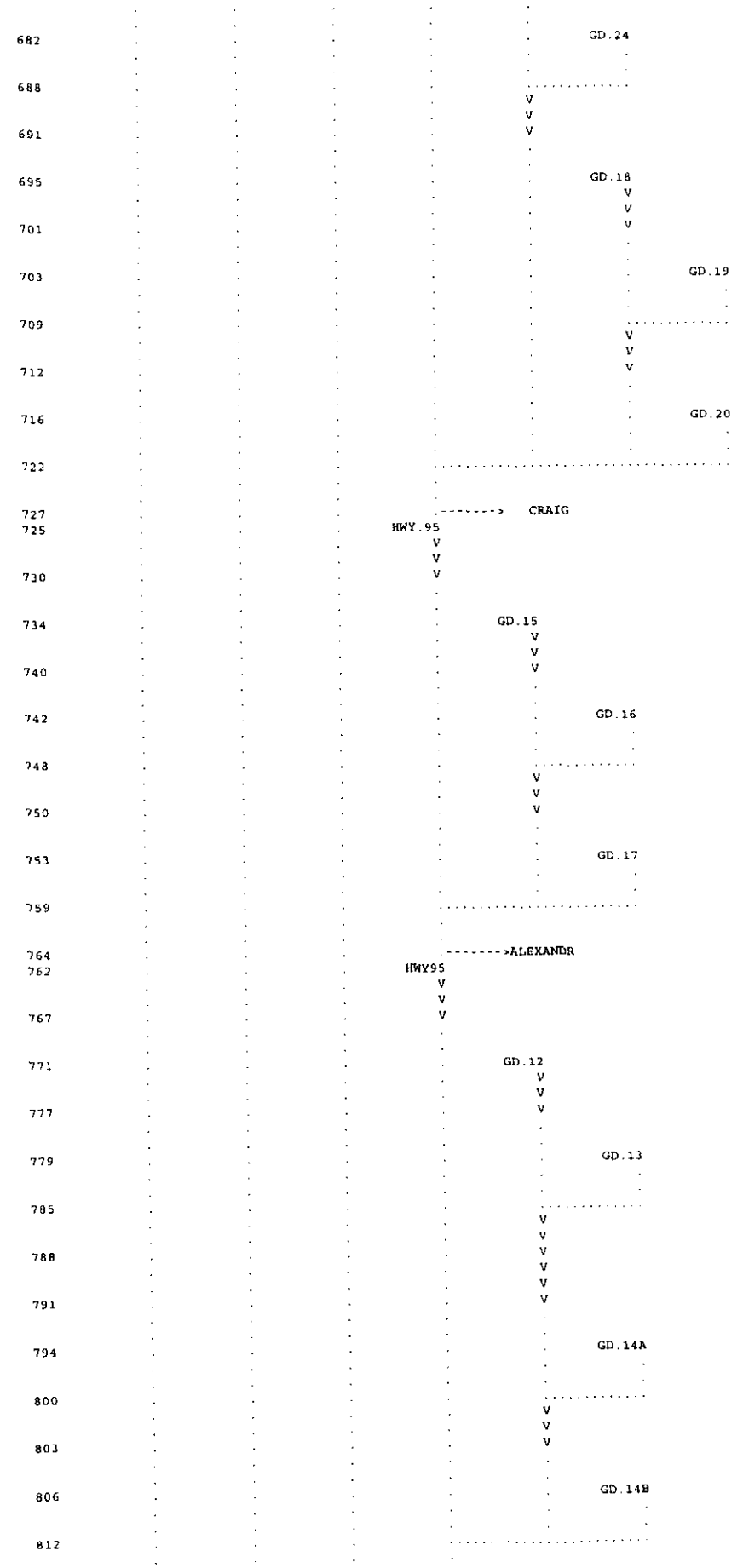
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    96            .             V
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    98            .             .           117
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   104            ..............................
                 V
                 V
   107        ULWDB
                 V
                 V
   117          116
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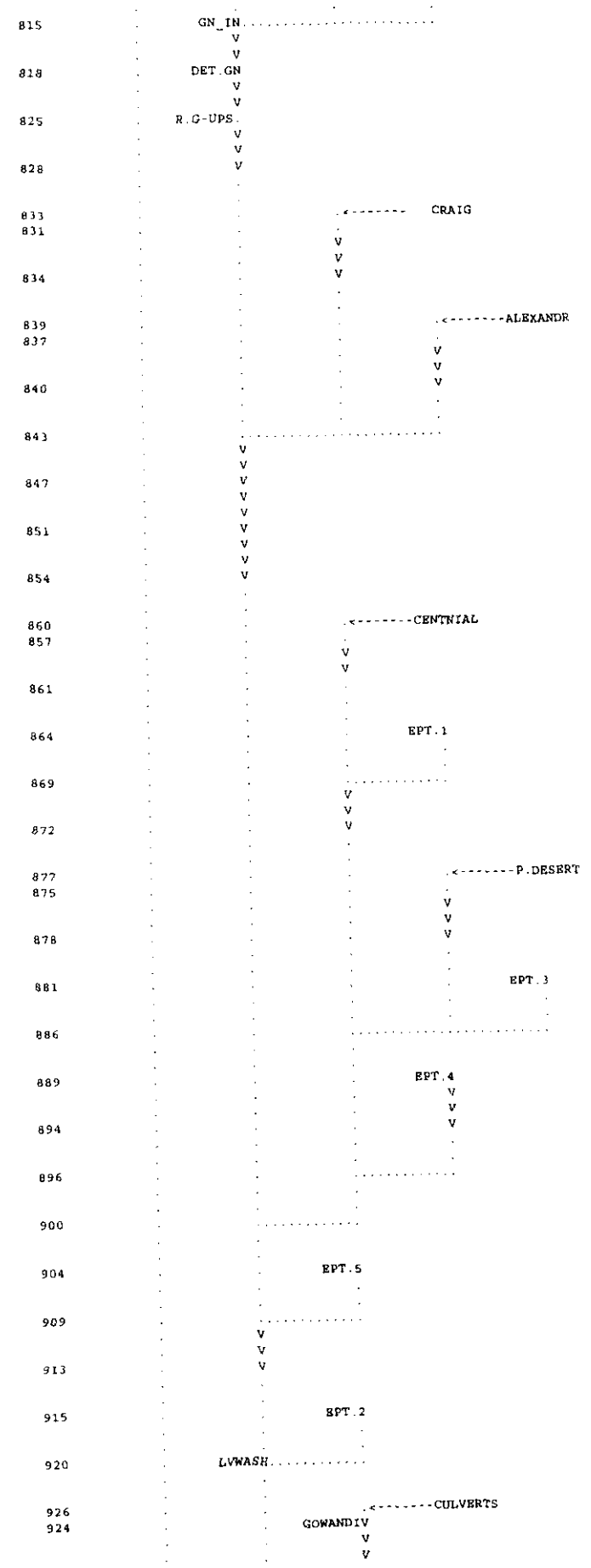

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NLVIN
201
DIVDIKE
199
206
NLVDET
219
DIVDIKE
217
220
223
303
228
RRCHANNL
226
RRBRIDGE
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KCHAR
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I15
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NC1
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241
NC2
245
NC3
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NC4
253
NC5
258
AP.1

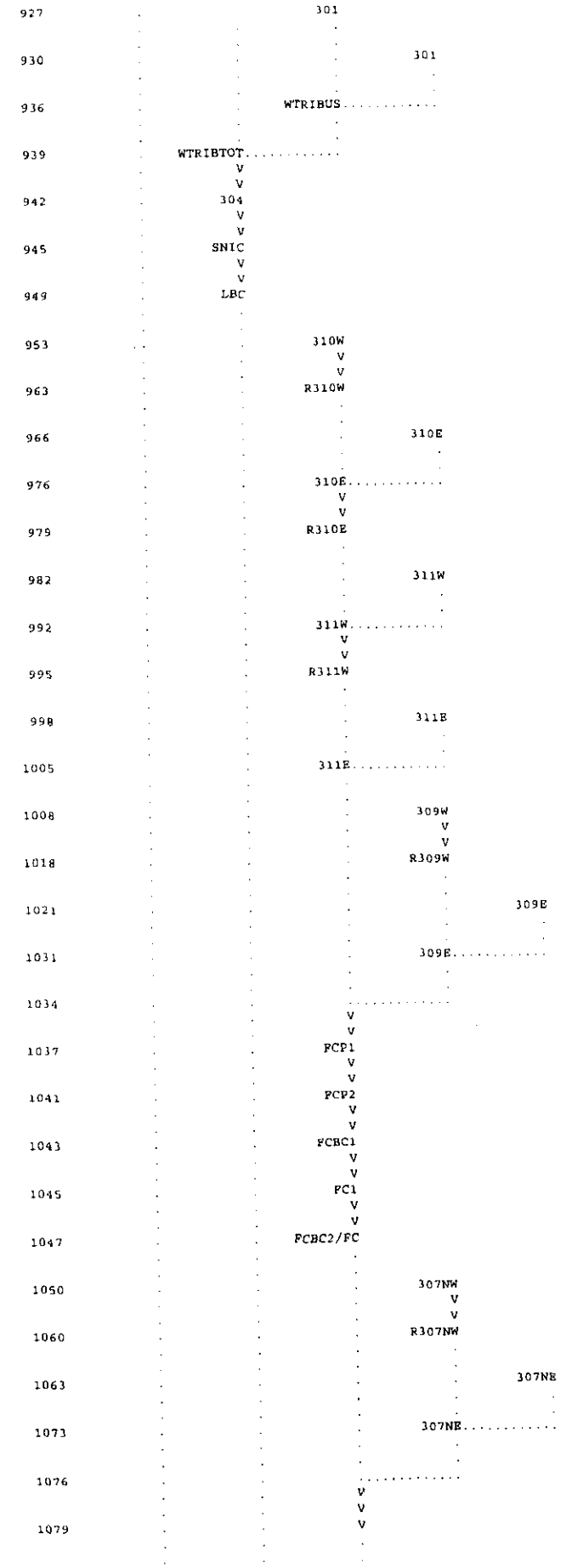

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399
AP.2
AP.3
AP.4
AP.5
AP.6
AP.7
N_CHN
GD.1
GD.2
GD.3
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HUALAPAI
HUA
AP.8
BOX
AP.9
N_CHAN
ANGEL.PK
SPILLWAY
AP_TO_VE

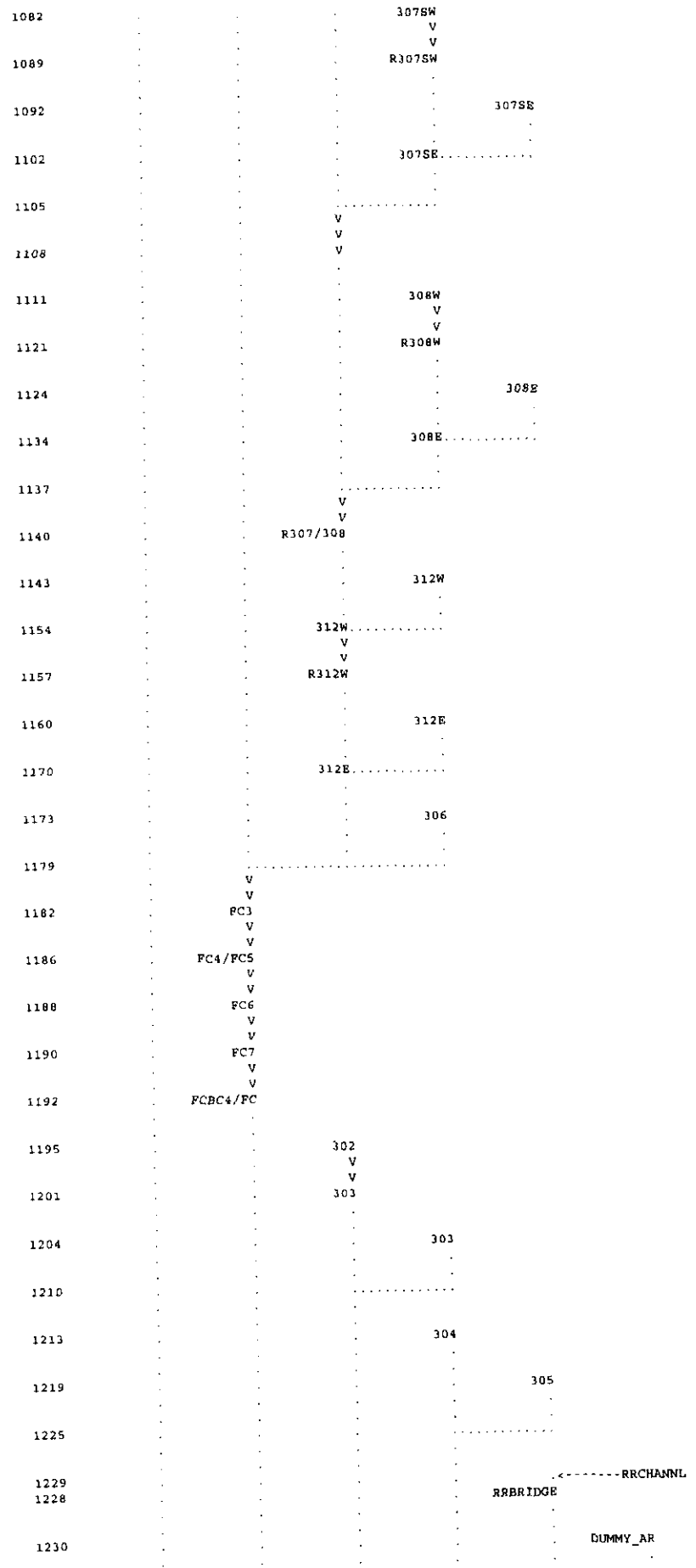

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BUFFALO_
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GD.7
412
BUFFALO_
415
BUFFALO_
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GD.4
424
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GD.5
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438
GD.6
444
447
450
GD.8
456
459
GD.34
465
GOWAN_SO
468
DET.GS
474
R.GSOUT
477
GD.9
484
486
GD.10
492
495
498
501
GD.11
507
510
GD.33
519
->CULVERTS
516
RANCHO
522
526
GD.32C
532
538
->CULVERTS
535
RANCHO
541

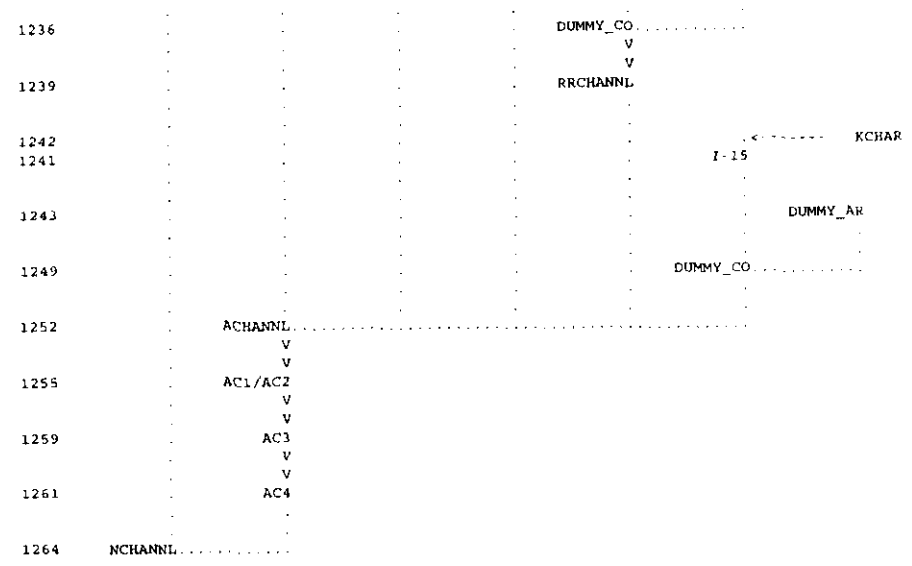

GD.30
GD.31B
->CULVERTS
RANCHO
GD.28
->CENTNIAL
RANCHO
GD.25
GD.26
GD.27
PDGC
->P.DESERT
RANCHO
GD.21
GD.22
GD.23


682
GD.24
688
691
695
GD.18
701
703
GD.19
709
712
716
GD.20
722
727
725
CRAIG
HWY.95
730
734
GD.15
740
742
GD.16
748
750
753
GD.17
759
764
762
ALEXANDR
HWY95
767
771
GD.12
777
779
GD.13
785
788
791
794
GD.14A
800
803
806
GD.14B
812


GN_IN
DET.GN
R.G-UPS
CRAIG
ALEXANDR
CENTNIAL
EPT.1
P.DESERT
EPT.3
EPT.4
EPT.5
EPT.2
LVWASH
CULVERTS
GOWANDIV


927
301
930
301
936
WTRIBUS
939
WTRIBTOT
942
304
945
SNIC
949
LBC
953
310W
963
R310W
966
310E
976
310E
979
R310E
982
311W
992
311W
995
R311W
998
311E
1005
311E
1008
309W
1018
R309W
1021
309E
1031
309E
1034
1037
FCP1
1041
FCP2
1043
FCBC1
1045
FC1
1047
FCBC2/FC
1050
307NW
1060
R307NW
1063
307NE
1073
307NE
1076
1079


1082
307SW
1089
R307SW
1092
307SE
1102
307SE
1105
1108
1111
308W
1121
R308W
1124
308E
1134
308E
1137
1140
R307/308
1143
312W
1154
312W
1157
R312W
1160
312E
1170
312E
1173
306
1179
1182
FC3
1186
FC4/FC5
1188
FC6
1190
FC7
1192
FCBC4/FC
1195
302
1201
303
1204
303
1210
1213
304
1219
305
1225
1229
1228
RRCHANNL
RRBRIDGE
1230
DUMMY_AR



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:18:56   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
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FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 50-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 50-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
50 IO          OUTPUT CONTROL VARIABLES
                    IPRNT         5  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
```

```
IT          HYDROGRAPH TIME DATA
                  NMIN            6  MINUTES IN COMPUTATION INTERVAL
                 IDATE       1    0  STARTING DATE
                 ITIME         0000  STARTING TIME
                    NQ          200  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE       1    0  ENDING DATE
                NDTIME         1954  ENDING TIME
                 ICENT           19  CENTURY MARK

              COMPUTATION INTERVAL     0.10 HOURS
                   TOTAL TIME BASE    19.90 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

JP          MULTI-PLAN OPTION
                 NPLAN            1  NUMBER OF PLANS

JR          MULTI-RATIO OPTION
              RATIOS OF PRECIPITATION
             1.06      0.95      0.85

 *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1

 *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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 *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2
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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

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*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

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PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.06	RATIO 2 0.95	RATIO 3 0.85
HYDROGRAPH AT							
+	112	5.33	1	FLOW	1253.	990.	764.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	119	2.74	1	FLOW	811.	643.	499.
				TIME	3.70	3.70	3.80
2 COMBINED AT							
+		8.07	1	FLOW	2032.	1605.	1238.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	120	8.07	1	FLOW	1909.	1510.	1166.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	125UDB	8.07	1	FLOW	1712.	1357.	1052.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	117	8.07	1	FLOW	1607.	1272.	983.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT							
+	118	5.08	1	FLOW	1558.	1240.	965.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	117	5.08	1	FLOW	1387.	1108.	867.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	5.08	1	FLOW	1285.	1022.	795.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	5.08	1	FLOW	1164.	926.	721.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT							
+	117	7.37	1	FLOW	512.	387.	284.
				TIME	5.90	5.90	6.00

3 COMBINED AT							
+	.	20.52	1	FLOW	2581.	2056.	1612.
				TIME	5.30	5.40	5.50
ROUTED TO							
+	ULWDB	20.52	1	FLOW	2031.	1749.	1411.
				TIME	6.10	6.00	6.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2347.76	2345.41	2343.69
				TIME	6.10	6.00	6.00
ROUTED TO							
+	116	20.52	1	FLOW	2021.	1741.	1397.
				TIME	6.60	6.50	6.50
HYDROGRAPH AT							
+	111	4.08	1	FLOW	1233.	980.	762.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	116	4.08	1	FLOW	1153.	916.	712.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	4.08	1	FLOW	1035.	825.	645.
				TIME	3.90	4.00	4.00
HYDROGRAPH AT							
+	116	5.19	1	FLOW	294.	218.	156.
				TIME	5.60	5.70	5.80
3 COMBINED AT							
+	.	29.79	1	FLOW	2399.	1982.	1572.
				TIME	5.40	6.20	6.30
ROUTED TO							
+	109	29.79	1	FLOW	2343.	1971.	1559.
				TIME	5.90	6.60	6.70
HYDROGRAPH AT							
+	110	2.94	1	FLOW	945.	763.	604.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	109	2.94	1	FLOW	896.	723.	573.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	2.94	1	FLOW	818.	660.	523.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	245.	183.	132.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	.	36.91	1	FLOW	2685.	2151.	1682.
				TIME	5.80	5.80	5.80
ROUTED TO							
+	101	36.91	1	FLOW	2639.	2138.	1665.
				TIME	6.40	6.60	6.50
HYDROGRAPH AT							
+	103	6.20	1	FLOW	1833.	1468.	1151.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	102	6.20	1	FLOW	1730.	1383.	1083.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	1756.	1371.	1043.
				TIME	3.80	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	3485.	2794.	2125.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	101	14.65	1	FLOW	3340.	2636.	2031.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	3110.	2466.	1912.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	101	9.08	1	FLOW	455.	332.	234.
				TIME	5.80	5.80	5.90
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	4374.	3484.	2726.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10

HYDROGRAPH AT							
+	.	60.65	1	FLOW	4374.	3484.	2726.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	1792.	1566.	1335.
				TIME	8.60	8.30	8.20
			**	PEAK STAGES IN FEET **			
			1	STAGE	16.06	12.92	10.29
				TIME	8.60	8.30	8.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	1792.	1566.	1335.
				TIME	8.60	8.30	8.20
ROUTED TO							
+	303	60.65	1	FLOW	1789.	1561.	1332.
				TIME	9.90	9.60	9.40
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	1789.	1561.	1332.
				TIME	9.90	9.60	9.40
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	1431.	1249.	1065.
				TIME	9.90	9.60	9.40
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.60	9.40
ROUTED TO							
+	NC1	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.60	9.40
ROUTED TO							
+	V	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC2	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC3	60.65	1	FLOW	358.	312.	266.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC4	60.65	1	FLOW	358.	312.	266.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC5	60.65	1	FLOW	358.	312.	266.
				TIME	10.10	9.80	9.60
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	253.	206.	166.
				TIME	3.70	3.80	3.80
2 COMBINED AT							
+	.	0.85	1	FLOW	253.	206.	166.
				TIME	3.70	3.80	3.80
ROUTED TO							
+	V	0.85	1	FLOW	200.	164.	132.
				TIME	4.90	4.90	4.90
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	487.	407.	336.
				TIME	6.10	6.30	6.30
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
3 COMBINED AT							
+	.	4.47	1	FLOW	610.	510.	422.
				TIME	6.10	6.10	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	0.	0.	0.
				TIME	3.80	3.80	3.80

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.20	5.20	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	264.	216.	173.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	264.	216.	173.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.60	4.60
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	1.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	295.	243.	197.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	295.	243.	197.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUA	1.82	1	FLOW	512.	419.	338.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	1.82	1	FLOW	508.	414.	333.
				TIME	3.90	3.90	4.00
ROUTED TO							
+	V	1.82	1	FLOW	502.	412.	333.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	AP.8	0.93	1	FLOW	247.	205.	168.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	BOX	2.75	1	FLOW	746.	615.	499.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	2.75	1	FLOW	746.	611.	494.
				TIME	4.10	4.10	4.20
HYDROGRAPH AT							
+	AP.9	0.68	1	FLOW	153.	127.	105.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	N_CHAN	3.43	1	FLOW	895.	734.	598.
				TIME	4.10	4.10	4.20
2 COMBINED AT							
+	ANGEL.PK	7.91	1	FLOW	1153.	963.	799.
				TIME	5.30	5.30	5.40
ROUTED TO							
+	SPILLWAY	7.91	1	FLOW	64.	62.	60.
				TIME	10.20	10.00	9.80

** PEAK STAGES IN FEET **

1	STAGE	2610.57	2609.29	2608.06
	TIME	10.30	10.10	9.90

ROUTED TO							
+	AP_TO_VE	7.91	1	FLOW	64.	62.	60.
				TIME	10.30	10.10	9.90
ROUTED TO							
+	BUFFALO_	7.91	1	FLOW	64.	62.	60.
				TIME	10.30	10.10	9.90
HYDROGRAPH AT							
+	GD.7	1.13	1	FLOW	196.	163.	135.
				TIME	5.10	5.20	5.30
2 COMBINED AT							
+	BUFFALO_	9.04	1	FLOW	251.	216.	186.
				TIME	5.20	5.30	5.40
ROUTED TO							
+	BUFFALO_	9.04	1	FLOW	250.	216.	186.
				TIME	5.40	5.40	5.50
HYDROGRAPH AT							
+	GD.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.5	3.31	1	FLOW	514.	422.	343.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	.	3.31	1	FLOW	514.	422.	343.
				TIME	5.30	5.30	5.40
ROUTED TO							
+	V	3.31	1	FLOW	510.	419.	340.
				TIME	5.70	5.70	5.80
HYDROGRAPH AT							
+	GD.6	1.60	1	FLOW	251.	201.	159.
				TIME	4.40	4.50	4.50
2 COMBINED AT							
+	.	4.91	1	FLOW	719.	590.	477.
				TIME	5.50	5.50	5.50
ROUTED TO							
+	V	4.91	1	FLOW	719.	589.	477.
				TIME	5.50	5.50	5.60
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	200.	159.	125.
				TIME	4.70	4.70	5.00
2 COMBINED AT							
+	.	6.44	1	FLOW	905.	742.	599.
				TIME	5.50	5.50	5.50
HYDROGRAPH AT							
+	GD.34	3.84	1	FLOW	401.	321.	252.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	GOWAN_SO	19.32	1	FLOW	1547.	1270.	1031.
				TIME	5.50	5.50	5.60
ROUTED TO							
+	DET.GS	19.32	1	FLOW	389.	365.	345.
				TIME	7.90	7.80	7.60
			** PEAK STAGES IN FEET **				
			1	STAGE	2344.61	2342.81	2341.30
				TIME	7.90	7.80	7.60
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	389.	365.	345.
				TIME	7.90	7.80	7.70
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.90	4.90	4.90

ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	297.	240.	190.
				TIME	6.40	6.50	6.50
2 COMBINED AT							
+	.	3.17	1	FLOW	298.	240.	190.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.10	7.10
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.10	7.10
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.90	7.90	7.80
HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
3 COMBINED AT							
+	.	1.03	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50

ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.30	5.30	5.30
HYDROGRAPH AT	GD.26	0.00	1	FLOW	0.	0.	0.
+				TIME	5.30	5.50	5.40
2 COMBINED AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	5.30	5.30	5.40
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.80	5.80	5.80
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	6.30	6.30	6.40
HYDROGRAPH AT	GD.27	1.13	1	FLOW	73.	55.	40.
+				TIME	5.80	5.80	5.90
3 COMBINED AT	.	2.16	1	FLOW	74.	55.	40.
+				TIME	5.80	5.80	5.90
ROUTED TO	V	2.16	1	FLOW	73.	55.	40.
+				TIME	5.90	6.00	6.00
ROUTED TO	V	2.16	1	FLOW	73.	55.	40.
+				TIME	6.00	6.10	6.20
HYDROGRAPH AT	GD.29	0.76	1	FLOW	47.	35.	25.
+				TIME	5.70	5.80	5.80
ROUTED TO	V	0.76	1	FLOW	47.	35.	25.
+				TIME	6.10	6.20	6.30
HYDROGRAPH AT	PDGC	0.53	1	FLOW	45.	35.	26.
+				TIME	5.40	5.50	5.50
3 COMBINED AT	.	3.45	1	FLOW	159.	119.	87.
+				TIME	5.90	6.00	6.10
DIVERSION TO	P.DESERT	3.45	1	FLOW	159.	119.	87.
+				TIME	5.90	6.00	6.10
HYDROGRAPH AT	RANCHO	3.45	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
ROUTED TO	V	3.45	1	FLOW	0.	0.	0.
+				TIME	0.10	0.10	0.10
HYDROGRAPH AT	GD.21	0.00	1	FLOW	0.	0.	0.
+				TIME	4.10	4.10	4.10
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.00	5.00	5.00
HYDROGRAPH AT	GD.22	0.00	1	FLOW	0.	0.	0.
+				TIME	5.30	5.50	5.40
HYDROGRAPH AT	GD.23	0.00	1	FLOW	0.	0.	0.
+				TIME	5.30	5.20	5.40
3 COMBINED AT	.	0.00	1	FLOW	1.	0.	0.
+				TIME	5.00	5.00	5.00
ROUTED TO	V	0.00	1	FLOW	1.	0.	0.
+				TIME	5.70	5.70	5.70
HYDROGRAPH AT	GD.24	0.64	1	FLOW	42.	32.	23.
+				TIME	5.50	5.60	5.60
2 COMBINED AT	.	0.64	1	FLOW	43.	32.	24.
+				TIME	5.50	5.60	5.60
ROUTED TO	V	0.64	1	FLOW	42.	32.	23.
+				TIME	6.10	6.20	6.30

HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.30	5.20
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	166.	130.	99.
				TIME	6.60	6.60	6.70
4 COMBINED AT							
+	.	6.45	1	FLOW	206.	160.	121.
				TIME	6.40	6.50	6.50
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	206.	160.	121.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.60	5.60	5.60
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.70	5.70	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	39.	30.	22.
				TIME	6.10	6.20	6.20
3 COMBINED AT							
+	.	7.01	1	FLOW	39.	30.	23.
				TIME	6.10	6.20	6.20
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	39.	30.	23.
				TIME	6.10	6.20	6.20
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60

ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	5.70	5.70	5.70
HYDROGRAPH AT	GD.14A	1.71	1	FLOW	196.	149.	115.
+				TIME	4.40	4.40	5.40
2 COMBINED AT	.	1.71	1	FLOW	196.	149.	116.
+				TIME	4.40	4.40	5.40
ROUTED TO	V	1.71	1	FLOW	188.	144.	112.
+				TIME	5.00	5.80	5.80
HYDROGRAPH AT	GD.14B	0.68	1	FLOW	69.	55.	43.
+				TIME	5.70	5.80	5.80
3 COMBINED AT	.	9.40	1	FLOW	249.	198.	155.
+				TIME	5.70	5.80	5.80
3 COMBINED AT	GN_IN	31.90	1	FLOW	884.	763.	660.
+				TIME	6.10	6.10	6.10
ROUTED TO	DET.GN	31.90	1	FLOW	310.	292.	275.
+				TIME	15.70	13.70	12.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2316.21	2315.52	2314.91
				TIME	15.70	13.70	12.00
ROUTED TO	R.G-UPS.	31.90	1	FLOW	310.	292.	275.
+				TIME	15.70	13.70	12.10
ROUTED TO	V	31.90	1	FLOW	310.	292.	275.
+				TIME	15.80	13.80	12.10
HYDROGRAPH AT	.	0.00	1	FLOW	206.	160.	121.
+				TIME	6.40	6.50	6.50
ROUTED TO	V	0.00	1	FLOW	204.	158.	120.
+				TIME	6.90	6.90	7.00
HYDROGRAPH AT	.	0.00	1	FLOW	39.	30.	23.
+				TIME	6.10	6.20	6.20
ROUTED TO	V	0.00	1	FLOW	38.	29.	22.
+				TIME	7.00	7.10	7.10
3 COMBINED AT	.	31.90	1	FLOW	512.	448.	394.
+				TIME	7.00	7.10	7.10
ROUTED TO	V	31.90	1	FLOW	512.	448.	394.
+				TIME	7.10	7.10	7.20
ROUTED TO	V	31.90	1	FLOW	512.	448.	394.
+				TIME	7.10	7.20	7.20
ROUTED TO	V	31.90	1	FLOW	512.	448.	394.
+				TIME	7.10	7.20	7.30
HYDROGRAPH AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	6.50	6.70	6.70
ROUTED TO	.	0.00	1	FLOW	0.	0.	0.
+				TIME	8.50	8.50	8.70
HYDROGRAPH AT	EPT.1	3.76	1	FLOW	264.	212.	167.
+				TIME	7.30	7.30	7.40
2 COMBINED AT	.	3.76	1	FLOW	264.	212.	167.
+				TIME	7.30	7.30	7.40
ROUTED TO	V	3.76	1	FLOW	262.	210.	166.
+				TIME	8.10	8.10	8.20
HYDROGRAPH AT	.	0.00	1	FLOW	159.	119.	87.
+				TIME	5.90	6.00	6.10

ROUTED TO	V	0.00	1	FLOW	151.	112.	81.
+				TIME	7.90	8.00	8.10
HYDROGRAPH AT	EPT.3	4.39	1	FLOW	358.	294.	239.
+				TIME	7.50	7.50	7.60
3 COMBINED AT	.	8.15	1	FLOW	764.	611.	480.
+				TIME	7.80	7.90	7.90
HYDROGRAPH AT	EPT.4	1.37	1	FLOW	151.	126.	103.
+				TIME	6.60	6.60	6.60
ROUTED TO	V	1.37	1	FLOW	150.	124.	102.
+				TIME	7.50	7.50	7.50
2 COMBINED AT	.	9.52	1	FLOW	910.	732.	579.
+				TIME	7.80	7.80	7.90
2 COMBINED AT	.	41.42	1	FLOW	1404.	1165.	963.
+				TIME	7.60	7.70	7.70
HYDROGRAPH AT	EPT.5	3.01	1	FLOW	185.	150.	121.
+				TIME	8.60	8.60	8.60
2 COMBINED AT	.	44.42	1	FLOW	1575.	1305.	1075.
+				TIME	7.70	7.70	7.80
ROUTED TO	V	44.42	1	FLOW	1575.	1305.	1075.
+				TIME	7.70	7.80	7.80
HYDROGRAPH AT	EPT.2	1.49	1	FLOW	131.	105	83.
+				TIME	6.50	6.50	6.60
2 COMBINED AT	LVWASH	45.92	1	FLOW	1673.	1383.	1136.
+				TIME	7.60	7.70	7.70
HYDROGRAPH AT	GOWANDIV	0.00	1	FLOW	0.	0.	0.
+				TIME	7.20	7.10	7.10
ROUTED TO	301	0.00	1	FLOW	0.	0.	0.
+				TIME	9.30	9.30	9.50
HYDROGRAPH AT	301	18.62	1	FLOW	918.	728.	567.
+				TIME	8.20	8.20	8.30
2 COMBINED AT	WTRIBUS	18.62	1	FLOW	918.	728.	567.
+				TIME	8.20	8.20	8.30
2 COMBINED AT	WTRIBTOT	64.53	1	FLOW	2564.	2091.	1688.
+				TIME	7.80	7.90	7.90
ROUTED TO	304	64.53	1	FLOW	2558.	2086.	1685.
+				TIME	8.10	8.20	8.20
ROUTED TO	SNIC	64.53	1	FLOW	2558.	2086.	1684.
+				TIME	8.10	8.20	8.20
ROUTED TO	LBC	64.53	1	FLOW	2557.	2086.	1684.
+				TIME	8.20	8.20	8.30
HYDROGRAPH AT	310W	0.80	1	FLOW	118.	87.	68.
+				TIME	4.40	4.60	5.20
ROUTED TO	R310W	0.80	1	FLOW	117.	86.	68.
+				TIME	4.80	5.10	5.70
HYDROGRAPH AT	310E	1.24	1	FLOW	134.	106.	83.
+				TIME	4.50	5.30	5.40
2 COMBINED AT	310E	2.04	1	FLOW	244.	191.	150.
+				TIME	4.80	5.20	5.40
ROUTED TO	R310E	2.04	1	FLOW	242.	191.	149.
+				TIME	4.90	5.30	5.60

HYDROGRAPH AT							
+	311W	0.96	1	FLOW	108.	83.	65.
				TIME	4.40	5.20	5.30
2 COMBINED AT							
+	311W	3.00	1	FLOW	339.	274.	211.
				TIME	5.00	5.30	5.50
ROUTED TO							
+	R311W	3.00	1	FLOW	339.	273.	209.
				TIME	5.10	5.40	5.70
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	47.	34.	24.
				TIME	5.10	5.10	5.10
2 COMBINED AT							
+	311E	3.77	1	FLOW	386.	300.	219.
				TIME	5.10	5.40	5.70
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	14.	7.	2.
				TIME	6.90	7.90	9.60
ROUTED TO							
+	R309W	0.81	1	FLOW	14.	6.	2.
				TIME	8.90	10.60	13.70
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	116.	88.	64.
				TIME	5.40	5.60	5.90
2 COMBINED AT							
+	309E	2.00	1	FLOW	116.	88.	64.
				TIME	5.40	5.60	5.90
2 COMBINED AT							
+		5.77	1	FLOW	497.	383.	279.
				TIME	5.20	5.40	5.70
ROUTED TO							
+	FCP1	5.77	1	FLOW	497.	383.	279.
				TIME	5.20	5.40	5.80
ROUTED TO							
+	FCP2	5.77	1	FLOW	496.	382.	279.
				TIME	5.20	5.40	5.80
ROUTED TO							
+	FCBC1	5.77	1	FLOW	496.	382.	279.
				TIME	5.20	5.50	5.80
ROUTED TO							
+	FC1	5.77	1	FLOW	495.	382.	279.
				TIME	5.20	5.50	5.80
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	495.	382.	279.
				TIME	5.30	5.50	5.80
HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	184.	135.	110.
				TIME	4.40	5.20	5.20
ROUTED TO							
+	R307NW	1.33	1	FLOW	184.	135.	110.
				TIME	4.50	5.30	5.30
HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	91.	68.	56.
				TIME	4.40	5.10	5.20
2 COMBINED AT							
+	307NE	1.97	1	FLOW	274.	203.	165.
				TIME	4.50	5.20	5.30
2 COMBINED AT							
+		7.74	1	FLOW	736.	577.	419.
				TIME	5.20	5.40	5.70
ROUTED TO							
+	V	7.74	1	FLOW	720.	559.	407.
				TIME	5.60	5.80	6.10
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	19.	7.	1.
				TIME	5.00	5.10	5.30
ROUTED TO							
+	R307SW	1.10	1	FLOW	19.	7.	1.
				TIME	5.60	6.10	8.10
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	212.	158.	128.
				TIME	4.50	5.20	5.30
2 COMBINED AT							
+	307SE	2.68	1	FLOW	212.	158.	128.
				TIME	4.50	5.20	5.30

2 COMBINED AT	.	10.42	1	FLOW	902.	683.	495.
+				TIME	5.60	5.80	6.00
ROUTED TO	V	10.42	1	FLOW	890.	675.	491.
+				TIME	5.80	6.00	6.20
HYDROGRAPH AT	308W	0.81	1	FLOW	14.	6.	2.
+				TIME	6.90	7.90	9.60
ROUTED TO	R308W	0.81	1	FLOW	14.	6.	2.
+				TIME	7.50	8.70	10.90
HYDROGRAPH AT	308E	0.72	1	FLOW	97.	70.	56.
+				TIME	4.40	4.70	5.30
2 COMBINED AT	308E	1.53	1	FLOW	97.	70.	56.
+				TIME	4.40	4.70	5.30
2 COMBINED AT	.	11.95	1	FLOW	953.	726.	527.
+				TIME	5.80	5.90	6.20
ROUTED TO	R307/308	11.95	1	FLOW	953.	725.	527.
+				TIME	5.80	6.00	6.30
HYDROGRAPH AT	312W	0.77	1	FLOW	61.	44.	30.
+				TIME	5.40	5.60	5.90
2 COMBINED AT	312W	12.72	1	FLOW	1005.	763.	553.
+				TIME	5.80	6.00	6.30
ROUTED TO	R312W	12.72	1	FLOW	1003.	762.	552.
+				TIME	5.90	6.10	6.40
HYDROGRAPH AT	312E	0.70	1	FLOW	43.	29.	18.
+				TIME	5.50	5.70	6.00
2 COMBINED AT	312E	13.42	1	FLOW	1039.	787.	568.
+				TIME	5.90	6.10	6.40
HYDROGRAPH AT	306	5.07	1	FLOW	309.	243.	187.
+				TIME	7.00	7.10	7.10
3 COMBINED AT	.	83.02	1	FLOW	3163.	2590.	2105.
+				TIME	7.60	7.70	7.70
ROUTED TO	FC3	83.02	1	FLOW	3162.	2590.	2104.
+				TIME	7.70	7.70	7.70
ROUTED TO	FC4/FC5	83.02	1	FLOW	3162.	2590	2104.
+				TIME	7.70	7.70	7.70
ROUTED TO	FC6	83.02	1	FLOW	3162.	2589.	2104.
+				TIME	7.70	7.70	7.80
ROUTED TO	FC7	83.02	1	FLOW	3161.	2589.	2103.
+				TIME	7.80	7.80	7.80
ROUTED TO	FCBC4/FC	83.02	1	FLOW	3161.	2588.	2103.
+				TIME	7.80	7.80	7.90
HYDROGRAPH AT	302	12.11	1	FLOW	848.	681.	538.
+				TIME	7.00	7.10	7.10
ROUTED TO	303	12.11	1	FLOW	841.	675.	533.
+				TIME	7.90	7.90	8.00
HYDROGRAPH AT	303	10.22	1	FLOW	469.	368.	283.
+				TIME	8.20	8.20	8.30
2 COMBINED AT	.	22.33	1	FLOW	1306.	1040.	814.
+				TIME	8.00	8.00	8.10
HYDROGRAPH AT	304	2.90	1	FLOW	276.	223.	177.
+				TIME	6.00	6.00	6.10

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 HYDROGRAPH AT
+                    305       3.30      1   FLOW          385.      314.      252.
                                               TIME          5.50      5.50      5.50

   2 COMBINED AT
+                    .         6.20      1   FLOW          647.      524.      419.
                                               TIME          5.60      5.70      5.70

 HYDROGRAPH AT
+                  RRBRIDGE    0.00      1   FLOW            0.        0.        0.
                                               TIME          0.10      0.10      0.10

 HYDROGRAPH AT
+                  DUMMY_AR    0.00      1   FLOW            0.        0.        0.
                                               TIME          4.50      4.50      5.30

   2 COMBINED AT
+                  DUMMY_CO    0.00      1   FLOW            0.        0.        0.
                                               TIME          4.50      4.50      5.30

 ROUTED TO
+                  RRCHANNL    0.00      1   FLOW            0.        0.        0.
                                               TIME          7.70      8.00      9.20

 HYDROGRAPH AT
+                    I-15      0.00      1   FLOW         1431.     1249.     1065.
                                               TIME          9.90      9.60      9.40

 HYDROGRAPH AT
+                  DUMMY_AR    0.00      1   FLOW            0.        0.        0.
                                               TIME          4.50      4.50      5.30

   2 COMBINED AT
+                  DUMMY_CO    0.00      1   FLOW         1431.     1249.     1065.
                                               TIME          9.90      9.60      9.40

   5 COMBINED AT
+                  ACHANNL   111.56      1   FLOW         5982.     4931.     4008.
                                               TIME          7.80      7.90      8.00

 ROUTED TO
+                  AC1/AC2   111.56      1   FLOW         5980.     4931.     4007.
                                               TIME          7.80      7.90      8.00

 ROUTED TO
+                    AC3     111.56      1   FLOW         5980.     4930.     4007.
                                               TIME          7.90      7.90      8.10

 ROUTED TO
+                    AC4     111.56      1   FLOW         5979.     4930.     4007.
                                               TIME          7.90      7.90      8.10

   2 COMBINED AT
+                  NCHANNL   172.20      1   FLOW         6304.     5211.     4246.
                                               TIME          7.90      8.00      8.10
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK     TIME TO PEAK     VOLUME     DT        PEAK     TIME TO PEAK     VOLUME
                                (MIN)     (CFS)      (MIN)          (IN)     (MIN)     (CFS)      (MIN)          (IN)
        FOR PLAN = 1  RATIO= 1.06
             NC1  MANE          0.33    357.72     594.13          0.08      6.00    357.72     594.00          0.08

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2741E+03 EXCESS=0.0000E+00 OUTFLOW=0.2740E+03 BASIN STORAGE=0.6701E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.95
             NC1  MANE          0.41    312.25     576.71          0.07      6.00    312.25     576.00          0.07

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2127E+03 EXCESS=0.0000E+00 OUTFLOW=0.2126E+03 BASIN STORAGE=0.5263E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.85
             NC1  MANE          0.46    266.37     564.91          0.05      6.00    266.36     564.00          0.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1613E+03 EXCESS=0.0000E+00 OUTFLOW=0.1612E+03 BASIN STORAGE=0.5041E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.40    357.72     596.55          0.08      6.00    357.71     594.00          0.08

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2740E+03 EXCESS=0.0000E+00 OUTFLOW=0.2736E+03 BASIN STORAGE=0.3853E+00 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.37    312.24     578.89          0.07      6.00    312.21     582.00          0.07

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2127E+03 EXCESS=0.0000E+00 OUTFLOW=0.2124E+03 BASIN STORAGE=0.3004E+00 PERCENT ERROR=   0.0
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FOR PLAN = 1 RATIO= 0.85

V	MANE	1.53	266.36	568.23	0.05	6.00	266.35	570.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1612E+03 EXCESS=0.0000E+00 OUTFLOW=0.1610E+03 BASIN STORAGE=0.2885E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	0.86	357.71	595.75	0.08	6.00	357.69	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2736E+03 EXCESS=0.0000E+00 OUTFLOW=0.2734E+03 BASIN STORAGE=0.2111E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	0.90	312.21	582.95	0.07	6.00	312.20	582.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2123E+03 EXCESS=0.0000E+00 OUTFLOW=0.2121E+03 BASIN STORAGE=0.1608E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	0.93	266.35	572.20	0.05	6.00	266.33	570.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1609E+03 EXCESS=0.0000E+00 OUTFLOW=0.1607E+03 BASIN STORAGE=0.1541E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	2.63	357.68	600.76	0.08	6.00	357.68	600.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2733E+03 EXCESS=0.0000E+00 OUTFLOW=0.2726E+03 BASIN STORAGE=0.7072E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	2.62	312.18	585.86	0.07	6.00	312.18	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2121E+03 EXCESS=0.0000E+00 OUTFLOW=0.2116E+03 BASIN STORAGE=0.5236E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	2.73	266.33	575.35	0.05	6.00	266.33	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1607E+03 EXCESS=0.0000E+00 OUTFLOW=0.1602E+03 BASIN STORAGE=0.5005E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	0.74	357.68	601.51	0.08	6.00	357.65	600.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2725E+03 EXCESS=0.0000E+00 OUTFLOW=0.2723E+03 BASIN STORAGE=0.2039E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	0.82	312.17	589.56	0.07	6.00	312.16	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2115E+03 EXCESS=0.0000E+00 OUTFLOW=0.2114E+03 BASIN STORAGE=0.1475E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	0.90	266.32	577.73	0.05	6.00	266.30	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1601E+03 EXCESS=0.0000E+00 OUTFLOW=0.1600E+03 BASIN STORAGE=0.1410E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC5	MANE	0.46	357.65	601.29	0.08	6.00	357.64	606.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2723E+03 EXCESS=0.0000E+00 OUTFLOW=0.2722E+03 BASIN STORAGE=0.1144E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC5	MANE	0.51	312.16	588.77	0.07	6.00	312.15	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2114E+03 EXCESS=0.0000E+00 OUTFLOW=0.2113E+03 BASIN STORAGE=0.8214E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC5	MANE	0.46	266.30	577.01	0.05	6.00	266.28	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1600E+03 EXCESS=0.0000E+00 OUTFLOW=0.1599E+03 BASIN STORAGE=0.7842E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.62	508.60	234.06	0.80	6.00	508.41	234.00	0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7790E+02 EXCESS=0.0000E+00 OUTFLOW=0.7809E+02 BASIN STORAGE=0.7355E-02 PERCENT ERROR= -0.2

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.92    415.70    234.56      0.66      6.00    414.18    234.00         0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6374E+02 EXCESS=0.0000E+00 OUTFLOW=0.6387E+02 BASIN STORAGE=0.6331E-02 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.28    335.03    238.87      0.53      6.00    333.47    240.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5149E+02 EXCESS=0.0000E+00 OUTFLOW=0.5164E+02 BASIN STORAGE=0.7890E-02 PERCENT ERROR=  -0.3

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          3.54    506.53    242.59      0.80      6.00    502.45    246.00         0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7807E+02 EXCESS=0.0000E+00 OUTFLOW=0.7810E+02 BASIN STORAGE=0.7938E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.92    413.18    243.94      0.66      6.00    411.93    246.00         0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6386E+02 EXCESS=0.0000E+00 OUTFLOW=0.6392E+02 BASIN STORAGE=0.7131E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.12    332.98    247.47      0.53      6.00    332.55    246.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5164E+02 EXCESS=0.0000E+00 OUTFLOW=0.5165E+02 BASIN STORAGE=0.6992E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.70    746.08    247.09      0.81      6.00    746.06    246.00         0.81

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1190E+03 EXCESS=0.0000E+00 OUTFLOW=0.1190E+03 BASIN STORAGE=0.1142E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.79    613.45    248.25      0.67      6.00    611.31    246.00         0.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9774E+02 EXCESS=0.0000E+00 OUTFLOW=0.9777E+02 BASIN STORAGE=0.1170E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          2.02    498.52    249.95      0.54      6.00    493.90    252.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7934E+02 EXCESS=0.0000E+00 OUTFLOW=0.7934E+02 BASIN STORAGE=0.1080E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          AP_TO_VE  MANE          1.81     64.22    621.50      0.22      6.00     64.22    618.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9192E+02 EXCESS=0.0000E+00 OUTFLOW=0.9168E+02 BASIN STORAGE=0.3005E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          AP_TO_VE  MANE          1.81     61.88    609.88      0.21      6.00     61.88    612.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8841E+02 EXCESS=0.0000E+00 OUTFLOW=0.8812E+02 BASIN STORAGE=0.2924E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          AP_TO_VE  MANE          1.81     59.60    596.97      0.20      6.00     59.59    600.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8496E+02 EXCESS=0.0000E+00 OUTFLOW=0.8466E+02 BASIN STORAGE=0.2836E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          1.34     64.22    622.14      0.22      6.00     64.22    624.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9154E+02 EXCESS=0.0000E+00 OUTFLOW=0.9130E+02 BASIN STORAGE=0.2921E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          1.34     61.88    613.40      0.21      6.00     61.88    612.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8805E+02 EXCESS=0.0000E+00 OUTFLOW=0.8785E+02 BASIN STORAGE=0.2859E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          1.30     59.59    602.46      0.20      6.00     59.59    600.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8461E+02 EXCESS=0.0000E+00 OUTFLOW=0.8435E+02 BASIN STORAGE=0.2844E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
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BUFFALO_  MANE          4.06    250.53    319.15      0.29      6.00    250.46    324.00      0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1409E+03 EXCESS=0.0000E+00 OUTFLOW=0.1397E+03 BASIN STORAGE=0.1598E+01 PERCENT ERROR=  -0.3

FOR PLAN = 1  RATIO= 0.95
BUFFALO_  MANE          4.39    216.38    327.57      0.27      6.00    216.26    324.00      0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1288E+03 EXCESS=0.0000E+00 OUTFLOW=0.1278E+03 BASIN STORAGE=0.1552E+01 PERCENT ERROR=  -0.4

FOR PLAN = 1  RATIO= 0.85
BUFFALO_  MANE          4.60    186.12    331.59      0.24      6.00    186.11    330.00      0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1179E+03 EXCESS=0.0000E+00 OUTFLOW=0.1168E+03 BASIN STORAGE=0.1504E+01 PERCENT ERROR=  -0.3

FOR PLAN = 1  RATIO= 1.06
       V  MANE          1.32    718.64    331.91      0.69      6.00    718.57    330.00      0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1809E+03 EXCESS=0.0000E+00 OUTFLOW=0.1809E+03 BASIN STORAGE=0.2554E-03 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.95
       V  MANE          1.45    589.75    332.49      0.56      6.00    589.13    330.00      0.56

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1467E+03 EXCESS=0.0000E+00 OUTFLOW=0.1468E+03 BASIN STORAGE=0.2545E-03 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.85
       V  MANE          1.62    476.87    334.21      0.45      6.00    476.53    336.00      0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1173E+03 EXCESS=0.0000E+00 OUTFLOW=0.1173E+03 BASIN STORAGE=0.3538E-03 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 1.06
R.GSOUT  MANE          1.02    389.05    475.79      0.42      6.00    389.04    474.00      0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4288E+03 EXCESS=0.0000E+00 OUTFLOW=0.4283E+03 BASIN STORAGE=0.5425E+00 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.95
R.GSOUT  MANE          1.01    365.15    468.87      0.36      6.00    365.15    468.00      0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3719E+03 EXCESS=0.0000E+00 OUTFLOW=0.3716E+03 BASIN STORAGE=0.4367E+00 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.85
R.GSOUT  MANE          1.02    345.26    458.78      0.31      6.00    345.25    462.00      0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3180E+03 EXCESS=0.0000E+00 OUTFLOW=0.3176E+03 BASIN STORAGE=0.3639E+00 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 1.06
       V  MANE          3.40     73.46    353.24      0.16      6.00     73.44    354.00      0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1805E+02 EXCESS=0.0000E+00 OUTFLOW=0.1806E+02 BASIN STORAGE=0.1035E-02 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.95
       V  MANE          3.68     55.16    355.14      0.12      6.00     55.10    360.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1339E+02 EXCESS=0.0000E+00 OUTFLOW=0.1339E+02 BASIN STORAGE=0.7761E-03 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.85
       V  MANE          4.17     40.21    361.49      0.08      6.00     40.16    360.00      0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9613E+01 EXCESS=0.0000E+00 OUTFLOW=0.9616E+01 BASIN STORAGE=0.9280E-03 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 1.06
       V  MANE          3.89     73.44    361.78      0.16      6.00     73.33    360.00      0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1806E+02 EXCESS=0.0000E+00 OUTFLOW=0.1806E+02 BASIN STORAGE=0.1173E-02 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.95
       V  MANE          4.20     55.09    368.56      0.12      6.00     55.08    366.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1339E+02 EXCESS=0.0000E+00 OUTFLOW=0.1339E+02 BASIN STORAGE=0.1071E-02 PERCENT ERROR=   0.0

FOR PLAN = 1  RATIO= 0.85
       V  MANE          4.64     40.13    371.51      0.08      6.00     40.12    372.00      0.08
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9616E+01 EXCESS=0.0000E+00 OUTFLOW=0.9614E+01 BASIN STORAGE=0.1040E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V MANE	5.43	46.63	363.90	0.27	6.00	46.54	366.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1099E+02 EXCESS=0.0000E+00 OUTFLOW=0.1099E+02 BASIN STORAGE=0.8857E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V MANE	5.93	34.59	368.67	0.20	6.00	34.51	372.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8037E+01 EXCESS=0.0000E+00 OUTFLOW=0.8040E+01 BASIN STORAGE=0.8187E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V MANE	6.00	24.87	375.68	0.14	6.00	24.82	378.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5670E+01 EXCESS=0.0000E+00 OUTFLOW=0.5674E+01 BASIN STORAGE=0.9979E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

R.G-UPS. MANE	0.76	310.12	943.26	0.22	6.00	310.12	942.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3762E+03 EXCESS=0.0000E+00 OUTFLOW=0.3755E+03 BASIN STORAGE=0.5936E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.G-UPS. MANE	0.76	291.84	823.60	0.21	6.00	291.84	822.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3514E+03 EXCESS=0.0000E+00 OUTFLOW=0.3508E+03 BASIN STORAGE=0.5619E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.G-UPS. MANE	0.75	275.36	726.50	0.19	6.00	275.36	726.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3275E+03 EXCESS=0.0000E+00 OUTFLOW=0.3270E+03 BASIN STORAGE=0.5328E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V MANE	1.69	310.12	945.54	0.22	6.00	310.11	948.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3755E+03 EXCESS=0.0000E+00 OUTFLOW=0.3739E+03 BASIN STORAGE=0.2105E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V MANE	1.70	291.84	826.71	0.21	6.00	291.84	828.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3507E+03 EXCESS=0.0000E+00 OUTFLOW=0.3493E+03 BASIN STORAGE=0.2021E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.85

V MANE	1.67	275.36	729.08	0.19	6.00	275.36	726.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3269E+03 EXCESS=0.0000E+00 OUTFLOW=0.3254E+03 BASIN STORAGE=0.1961E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V MANE	1.72	512.15	422.83	0.26	6.00	512.01	426.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4480E+03 EXCESS=0.0000E+00 OUTFLOW=0.4459E+03 BASIN STORAGE=0.2827E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V MANE	1.82	447.87	428.86	0.24	6.00	447.81	426.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4061E+03 EXCESS=0.0000E+00 OUTFLOW=0.4040E+03 BASIN STORAGE=0.2676E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V MANE	1.95	394.04	430.32	0.22	6.00	393.98	432.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3680E+03 EXCESS=0.0000E+00 OUTFLOW=0.3660E+03 BASIN STORAGE=0.2539E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V MANE	0.95	511.98	427.86	0.26	6.00	511.94	426.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4452E+03 EXCESS=0.0000E+00 OUTFLOW=0.4437E+03 BASIN STORAGE=0.1488E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V MANE	1.00	447.80	428.11	0.24	6.00	447.61	432.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4034E+03 EXCESS=0.0000E+00 OUTFLOW=0.4023E+03 BASIN STORAGE=0.1410E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.08	393.93	434.50	0.21	6.00	393.83	432.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3655E+03 EXCESS=0.0000E+00 OUTFLOW=0.3644E+03 BASIN STORAGE=0.1338E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	0.88	511.92	427.58	0.26	6.00	511.76	426.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4437E+03 EXCESS=0.0000E+00 OUTFLOW=0.4422E+03 BASIN STORAGE=0.1492E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.07	447.60	432.20	0.24	6.00	447.60	432.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4020E+03 EXCESS=0.0000E+00 OUTFLOW=0.4010E+03 BASIN STORAGE=0.1411E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.03	393.80	434.77	0.21	6.00	393.69	438.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3642E+03 EXCESS=0.0000E+00 OUTFLOW=0.3632E+03 BASIN STORAGE=0.1340E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.17	1574.81	464.11	0.38	6.00	1574.58	462.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9060E+03 EXCESS=0.0000E+00 OUTFLOW=0.9036E+03 BASIN STORAGE=0.2863E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.19	1305.19	465.20	0.33	6.00	1304.89	468.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7744E+03 EXCESS=0.0000E+00 OUTFLOW=0.7723E+03 BASIN STORAGE=0.2527E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.31	1075.33	469.77	0.28	6.00	1075.05	468.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6597E+03 EXCESS=0.0000E+00 OUTFLOW=0.6576E+03 BASIN STORAGE=0.2552E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

SNIC	MANE	0.71	2558.27	487.66	0.41	6.00	2557.81	486.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1401E+04 EXCESS=0.0000E+00 OUTFLOW=0.1399E+04 BASIN STORAGE=0.1679E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

SNIC	MANE	0.80	2086.07	492.37	0.34	6.00	2086.07	492.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1165E+04 EXCESS=0.0000E+00 OUTFLOW=0.1163E+04 BASIN STORAGE=0.1571E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

SNIC	MANE	0.89	1684.66	494.09	0.28	6.00	1684.26	492.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9616E+03 EXCESS=0.0000E+00 OUTFLOW=0.9600E+03 BASIN STORAGE=0.1471E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

LBC	MANE	1.18	2557.76	488.36	0.41	6.00	2556.79	492.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1399E+04 EXCESS=0.0000E+00 OUTFLOW=0.1396E+04 BASIN STORAGE=0.3356E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

LBC	MANE	1.36	2085.89	494.72	0.34	6.00	2085.60	492.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1163E+04 EXCESS=0.0000E+00 OUTFLOW=0.1160E+04 BASIN STORAGE=0.3156E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

LBC	MANE	1.32	1684.24	494.60	0.28	6.00	1683.91	498.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9600E+03 EXCESS=0.0000E+00 OUTFLOW=0.9569E+03 BASIN STORAGE=0.2969E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

310W	MANE	5.47	101.24	272.83	0.48	6.00	100.62	270.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2108E+02 OUTFLOW=0.2063E+02 BASIN STORAGE=0.1656E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

310W	MANE	6.00	117.82	263.32	0.54	6.00	117.70	264.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2362E+02 OUTFLOW=0.2314E+02 BASIN STORAGE=0.1589E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.95

310W	MANE	5.63	87.27	279.19	0.44	6.00	86.74	276.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1902E+02 OUTFLOW=0.1859E+02 BASIN STORAGE=0.1611E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.85

310W	MANE	6.00	67.96	312.95	0.34	6.00	67.90	312.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1509E+02 OUTFLOW=0.1470E+02 BASIN STORAGE=0.1608E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

R310W	MANE	6.00	116.54	289.82	0.54	6.00	116.50	288.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2314E+02 EXCESS=0.0000E+00 OUTFLOW=0.2313E+02 BASIN STORAGE=0.1834E+00 PERCENT ERROR= -0.8

FOR PLAN = 1 RATIO= 0.95

R310W	MANE	6.00	86.69	300.70	0.44	6.00	86.32	306.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1858E+02 EXCESS=0.0000E+00 OUTFLOW=0.1875E+02 BASIN STORAGE=0.1942E+00 PERCENT ERROR= -2.0

FOR PLAN = 1 RATIO= 0.85

R310W	MANE	6.00	67.83	337.64	0.34	6.00	67.75	342.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1469E+02 EXCESS=0.0000E+00 OUTFLOW=0.1456E+02 BASIN STORAGE=0.1868E+00 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 1.06

310E	MANE	6.00	118.08	311.88	0.39	6.00	118.08	312.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2605E+02 OUTFLOW=0.2548E+02 BASIN STORAGE=0.2051E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

310E	MANE	5.81	134.46	267.83	0.44	6.00	134.45	270.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2953E+02 OUTFLOW=0.2896E+02 BASIN STORAGE=0.1997E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.95

310E	MANE	6.00	106.69	313.63	0.34	6.00	106.39	318.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2325E+02 OUTFLOW=0.2272E+02 BASIN STORAGE=0.1924E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.85

310E	MANE	5.74	83.30	319.26	0.26	6.00	83.26	324.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1796E+02 OUTFLOW=0.1749E+02 BASIN STORAGE=0.2016E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	3.46	242.93	296.71	0.48	6.00	241.76	294.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5204E+02 EXCESS=0.0000E+00 OUTFLOW=0.5188E+02 BASIN STORAGE=0.1411E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	3.92	191.06	317.37	0.38	6.00	191.01	318.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4146E+02 EXCESS=0.0000E+00 OUTFLOW=0.4135E+02 BASIN STORAGE=0.1375E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	4.17	149.43	334.95	0.29	6.00	149.31	336.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3204E+02 EXCESS=0.0000E+00 OUTFLOW=0.3186E+02 BASIN STORAGE=0.1393E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	4.58	91.47	314.37	0.38	6.00	91.41	312.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1979E+02 OUTFLOW=0.1941E+02 BASIN STORAGE=0.1185E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 1.06

311W	MANE	4.27	108.03	261.15	0.43	6.00	107.75	264.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2247E+02 OUTFLOW=0.2206E+02 BASIN STORAGE=0.1217E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

311W	MANE	4.73	83.10	312.87	0.34	6.00	82.96	312.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1764E+02 OUTFLOW=0.1726E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

311W	MANE	5.25	64.92	316.63	0.26	6.00	64.87	318.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1359E+02 OUTFLOW=0.1324E+02 BASIN STORAGE=0.1227E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

R311W	MANE	4.27	339.22	309.36	0.46	6.00	338.90	306.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7393E+02 EXCESS=0.0000E+00 OUTFLOW=0.7365E+02 BASIN STORAGE=0.2477E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R311W	MANE	4.74	273.32	323.31	0.36	6.00	273.28	324.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5857E+02 EXCESS=0.0000E+00 OUTFLOW=0.5825E+02 BASIN STORAGE=0.2529E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R311W	MANE	5.19	209.18	344.47	0.28	6.00	208.62	342.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4509E+02 EXCESS=0.0000E+00 OUTFLOW=0.4481E+02 BASIN STORAGE=0.2447E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.89	9.54	443.99	0.07	6.00	9.54	444.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3135E+01 OUTFLOW=0.2869E+01 BASIN STORAGE=0.1679E+00 PERCENT ERROR= 3.1

FOR PLAN = 1 RATIO= 1.06

309W	MANE	6.00	14.00	416.91	0.09	6.00	13.96	414.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4044E+01 OUTFLOW=0.3776E+01 BASIN STORAGE=0.1638E+00 PERCENT ERROR= 2.6

FOR PLAN = 1 RATIO= 0.95

309W	MANE	6.00	6.50	475.09	0.05	6.00	6.50	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2456E+01 OUTFLOW=0.2202E+01 BASIN STORAGE=0.1618E+00 PERCENT ERROR= 3.7

FOR PLAN = 1 RATIO= 0.85

309W	MANE	6.00	2.42	574.14	0.03	6.00	2.42	576.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1325E+01 OUTFLOW=0.1082E+01 BASIN STORAGE=0.1620E+00 PERCENT ERROR= 6.1

FOR PLAN = 1 RATIO= 1.06

R309W	MANE	6.00	13.88	537.35	0.10	6.00	13.85	534.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3764E+01 EXCESS=0.0000E+00 OUTFLOW=0.4175E+01 BASIN STORAGE=0.5567E+00 PERCENT ERROR= -25.7

FOR PLAN = 1 RATIO= 0.95

R309W	MANE	6.00	6.47	640.46	0.05	6.00	6.47	636.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2194E+01 EXCESS=0.0000E+00 OUTFLOW=0.2249E+01 BASIN STORAGE=0.5571E+00 PERCENT ERROR= -27.9

FOR PLAN = 1 RATIO= 0.85

R309W	MANE	6.00	2.41	821.76	0.02	6.00	2.41	822.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1080E+01 EXCESS=0.0000E+00 OUTFLOW=0.8650E+00 BASIN STORAGE=0.5530E+00 PERCENT ERROR= -31.1

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	100.79	330.66	0.37	6.00	100.79	330.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2413E+02 OUTFLOW=0.2339E+02 BASIN STORAGE=0.4085E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	116.00	322.39	0.42	6.00	115.75	324.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2737E+02 OUTFLOW=0.2657E+02 BASIN STORAGE=0.4342E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	88.18	331.71	0.33	6.00	88.01	336.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2153E+02 OUTFLOW=0.2081E+02 BASIN STORAGE=0.4037E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	64.12	354.31	0.25	6.00	64.09	354.00	0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1663E+02 OUTFLOW=0.1594E+02 BASIN STORAGE=0.4230E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

FCP1	MANE	0.22	497.00	312.35	0.36	6.00	496.75	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.4300E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP1	MANE	0.23	383.22	324.57	0.28	6.00	382.82	324.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8578E+02 BASIN STORAGE=0.4258E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP1	MANE	0.21	279.45	342.57	0.21	6.00	279.42	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6443E+02 BASIN STORAGE=0.4180E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCP2	MANE	0.31	496.68	312.56	0.36	6.00	496.09	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.7489E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP2	MANE	0.31	382.77	324.82	0.28	6.00	381.87	324.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8578E+02 BASIN STORAGE=0.7415E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP2	MANE	0.43	279.35	348.09	0.21	6.00	279.34	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6443E+02 BASIN STORAGE=0.7270E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC1	MANE	0.32	496.01	312.65	0.36	6.00	495.61	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1736E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC1	MANE	0.23	381.86	324.62	0.28	6.00	381.71	330.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1724E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC1	MANE	0.36	279.21	348.16	0.21	6.00	279.17	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6442E+02 BASIN STORAGE=0.1701E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC1	MANE	0.22	495.59	312.46	0.36	6.00	495.03	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1874E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC1	MANE	0.24	381.68	330.21	0.28	6.00	381.67	330.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1863E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC1	MANE	0.22	279.11	348.34	0.21	6.00	278.94	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6443E+02 EXCESS=0.0000E+00 OUTFLOW=0.6441E+02 BASIN STORAGE=0.1835E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC2/FC	MANE	0.30	495.00	312.72	0.36	6.00	494.63	318.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1793E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC2/FC	MANE	0.21	381.62	330.30	0.28	6.00	381.59	330.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8578E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1780E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC2/FC	MANE	0.37	278.81	348.40	0.21	6.00	278.65	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6442E+02 EXCESS=0.0000E+00 OUTFLOW=0.6440E+02 BASIN STORAGE=0.1755E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	4.84	154.69	268.39	0.46	6.00	154.52	270.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3324E+02 OUTFLOW=0.3254E+02 BASIN STORAGE=0.2234E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	4.39	184.10	261.95	0.52	6.00	184.01	264.00	0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1734E+02 OUTFLOW=0.3663E+02 BASIN STORAGE=0.2245E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

307NW	MANE	4.98	135.29	309.10	0.41	6.00	134.96	312.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2992E+02 OUTFLOW=0.2925E+02 BASIN STORAGE=0.2254E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

307NW	MANE	5.46	110.14	311.02	0.32	6.00	110.13	312.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2360E+02 OUTFLOW=0.2298E+02 BASIN STORAGE=0.2250E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

R307NW	MANE	3.09	183.95	270.21	0.52	6.00	183.77	270.00	0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3664E+02 EXCESS=0.0000E+00 OUTFLOW=0.3657E+02 BASIN STORAGE=0.7404E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R307NW	MANE	3.61	134.93	315.66	0.41	6.00	134.87	318.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2926E+02 EXCESS=0.0000E+00 OUTFLOW=0.2916E+02 BASIN STORAGE=0.7173E-01 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R307NW	MANE	3.80	109.90	321.96	0.32	6.00	109.79	318.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2298E+02 EXCESS=0.0000E+00 OUTFLOW=0.2288E+02 BASIN STORAGE=0.7174E-01 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	4.01	77.56	269.67	0.48	6.00	77.55	270.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1687E+02 OUTFLOW=0.1652E+02 BASIN STORAGE=0.1108E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	3.61	91.51	263.04	0.54	6.00	91.43	264.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1890E+02 OUTFLOW=0.1855E+02 BASIN STORAGE=0.1068E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

307NE	MANE	4.08	68.33	308.25	0.44	6.00	68.22	306.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+02 OUTFLOW=0.1490E+02 BASIN STORAGE=0.1118E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.85

307NE	MANE	4.44	55.96	312.68	0.34	6.00	55.93	312.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1207E+02 OUTFLOW=0.1177E+02 BASIN STORAGE=0.1148E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

R307SW	MANE	5.92	18.83	333.83	0.03	6.00	18.73	336.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1360E+01 EXCESS=0.0000E+00 OUTFLOW=0.1601E+01 BASIN STORAGE=0.1008E-01 PERCENT ERROR= -18.5

FOR PLAN = 1 RATIO= 0.95

R307SW	MANE	5.25	6.92	360.39	0.01	6.00	6.84	366.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4690E+00 EXCESS=0.0000E+00 OUTFLOW=0.7175E+00 BASIN STORAGE=0.1034E-01 PERCENT ERROR= -55.2

FOR PLAN = 1 RATIO= 0.85

R307SW	MANE	5.03	0.56	481.28	0.00	6.00	0.56	486.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5576E-01 EXCESS=0.0000E+00 OUTFLOW=0.1211E+00 BASIN STORAGE=0.9268E-02 PERCENT ERROR=-133.8

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	5.17	178.98	274.32	0.45	6.00	178.46	276.00	0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3895E+02 OUTFLOW=0.3809E+02 BASIN STORAGE=0.2914E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.83	213.72	267.48	0.51	6.00	212.07	270.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4379E+02 OUTFLOW=0.4291E+02 BASIN STORAGE=0.2875E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

307SE	MANE	5.34	158.10	312.95	0.41	6.00	158.05	312.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3504E+02 OUTFLOW=0.3419E+02 BASIN STORAGE=0.2880E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 0.85

307SE	MANE	5.81	127.92	313.79	0.32	6.00	127.74	318.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2759E+02 OUTFLOW=0.2684E+02 BASIN STORAGE=0.2834E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	9.29	445.08	0.07	6.00	9.28	444.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3118E+01 OUTFLOW=0.2856E+01 BASIN STORAGE=0.1609E+00 PERCENT ERROR= 3.2

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	13.63	418.33	0.09	6.00	13.60	414.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4025E+01 OUTFLOW=0.3743E+01 BASIN STORAGE=0.1652E+00 PERCENT ERROR= 2.9

FOR PLAN = 1 RATIO= 0.95

308W	MANE	6.00	6.32	476.59	0.05	6.00	6.31	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2441E+01 OUTFLOW=0.2188E+01 BASIN STORAGE=0.1614E+00 PERCENT ERROR= 3.8

FOR PLAN = 1 RATIO= 0.85

308W	MANE	6.00	2.33	575.85	0.02	6.00	2.33	576.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1315E+01 OUTFLOW=0.1069E+01 BASIN STORAGE=0.1623E+00 PERCENT ERROR= 6.4

FOR PLAN = 1 RATIO= 1.06

R308W	MANE	5.76	13.57	452.28	0.08	6.00	13.54	450.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3739E+01 EXCESS=0.0000E+00 OUTFLOW=0.3614E+01 BASIN STORAGE=0.1217E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R308W	MANE	6.00	6.31	522.70	0.05	6.00	6.30	522.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2182E+01 EXCESS=0.0000E+00 OUTFLOW=0.2058E+01 BASIN STORAGE=0.1238E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R308W	MANE	6.00	2.33	653.76	0.02	6.00	2.33	654.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1068E+01 EXCESS=0.0000E+00 OUTFLOW=0.9388E+00 BASIN STORAGE=0.1263E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 1.06

308E	MANE	5.83	82.10	271.97	0.44	6.00	81.39	270.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1717E+02 OUTFLOW=0.1681E+02 BASIN STORAGE=0.1175E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

308E	MANE	5.44	98.07	265.34	0.49	6.00	97.31	264.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1933E+02 OUTFLOW=0.1895E+02 BASIN STORAGE=0.1268E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

308E	MANE	6.00	70.42	278.30	0.39	6.00	70.01	282.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1542E+02 OUTFLOW=0.1507E+02 BASIN STORAGE=0.1176E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

308E	MANE	5.24	56.49	316.21	0.31	6.00	56.35	318.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1209E+02 OUTFLOW=0.1178E+02 BASIN STORAGE=0.1194E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

R307/308	MANE	2.36	952.62	349.62	0.36	6.00	952.51	348.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2329E+03 EXCESS=0.0000E+00 OUTFLOW=0.2323E+03 BASIN STORAGE=0.4697E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R307/308	MANE	2.58	725.28	359.61	0.28	6.00	725.09	360.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1816E+03 EXCESS=0.0000E+00 OUTFLOW=0.1810E+03 BASIN STORAGE=0.4694E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R307/308	MANE	2.88	526.75	377.70	0.22	6.00	526.54	378.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1385E+03 EXCESS=0.0000E+00 OUTFLOW=0.1379E+03 BASIN STORAGE=0.4618E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.15	51.64	330.62	0.25	6.00	51.61	330.00	0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1077E+02 OUTFLOW=0.1042E+02 BASIN STORAGE=0.1469E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 1.06

312W	MANE	6.00	60.65	322.51	0.30	6.00	60.52	324.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1251E+02 OUTFLOW=0.1215E+02 BASIN STORAGE=0.1352E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

312W	MANE	5.54	43.89	336.41	0.22	6.00	43.87	336.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9394E+01 OUTFLOW=0.9058E+01 BASIN STORAGE=0.1423E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.85

312W	MANE	6.00	29.74	351.45	0.16	6.00	29.68	354.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6851E+01 OUTFLOW=0.6565E+01 BASIN STORAGE=0.1391E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 1.06

R312W	MANE	2.34	1003.70	353.42	0.36	6.00	1003.03	354.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2444E+03 EXCESS=0.0000E+00 OUTFLOW=0.2437E+03 BASIN STORAGE=0.5129E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R312W	MANE	2.56	762.62	364.40	0.28	6.00	761.71	366.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1901E+03 EXCESS=0.0000E+00 OUTFLOW=0.1895E+03 BASIN STORAGE=0.5009E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	2.97	552.58	383.56	0.21	6.00	552.21	384.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+03 EXCESS=0.0000E+00 OUTFLOW=0.1438E+03 BASIN STORAGE=0.5021E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	34.67	337.10	0.19	6.00	34.66	336.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7394E+01 OUTFLOW=0.7157E+01 BASIN STORAGE=0.1026E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 1.06

312E	MANE	5.57	42.51	329.92	0.23	6.00	42.50	330.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8744E+01 OUTFLOW=0.8490E+01 BASIN STORAGE=0.9853E-01 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

312E	MANE	5.20	28.70	342.65	0.16	6.00	28.70	342.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6335E+01 OUTFLOW=0.6111E+01 BASIN STORAGE=0.1047E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 0.85

312E	MANE	6.00	17.84	360.89	0.11	6.00	17.82	360.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4417E+01 OUTFLOW=0.4219E+01 BASIN STORAGE=0.9429E-01 PERCENT ERROR= 2.3

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.31	3162.70	456.62	0.40	6.00	3162.44	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1764E+04 EXCESS=0.0000E+00 OUTFLOW=0.1763E+04 BASIN STORAGE=0.7455E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.34	2590.05	462.56	0.33	6.00	2589.98	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1446E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.6974E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.47	2104.77	463.08	0.27	6.00	2104.48	462.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1175E+04 EXCESS=0.0000E+00 OUTFLOW=0.1174E+04 BASIN STORAGE=0.6529E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.25	3162.42	462.19	0.40	6.00	3162.41	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1763E+04 EXCESS=0.0000E+00 OUTFLOW=0.1762E+04 BASIN STORAGE=0.5867E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.25	2589.94	462.27	0.33	6.00	2589.88	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1445E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.5507E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.29	2104.46	462.70	0.27	6.00	2104.20	462.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1174E+04 EXCESS=0.0000E+00 OUTFLOW=0.1174E+04 BASIN STORAGE=0.5174E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	1.86	3162.19	463.95	0.40	6.00	3161.95	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1763E+04 EXCESS=0.0000E+00 OUTFLOW=0.1757E+04 BASIN STORAGE=0.4756E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	1.95	2589.54	464.75	0.33	6.00	2588.81	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1445E+04 EXCESS=0.0000E+00 OUTFLOW=0.1440E+04 BASIN STORAGE=0.4458E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	2.04	2104.19	466.75	0.26	6.00	2104.16	468.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1174E+04 EXCESS=0.0000E+00 OUTFLOW=0.1170E+04 BASIN STORAGE=0.4176E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	0.91	3161.88	463.80	0.40	6.00	3160.64	468.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1757E+04 EXCESS=0.0000E+00 OUTFLOW=0.1755E+04 BASIN STORAGE=0.2399E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	1.01	2588.80	464.88	0.32	6.00	2588.78	468.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1440E+04 EXCESS=0.0000E+00 OUTFLOW=0.1437E+04 BASIN STORAGE=0.2253E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	1.08	2104.05	470.41	0.26	6.00	2103.35	468.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1169E+04 EXCESS=0.0000E+00 OUTFLOW=0.1167E+04 BASIN STORAGE=0.2114E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC4/FC	MANE	1.23	3160.63	467.96	0.40	6.00	3160.63	468.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1754E+04 EXCESS=0.0000E+00 OUTFLOW=0.1752E+04 BASIN STORAGE=0.3279E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC4/FC	MANE	1.30	2588.67	470.44	0.32	6.00	2588.24	468.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1437E+04 EXCESS=0.0000E+00 OUTFLOW=0.1435E+04 BASIN STORAGE=0.3077E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC4/FC	MANE	1.39	2103.32	471.81	0.26	6.00	2103.27	474.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1167E+04 EXCESS=0.0000E+00 OUTFLOW=0.1164E+04 BASIN STORAGE=0.2890E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

RRCHANNL	MANE	5.97	0.16	463.63	0.87	6.00	0.16	462.00	0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95

RRCHANNL	MANE	5.97	0.12	484.09	0.71	6.00	0.12	486.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85

RRCHANNL	MANE	6.00	0.09	550.79	0.57	6.00	0.09	552.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06

AC1/AC2	MANE	0.64	5981.58	469.65	0.60	6.00	5980.28	468.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3585E+04 EXCESS=0.0000E+00 OUTFLOW=0.3582E+04 BASIN STORAGE=0.2871E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC1/AC2	MANE	0.72	4930.90	475.06	0.48	6.00	4930.72	474.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2871E+04 EXCESS=0.0000E+00 OUTFLOW=0.2869E+04 BASIN STORAGE=0.2585E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC1/AC2	MANE	0.75	4008.34	481.77	0.38	6.00	4007.30	480.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2266E+04 EXCESS=0.0000E+00 OUTFLOW=0.2264E+04 BASIN STORAGE=0.2435E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC3	MANE	0.54	5980.20	469.33	0.60	6.00	5979.56	474.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3582E+04 EXCESS=0.0000E+00 OUTFLOW=0.3581E+04 BASIN STORAGE=0.2140E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC3	MANE	0.46	4930.59	474.68	0.48	6.00	4930.26	474.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2869E+04 EXCESS=0.0000E+00 OUTFLOW=0.2867E+04 BASIN STORAGE=0.1930E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC3	MANE	0.51	4007.28	481.34	0.38	6.00	4007.13	486.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2264E+04 EXCESS=0.0000E+00 OUTFLOW=0.2262E+04 BASIN STORAGE=0.1823E+01 PERCENT ERROR= 0.0

```
          FOR PLAN = 1  RATIO= 1.06
               AC4  MANE          0.61   5979.47    474.18       0.60       6.00   5979.45    474.00          0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3580E+04 EXCESS=0.0000E+00 OUTFLOW=0.3578E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               AC4  MANE          0.63   4930.14    475.22       0.48       6.00   4929.53    474.00          0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2867E+04 EXCESS=0.0000E+00 OUTFLOW=0.2865E+04 BASIN STORAGE=0.2350E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               AC4  MANE          0.71   4007.00    486.89       0.38       6.00   4006.96    486.00          0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2262E+04 EXCESS=0.0000E+00 OUTFLOW=0.2260E+04 BASIN STORAGE=0.2222E+01 PERCENT ERROR=   0.0



*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:20:51   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*          (916) 551-1748               *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS *HEC1 (JAN 73)*, *HEC1GS*, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID        FEMA FLOOD INSURANCE STUDY, 1996
    2         ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
    3         ID        LOWER CENTRAL VALLEY 100-YEAR STORM
    4         ID
    5         ID        Current (05/96) model based on a HEC-1 model prepared by James M
    6         ID        Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
    7         ID        Study Hydrology Report dated 9/91.  Two modifications were made
    8         ID        to the source model.  First, Upper Las Vegas Detention Basin storage
    9         ID        and outflow characteristics were revised to reflect the as-built
   10         ID        configuration described by construction drawings dated 5/91 and HEC-1
   11         ID        models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
   12         ID        relationship for the North Las Vegas Detention Basin was revised
   13         ID        to reflect the current three-pipe outlet condition (two of the five
   14         ID        pipes were blocked *following* construction of the upper basin) and the
   15         ID        hydraulic control created by the 4-foot high barrier wall located
   16         ID        upstream from the pipe inlets.
   17         ID
   18         ID        Remaining comments are from the original model dated 1/91.
   19         ID
   20         ID        CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
   21         ID        Northern Las Vegas Wash - *FIS FLOWS*
   22         ID        Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
   23         ID
   24         ID        Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
   25         ID        Lower Central Valley 100-Year Storm, Existing Conditions
   26         ID        Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
   27         ID        (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAMR.DAT)
   28         ID        PB & CN values adjusted by JMM to be consistent *with B&V values*, 8/90
   29         ID
   30         ID        All routing steps immediately d/s of a diversion converted to
   31         ID        Muskingum routing to avoid zero flow, 8/90
   32         ID
   33         ID        Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
   34         ID        Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
   35         ID        Channel and Hualapai Diversion included, 8/90
   36         ID
   37         ID        This data file models DARF's at certain locations where FIS flows are
   38         ID        required.  The original B&V data file used a factor of 0.62; ratios
   39         ID        of this factor are used in the JR card to model DA's at the points
   40         ID        of interest (JMM DARF's extracted from CCRFCD Design Manual):
   41         ID
   42         ID          PT OF                  AREA          DARF       DARF/0.62      RATIO
   43         ID          INTEREST               (SQ MI)
   44         ID
   45         ID     RRBRIDGE, NC5, & 304     60.7 - 64.5      0.66         1.06          1
   46         ID          ACHANNL                111.6         0.59         0.95          2
   47         ID          NCHANNL                172.2         0.53         0.85          3
   48         ID
*** FREE ***
   49         IT      6       0       0      200
   50         IO      5       0       0
   51         IN      5       0       0
   52         JR    PREC    1.06    0.95    0.85
```

1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   53         KK     112
   54         KM   RUNOFF FROM SUBBASIN 112
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```
BA   5.333
PB    2.01
PC     .000     .020     .059     .080     .110     .144     .150     .160     .168     .171
PC     .180     .182     .187     .190     .197     .202     .210     .220     .230     .241
PC     .250     .259     .265     .280     .290     .300     .305     .309     .310     .317
PC     .321     .327     .333     .346     .361     .381     .408     .430     .477     .514
PC     .561     .630     .710     .720     .731     .752     .779     .790     .795     .804
PC     .810     .820     .826     .840     .859     .889     .910     .938     .966     .970
PC     .974     .979     .981     .983     .985     .989     .990     .992     .993     .996
PC     .997     .999    1.00
LS        0       82
UD     .462

KK     119
KM   RUNOFF FROM SUBBASIN 119
BA   2.739
PB    2.09
LS        0       82
UD     .346

KK
KM   COMBINE SUBBASINS 112 & 119
HC        2

KK     120
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
RM        3     0.27     0.15

KK  125UDB
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
RM        5     0.53     0.15

KK     117
KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
RM        4     0.43     0.15

KK     118
KM   RUNOFF FROM SUBBASIN 118
BA   5.079
PB    1.83
LS        0       84
UD     .233

KK     117
KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
RM        1     0.13     0.15
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


KK        V
RM        3     0.25     0.15

KK        V
RM        4     0.37     0.15

KK     117
KM   RUNOFF FROM SUBBASIN 117
BA   7.366
PB    1.66
LS        0       78
UD   1.699

KK
KM   COMBINE SUBBASINS 112, 117, 118, & 119
HC        3

KK   ULWDB
*  *** lines from 1/91 model removed 5/96
* KM      UPPER LAS VEGAS WASH DETENTION BASIN
* KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
* RS 1 STOR -1
* SV 0 40 75 110 250 500 920 1550 1700 1860
* SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
* SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
* SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
* SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
* SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
RS        1    STOR       -1
SV        0      12       80      170      320      560     1000     1610     1800     1980
SV     2150    2330     2500     2690     2900     3100     3600     4950     6680
SE     2335    2340     2345     2350     2355     2360     2365     2370     2371     2372
SE     2373    2374     2375     2376     2377     2378     2380     2385     2390
SQ        0     600     1700     2300     2800     3300     3750     4100     4170     4240
SQ     6200    9960    15150    21140    28320    36220    54120   110170   180730

KK     116
KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
RM        5     0.50     0.15

KK     111
KM   RUNOFF FROM SUBBASIN 111
BA    4.08
PB    1.92
LS        0       84
UD     .239
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  126     KK    116
  127     KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
  128     RM       1    0.10    0.15

  129     KK       V
  130     RM       2    0.21    0.15

  131     KK    116
  132     KM   RUNOFF FROM SUBBASIN 116
  133     BA   5.189
  134     PB    1.66
  135     LS       0      78
  136     UD   1.418

  137     KK
  138     KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
  139     HC       3

  140     KK    109
  141     KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
  142     RM       4    0.42    0.15

  143     KK    110
  144     KM   RUNOFF FROM SUBBASIN 110
  145     BA   2.945
  146     PB    1.83
  147     LS       0      86
  148     UD    .237

  149     KK    109
  150     KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
  151     RM       1    0.09    0.15

  152     KK       V
  153     RM       2    0.19    0.15

  154     KK    109
  155     KM   RUNOFF FROM SUBBASIN 109
  156     BA   4.183
  157     PB    1.66
  158     LS       0      78
  159     UD   1.281

  160     KK
  161     KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  162     HC       3

  163     KK    101
  164     KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  165     KM   THRU SUBBASIN 101
  166     RM       5    0.54    0.15
```



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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  167     KK    103
  168     KM   RUNOFF FROM SUBBASIN 103
  169     BA   6.195
  170     PB    2.01
  171     LS       0      84
  172     UD    .324

  173     KK    102
  174     KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
  175     RM       1    0.11    0.15

  176     KK    102
  177     KM   RUNOFF FROM SUBBASIN 102
  178     BA   8.455
  179     PB    1.83
  180     LS       0      83
  181     UD    .369

  182     KK
  183     KM   COMBINE SUBBASINS 102 & 103
  184     HC       2

  185     KK    101
  186     KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
  187     RM       1    0.11    0.15

  188     KK       V
  189     RM       2    0.22    0.15

  190     KK    101
  191     KM   RUNOFF FROM SUBBASIN 101
  192     BA   9.082
  193     PB    1.66
  194     LS       0      77
  195     UD   1.505

  196     KK   NLVIN
  197     KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
```

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198          HC       3

199          KK
200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
201          DT DIVDIKE
202          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
203          DI   17775   20135   23000
204          DQ       0       0       0       0       0     410    1225    2435    3565    5135
205          DQ    6775    8635   11000

206          KK  NLVDET
207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
210          RS       1    STOR      -1
211          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          SV    1650    1825    1920    2000    2110    2200    2310    2430
213          SE       0       2       4       6      10      14      21      24      26      27
214          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
215          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
216          SQ    3050    4630    5710    7090    8610   10140   11670   13200

217          KK
218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
219          DR DIVDIKE

220          KK
221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
222          HC       2

223          KK     303
224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
225          RM      13    1.28    0.15

226          KKRRBRIDGE
227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
228          DTRRCHANNL
229          DI       0    6000   20000
230          DQ       0       0   13500

231          KK     I15
232          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
233          DT   KCHAR
234          DI       0    1000   10000
235          DQ       0     800    8000

236          KK     NC1
237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
238          RK     700  0.0058   0.016       0    TRAP      10       2

239          KK       V
240          RK    2000  0.0100   0.035       0    TRAP      30       2

241          KK     NC2
242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
243          KM   TO GOWAN AVE.
244          RK    1300   .0056    .030       0    TRAP      12       2

245          KK     NC3
246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
247          KM   TO CHEYENNE AVE.
248          RK    2600   .0021    .030       0    TRAP      20     2.5
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


249          KK     NC4
250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
252          RK    1300    .003    .016       0    TRAP      18       2

253          KK     NC5
254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
255          KM   TO "A" CHANNEL (LINED CHANNEL)
256          RK     500    .001    .016       0    TRAP      18       2
257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

258          KK    AP.1
259          KM       Begin subareas tributary to Gowan-South Detention Basin
260          KM       Begin subareas tributary to Angel Park Detention Basin
261          KM       From Wallace Angel Park Model
262          BA   0.001
263          PB     2.1
264          LS       0      89
265          UD    0.62

266          KK       V
267          KM   Route AP.1
268          RM       7    0.67    0.15

269          KK    AP.2
```

```
270          KM   One-third of subbasin AP.2
271          KM   From Wallace Angel Park Model
272          BA   0.853
273          PB     2.0
274          LS       0       87
275          UD   0.363

276          KK        .
277          KM   Combine AP.1 & AP.2
278          HC        2

279          KK        V
280          RM       11     1.06     0.15

281          KK     AP.3
282          BA     3.62
283          PB      1.9
284          LS       0       89
285          UD     2.41

286          KK     AP.4
287          KM   From Wallace Angel Park Model
288          BA   0.001
289          PB      1.8
290          LS       0       89
291          UD     1.03
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


292          KK        .
293          KM   Combine AP.1, AP.2, AP.3, AP.4
294          HC        3

295          KK     AP.5
296          KM   From Wallace Angel Park Model
297          BA   0.001
298          PB      2.1
299          LS       0       89
300          UD     0.39

301          KK        V
302          KM   Route AP.5
303          RM        8     0.82     0.15

304          KK     AP.6
305          BA   0.001
306          PB      2.1
307          LS       0       88
308          UD     0.75

309          KK        .
310          KM   Combine AP.5 & AP.6
311          HC        2

312          KK        V
313          KM   Route AP.5 & AP.6
314          RM        7     0.66     0.15

315          KK     AP.7
316          KM     One-half of subbasin AP.7
317          BA     1.02
318          PB      1.9
319          LS       0       86
320          UD     0.59

321          KK   N_CHN
322          KM   COMBINE NORTH CHANNEL FLOWS
323          HC        2

324          KK     GD.1
325          KM   Begin subareas tributary to Hualapai Diversion
326          KM   From VTN (PB & CN from B&V-La Madre)
327          BA   0.001
328          PB      2.2
329          LS       0       87
330          UD     0.62

331          KK        V
332          KM   Route GD.1
333          RM        2     0.24     0.15
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


334          KK        V
335          KM   Routing Cont'd
336          RM        3     0.27     0.15

337          KK     GD.2
338          KM   From VTN
339          BA   0.001
340          PB      2.0
341          LS       0       89
342          UD     0.83

343          KK        .
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```
344           KM   Combine GD.1 & GD.2
345           HC       2

346           KK  TO_DIV
347           KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
348           RM       3    0.34    0.15

349           KK    GD.3(=AP.12)
350           KM   From VTN
351           BA    0.80
352           PB     1.9
353           LS       0      87
354           UD    0.32

355           KKHUALAPAI
356           KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
357           HC       2

358           KK     HUA& NO.CH
359           KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
360           HC       2

361           KK       V
362           KM   Route Combined Flows
363           RK    5500    .023     .04       0    TRAP     100       2

364           KK       V
365           KM   Routing Cont'd
366           RK    4500    .004     .03       0    TRAP      30       4

367           KK    AP.8
368           BA    0.93
369           PB     1.9
370           LS       0      89
371           UD    0.62

372           KK     BOX
373           KM   SUMMERLIN PARKWAY CULVERT
374           HC       2

1                                        HEC-1 INPUT                                        PAGE 10

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


375           KK       V
376           KM   ROUTE TO ANGEL PARK DETENTION BASIN
377           RK    3000    .027     .04       0    TRAP     100       2

378           KK    AP.9
379           BA    0.68
380           PB     1.8
381           LS       0      89
382           UD     .83

383           KK  N_CHAN
384           KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
385           HC       2

386           KKANGEL.PK
387           KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 + AP.9 & GD.1 + GD.3)
388           HC       2

389           KKSPILLWAY
390           KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
391           KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
392           RS       1    STOR      -1
393           SV       0       3      22      45      80     125     190     270     369     492
394           SV     610     780     942    1115    1209
395           SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
396           SE    2616    2618    2620    2622    2623
397           SL  2592.5    3.14     0.6     0.5
398           SS  2619.1    1275     3.2     1.5

399           KKAP_TO_VEGAS/PIONEER
400           KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
401           KM   From VTN
402           RK    7500    0.03   0.012       0    CIRC      5       0

403           KKBUFFALO_1
404           KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
405           RK    1500    0.02    0.03       0    TRAP     20       4

406           KK    GD.7
407           KM   INTERSECTION OF LAKE MEAD & BUFFALO
408           BA    1.13
409           PB     1.8
410           LS       0      89
411           UD    1.38

412           KKBUFFALO_1
413           KM   Combine GD.7 W/ Buffalo Channel
414           HC       2

1                                        HEC-1 INPUT                                        PAGE 11

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


415           KKBUFFALO_2
416           KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
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417          RK    5000   0.005   0.025       0    TRAP      30       4

418          KK    GD.4
419          KM   From B&V-La Madre
420          BA   0.001
421          PB     2.0
422          LS       0       88
423          UD    0.62

424          KK       V
425          KM   ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
426          RM       7    0.74    0.15

427          KK    GD.5
428          BA    3.31
429          PB     1.9
430          LS       0       86
431          UD    1.38

432          KK       .
433          KM   Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
434          HC       2

435          KK       V
436          KM   ROUTE NORTH ALONG RAMPART
437          RM       4    0.43    0.15

438          KK    GD.6
439          KM   DEL WEBB-SUN CITY SUMMERLIN
440          BA     1.6
441          PB     1.8
442          LS       0       86
443          UD     .96

444          KK       .
445          KM   Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
446          HC       2

447          KK       V
448          KM   ROUTE TO BUFFALO along Cheyenne Channel
449          RK    5500    .015    .015       0    TRAP      20       2

450          KK    GD.8
451          KM   R.A. HOMES-DESERT SHORES
452          BA    1.53
453          PB     1.7
454          LS       0       85
455          UD    1.11
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

456          KK       .
457          KM   INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
458          HC       2

459          KK   GD.34
460          KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
461          BA    3.84
462          PB     1.7
463          LS       0       84
464          UD    1.72

465          KKGOWAN_SOUTH
466          KM   TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
467          HC       3

468          KK  DET.GS
469          KM   Gowan-South Detention Basin data from VTN
470          RS       1    STOR      -1
471          SV       0     9.8     113     435     454     680
472          SE    2326    2330    2340  2349.6    2350    2354
473          SQ       0     112     328     455     459   30700

474          KK R.GSOUT
475          KM   ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
476          RK    3200   0.007   0.012       0    CIRC       5       0

477          KK    GD.9
478          KM   Begin subareas tributary to Gowan-North Detention Basin
479          KM   From B&V-LaMadre
480          BA   0.001
481          PB     2.1
482          LS       0       89
483          UD    0.30

484          KK       V
485          RM       5    0.52    0.15

486          KK   GD.10
487          KM   From B&V-LaMadre
488          BA   0.001
489          PB     1.9
490          LS       0       88
491          UD    0.90

492          KK       .
493          KM   Combine GD.9 & GD.10
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494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6    0.61    0.15
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


498          KK       V
499          KM   Routing Cont'd
500          RM       7    0.74    0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB     1.8
505          LS       0      85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB     1.9
514          LS       0      89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0    1545    3129    4000    8000
521          DQ       0    1545    1545    2416    6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2    0.15    0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB     1.9
530          LS       0      86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0     900    2484    4000    8000
540          DQ       0     900     900    2416    6416
1                                        HEC-1 INPUT                                        PAGE 14

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1    0.14    0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    2.23
550          LS       0      80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12    1.23    0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB     1.9
559          LS       0      81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0     520    1889    4000    8000
568          DQ       0     520     520    2631    6631
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KK        V
KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
RM        1    0.14    0.15

KK   GD.28
KM   From Wallace
BA   0.001
PB     1.8
LS       0      77
UD    2.52

KK        .
KM   Combine GD.28 & GD.30 - GD.33
HC        2
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1 HEC-1 INPUT PAGE 15

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK  RANCHO
KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
DTCENTNIAL
DI        0    1040    5456    8000
DQ        0    1040    1040    3585

KK        V
KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
RM        1    0.07    0.15

KK   GD.25
KM   From Wallace
BA   0.001
PB     2.0
LS       0      89
UD    1.09

KK        V
RM        7    0.69    0.15

KK   GD.26
KM   From Wallace
BA   0.001
PB     1.9
LS       0      78
UD    1.23

KK        .
KM   Combine GD.25 & GD.26
HC        2

KK        V
KM   ROUTE WEST TO ANN ROAD AND HWY 95
KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
RM        4    0.43    0.15

KK        V
KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
RM        5    0.49    0.15

KK   GD.27
KM   From Wallace
BA    1.13
PB     1.8
LS       0      78
UD    1.61

KK        .
KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
HC        3
```

1 HEC-1 INPUT PAGE 16

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK        V
KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
RK    3000   0.009   0.025       0    TRAP      50       3

KK        V
RK    3000   0.004   0.022       0    TRAP      25       8

KK   GD.29
KM   From Wallace
BA    0.76
PB     1.8
LS       0      77
UD    1.49

KK        V
RK    8000    0.01   0.025       0    TRAP      20       8

KK    PDGC
KM   PAINTED DESERT GOLF COURSE
KM   From Wallace
BA    0.53
PB     1.7
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642          LS        0       80
643          UD      1.2

644          KK         .
645          KM    Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
646          HC        3

647          KK  RANCHO
648          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
649          DTP.DESERT
650          DI        0      233     1318     8000
651          DQ        0      233      233     6915

652          KK        V
653          KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
654          KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
655          RM        1     0.14     0.15

656          KK    GD.21
657          KM    From Wallace
658          BA    0.001
659          PB      2.1
660          LS        0       89
661          UD     0.72

662          KK        V
663          RM        8     0.81     0.15
1                                        HEC-1 INPUT                                        PAGE 17

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

664          KK    GD.22
665          KM    From Wallace
666          BA    0.001
667          PB      2.0
668          LS        0       86
669          UD      1.5

670          KK    GD.23
671          KM    From Wallace
672          BA    0.001
673          PB      2.0
674          LS        0       86
675          UD     1.41

676          KK         .
677          KM    Combine GD.21 - GD.23
678          HC        3

679          KK        V
680          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
681          RM        7     0.65     0.15

682          KK    GD.24
683          KM    From Wallace
684          BA     0.64
685          PB      1.8
686          LS        0       77
687          UD      1.2

688          KK         .
689          KM    Combine GD.21 - GD.24
690          HC        2

691          KK        V
692          KM    ROUTE WEST TO HWY 95
693          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
694          RM        7     0.65     0.15

695          KK    GD.18
696          KM    From Wallace
697          BA    0.001
698          PB      2.1
699          LS        0       89
700          UD     0.31

701          KK        V
702          RM        6     0.62     0.15

703          KK    GD.19
704          KM    From Wallace
705          BA    0.001
706          PB      1.9
707          LS        0       82
708          UD     1.24
1                                        HEC-1 INPUT                                        PAGE 18

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

709          KK         .
710          KM    Combine GD.18 & GD.19
711          HC        2

712          KK        V
713          KM    ROUTE WEST TO HWY 95 AT CRAIG ROAD
714          KM    ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
715          RM        9     0.88     0.15
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716          KK   GD.20
717          KM   From Wallace
718          BA    2.35
719          PB     1.7
720          LS       0       82
721          UD    2.51

722          KK
723          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724          HC       4

725          KK  HWY.95
726          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727          DT   CRAIG
728          DI       0      465     2056    10000
729          DQ       0      465      465     8409

730          KK       V
731          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733          RM       1     0.07     0.15

734          KK   GD.15
735          KM   From Wallace
736          BA   0.001
737          PB     2.1
738          LS       0       88
739          UD    0.48

740          KK       V
741          RM       7     0.74     0.15

742          KK   GD.16
743          KM   From Wallace
744          BA   0.001
745          PB     2.1
746          LS       0       82
747          UD    1.63

748          KK
749          HC       2
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

750          KK       V
751          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752          RM      10     1.01     0.15

753          KK   GD.17
754          KM   From Wallace
755          BA    0.56
756          PB     1.9
757          LS       0       80
758          UD     2.0

759          KK
760          KM   Combine GD.15 - GD.17
761          HC       3

762          KK   HWY95
763          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764          DTALEXANDR
765          DI       0      155     1746    10000
766          DQ       0      155      155     8409

767          KK       V
768          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770          RM       1     0.11     0.15

771          KK   GD.12
772          KM   From Wallace
773          BA   0.001
774          PB     2.1
775          LS       0       89
776          UD     0.3

777          KK       V
778          RM       4     0.42     0.15

779          KK   GD.13
780          KM   From Wallace
781          BA   0.001
782          PB     2.0
783          LS       0       86
784          UD    1.10

785          KK
786          KM   Combine GD.12 & GD.13
787          HC       2

788          KK       V
789          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790          RM       4     0.43     0.15
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  791     KK       V
  792     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  793     RM      11    1.06    0.15

  794     KK  GD.14A
  795     KM   From Wallace
  796     BA    1.71
  797     PB     1.8
  798     LS       0      81
  799     UD    0.88

  800     KK       .
  801     KM   Combine GD.12, GD.13 & GD.14A
  802     HC       2

  803     KK       V
  804     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  805     RM       5    0.53    0.15

  806     KK  GD.14B
  807     KM   From Wallace
  808     BA    0.68
  809     PB     1.7
  810     LS       0      83
  811     UD    1.67

  812     KK       .
  813     KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
  814     HC       3

  815     KK   GN_IN
  816     KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
  817     HC       3

  818     KK  DET.GN
  819     KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
  820     KM   From VTN
  821     RS       1    STOR      -1
  822     SV       0      28      46     113     774     885    1163
  823     SE    2308    2311    2312    2314    2324  2325.5    2329
  824     SQ       0       0     126     251     519     539   35800

  825     KKR.G-UPS.
  826     KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
  827     RK    2000   0.005   0.013       0    CIRC       6       0

  828     KK       V
  829     KM   Route Gowan outflow along Gowan Outfall Channel
  830     RK    7000   0.009   0.015       0    TRAP      10       0
1                                   HEC-1 INPUT                                PAGE 21

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  831     KK       .
  832     KM   Recall flow diverted at Craig Road
  833     DR   CRAIG

  834     KK       V
  835     KM   Route to Rancho
  836     RM       4    0.42    0.15

  837     KK       .
  838     KM   Recall flow diverted at Alexander
  839     DRALEXANDR

  840     KK       V
  841     KM   Route to Rancho
  842     RM       9    0.92    0.15

  843     KK       .
  844     KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
  845     KM   at Rancho
  846     HC       3

  847     KK       V
  848     KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
  849     KM   App. F)
  850     RK    8400   0.007   0.015       0    TRAP      10       0

  851     KK       V
  852     KM   Routing Cont'd
  853     RK    4000   0.005   0.015       0    TRAP      10       0

  854     KK       V
  855     KM   Routing Cont'd
  856     RK    4000   0.005   0.015       0    TRAP      10       0

  857     KK       .
  858     KM   Begin modeling of subareas on the east side of Rancho Road
  859     KM   Recall flow diverted at Centenial
  860     DRCENTNIAL

  861     KK       .
  862     KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  863     RM      20    2.03    0.15
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```
 864          KK   EPT.1
 865          BA    3.76
 866          PB     1.7
 867          LS       0       85
 868          UD    3.36
1                                        HEC-1 INPUT                                        PAGE 22

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


 869          KK       .
 870          KM   Combine EPT.1 & flow diverted at Centenial
 871          HC       2

 872          KK       V
 873          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 874          RM       8    0.76    0.15

 875          KK       .
 876          KM   Recall flow diverted at Painted Desert
 877          DRP.DESERT

 878          KK       V
 879          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 880          RM      20    2.03    0.15

 881          KK   EPT.3
 882          BA   4.391
 883          PB     1.7
 884          LS       0       88
 885          UD    3.67

 886          KK       .
 887          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
 888          HC       3

 889          KK   EPT.4
 890          BA   1.372
 891          PB     1.7
 892          LS       0       89
 893          UD     2.7

 894          KK       V
 895          RM       9    0.88    0.15

 896          KK       .
 897          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
 898          KM   Gowan Outfall Channel
 899          HC       2

 900          KK       .
 901          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
 902          KM   Alexander, Painted Desert & Centenial
 903          HC       2

 904          KK   EPT.5
 905          BA   3.005
 906          PB     1.7
 907          LS       0       87
 908          UD     4.7
1                                        HEC-1 INPUT                                        PAGE 23

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


 909          KK       .
 910          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
 911          KM   Alexander, Painted Desert & Centenial
 912          HC       2

 913          KK       V
 914          RK   10000    .013    .015       0    TRAP      10       0

 915          KK   EPT.2
 916          BA   1.492
 917          PB     1.7
 918          LS       0       85
 919          UD    2.51

 920          KK  LVWASH
 921          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
 922          HC       2
 923          KM   ************************** END GOWAN MODEL ********************************

 924          KKGOWANDIV
 925          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
 926          DRCULVERTS

 927          KK     301
 928          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
 929          RM      22    2.17    0.15

 930          KK     301
 931          KM   RUNOFF FROM SUBBASIN 301
 932          BA  18.616
 933          PB     1.9
 934          LS       0       85
 935          UD     4.3
```

```
 936          KK WTRIBUS
 937          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
 938          HC      2

 939          KKWTRIBTOT
 940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
 941          HC      2

 942          KK     304
 943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
 944          RM      3    0.28    0.15

 945          KK    SNIC
 946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
 947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
 948          RK    3850   .0122   0.016       0    TRAP      20       2
1                                        HEC-1 INPUT                                    PAGE 24

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 949          KK     LBC
 950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
 951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
 952          RK    2800    .002   0.016       0    TRAP      80       2

 953          KK    310W
 954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
 955          BA      .8
 956          PB    1.66
 957          LS       0      87       0       0      87
 958          UK     150    .010      .3      38
 959          UK     300    .015     .25      62
 960          RK    1000   .0075     .02    .013    TRAP      51       0
 961          RK    2600   .0075     .02      .2    TRAP      80       0
 962          RK    8700   .0150     .02       0    TRAP     100       0

 963          KK    R310W
 964          KM   ROUTE RUNOFF FROM 310W TO 310E
 965          RK   10500    .015     .02       0    TRAP     100       0

 966          KK    310E
 967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
 968          BA   1.238
 969          PB    1.66
 970          LS       0      86       0       0      83
 971          UK     150     .01      .3      46
 972          UK     300    .015     .25      54
 973          RK    1000   .0075     .02    .019    TRAP      51       0
 974          RK    2000   .0075     .02     .31    TRAP      80       0
 975          RK   10500    .015     .02       0    TRAP     100       0

 976          KK    310E
 977          KM   COMBINE ROUTED 310W WITH 310E
 978          HC      2

 979          KK    R310E
 980          KM   ROUTE FROM 310E TO 311W
 981          RK    5300   .0132     .02       0    TRAP     100       0

 982          KK    311W
 983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
 984          BA     .96
 985          PB    1.66
 986          LS       0      85       0       0      83
 987          UK     150    .010      .3      60
 988          UK     300   .0132     .25      40
 989          RK     650   .0065     .02     .01    TRAP      51       0
 990          RK    2200   .0065     .02     .14    TRAP      80       0
 991          RK    5300   .0132     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                    PAGE 25

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 992          KK    311W
 993          KM   COMBINE ROUTED 310E WITH 311W
 994          HC      2

 995          KK    R311W
 996          KM   ROUTE FROM 311W TO 311E
 997          RK    7500   .0132     .02       0    TRAP     100       0

 998          KK    311E
 999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311
1000          BA     .77
1001          PB    1.66
1002          LS       0      75       0       0      72
1003          UK     150    .010      .3      75
1004          UK     300   .0132     .25      25
1005          RK     650   .0065     .02    .008    TRAP      51
1006          RK    2200   .0065     .02     .11    TRAP      80       0
1007          RK    7500   .0132     .02       0    TRAP     100       0

1008          KK    311E
1009          KM   COMBINE ROUTED 311W WITH 311E
1010          HC      2
```

```
1011          KK    309W
1012          KM    RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1013          BA     .81
1014          PB    1.66
1015          LS       0      71       0       0      70
1016          UK     150     .01      .3      22
1017          UK     300    .0144     .25     78
1018          RK    1000     .007     .02     .013   TRAP     51      0
1019          RK    2600     .007     .02     .20    TRAP     80      0
1020          RK    8700    .0144     .02      0     TRAP    100      0

1021          KK    R309W
1022          KM    ROUTE FROM 309W TO 309E
1023          RK   21000    .0144     .02      0     TRAP    100      0

1024          KK    309E
1025          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1026          BA    1.19
1027          PB    1.66
1028          LS       0      87       0       0      80
1029          UK     150     .01      .3      52
1030          UK     300    .0144     .25     48
1031          RK    1000     .007     .02     .019   TRAP     51      0
1032          RK    2600     .007     .02     .30    TRAP     80      0
1033          RK   21000    .0144     .02      0     TRAP    100      0
```

1 HEC-1 INPUT PAGE 26

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1034          KK    309E
1035          KM    COMBINE ROUTED 309W WITH 309E
1036          HC       2

1037          KK
1038          KM    COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1039          HC       2

1040          KK    FCP1
1041          KM    ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1042          KM    TO LAKE MEAD BLVD.
1043          RK     410    .0045     .016      0     CIRC      5      0

1044          KK    FCP2
1045          RK     740    .0048     .016      0     CIRC     5.5     0

1046          KK    FCBC1
1047          RK     800    .0056     .016      0     TRAP      8      0

1048          KK    FC1
1049          RK    1250    .0195     .016      0     TRAP      8      0

1050          KKFCBC2/FC2/FCBC3
1051          KM    COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1052          RK    1430      .03     .016      0     TRAP      7      0

1053          KK    307NW
1054          KM    RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1055          BA    1.33
1056          PB    1.66
1057          LS       0      85       0       0      87
1058          UK     150    .010       .3      32
1059          UK     300    .011      .25      68
1060          RK    1000   .0055      .02     .017   TRAP     51      0
1061          RK    2600   .0055      .02     .27    TRAP     80      0
1062          RK    6400    .011      .02      0     TRAP    100      0

1063          KK   R307NW
1064          KM    ROUTE FROM 307NW TO 307NE
1065          RK    4000    .011      .02      0     TRAP    100      0

1066          KK    307NE
1067          KM    RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1068          BA     .64
1069          PB    1.66
1070          LS       0      87       0       0      87
1071          UK     150    .010       .3      11
1072          UK     300    .011      .25      89
1073          RK    1000   .0055      .02     .013   TRAP     51      0
1074          RK    2600   .0055      .02     .21    TRAP     80      0
1075          RK    4000    .011      .02      0     TRAP    100      0
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1 HEC-1 INPUT PAGE 27

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1076          KK    307NE
1077          KM    COMBINE ROUTED 307NW WITH 307NE
1078          HC       2

1079          KK
1080          KM    COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1081          HC       2

1082          KK       V
1083          KM    ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1084          RM       4    0.37    0.15

1085          KK    307SW
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1086          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1087          BA     1.1
1088          PB    1.66
1089          LS       0      61       0       0      64
1090          UK     150    .010      .3      16
1091          UK     300    .011     .25      84
1092          RK    1000   .0055     .02     .01    TRAP      51
1093          RK    2200   .0055     .02     .16    TRAP      80
1094          RK    6100    .011     .02       0    TRAP     100       0

1095          KK  R307SW
1096          KM   ROUTE FROM 307SW TO 307SE
1097          RK    7300    .011     .02       0    TRAP     100       0

1098          KK   307SE
1099          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1100          BA    1.58
1101          PB    1.66
1102          LS       0      85       0       0      87
1103          UK     150     .01      .3      40
1104          UK     300    .011     .25      60
1105          RK    1000   .0055     .02     .01    TRAP      51       0
1106          RK    2200   .0055     .02     .17    TRAP      80       0
1107          RK    7300    .011     .02       0    TRAP     100       0

1108          KK   307SE
1109          KM   COMBINE ROUTED 307SW WITH 307SE
1110          HC       2

1111          KK       .
1112          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1113          HC       2

1114          KK       V
1115          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1116          RM       2    0.18    0.15
```

1 HEC-1 INPUT PAGE 28

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1117          KK    308W
1118          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1119          BA     .81
1120          PB    1.66
1121          LS       0      71       0       0      70
1122          UK     150     .01      .3      19
1123          UK     300   .0134     .25      81
1124          RK    1000    .006     .02    .017    TRAP      51       0
1125          RK    2600    .006     .02     .27    TRAP      80       0
1126          RK    8700   .0134     .02       0    TRAP     100       0

1127          KK   R308W
1128          KM   ROUTE FROM 308W TO 308E
1129          RK    6500   .0134     .02       0    TRAP     100       0

1130          KK    308E
1131          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1132          BA     .72
1133          PB    1.66
1134          LS       0      85       0       0      87
1135          UK     150     .01      .3      59
1136          UK     300   .0134     .25      41
1137          RK    1000    .006     .02    .015    TRAP      51       0
1138          RK    2600    .006     .02     .24    TRAP      80       0
1139          RK    6500   .0134     .02       0    TRAP     100       0

1140          KK    308E
1141          KM   COMBINE ROUTED 308W WITH 308E
1142          HC       2

1143          KK       .
1144          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1145          HC       2

1146          KKR307/308
1147          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1148          RK    6100   .0132     .02       0    TRAP     100       0

1149          KK    312W
1150          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1151          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1152          BA     .77
1153          PB    1.66
1154          LS       0      81       0       0      80
1155          UK     150    .010      .3      20
1156          UK     300   .0132     .25      80
1157          RK    1000   .0065     .02    .012    TRAP      51       0
1158          RK    2600   .0065     .02    .175    TRAP      80       0
1159          RK    6100   .0132     .02       0    TRAP     100       0
```

1 HEC-1 INPUT PAGE 29

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1160          KK    312W
1161          KM   COMBINE ROUTED 307 & 308 WITH 312W
1162          HC       2
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1163          KK   R312W
1164          KM   ROUTE FROM 312W TO 312E
1165          RK    6100    .0132     .02       0    TRAP     100       0

1166          KK    312E
1167          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1168          BA      .7
1169          PB    1.66
1170          LS       0       79        0       0      76
1171          UK     150     .010       .3      50
1172          UK     300    .0132      .25      50
1173          RK     500    .0065      .02    .012    TRAP      51       0
1174          RK    2600    .0065      .02    .175    TRAP      80       0
1175          RK    6100    .0132      .02       0    TRAP     100       0

1176          KK    312E
1177          KM   COMBINE ROUTED 312W WITH 312E
1178          HC       2

1179          KK     306
1180          KM   RUNOFF FROM SUBBASIN 306
1181          BA   5.073
1182          PB    1.66
1183          LS       0       84
1184          UD    3.02

1185          KK
1186          KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1187          HC       3

1188          KK     FC3
1189          KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1190          KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1191          RK     900    .0012     .016       0    TRAP      10      1.5

1192          KK FC4/FC5
1193          RK     600  0.0012    0.016       0    TRAP      24      1.5

1194          KK     FC6
1195          RK    5150    .0011     .016       0    TRAP      16      1.5

1196          KK     FC7
1197          RK    2400    .0010     .016       0    TRAP      20      1.5

1198          KKFCBC4/FC8
1199          KM   COMBINE FCBC4 & FC8 ROUTING STEPS
1200          RK    3475    .0012     .016       0    TRAP      20      1.5
```



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1                                    HEC-1 INPUT

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1201          KK     302
1202          KM   RUNOFF SUBBASIN 302
1203          BA  12.113
1204          PB    1.66
1205          LS       0       86
1206          UD     3.1

1207          KK     303
1208          KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
1209          RM       8    0.83    0.15

1210          KK     303
1211          KM   RUNOFF FROM 303
1212          BA  10.217
1213          PB    1.66
1214          LS       0       84
1215          UD    4.24

1216          KK
1217          KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1218          HC       2

1219          KK     304
1220          KM   RUNOFF FROM SUBBASIN 304
1221          BA   2.903
1222          PB    1.66
1223          LS       0       86
1224          UD    1.98

1225          KK     305
1226          KM   RUNOFF FROM SUBBASIN 305
1227          BA   3.298
1228          PB    1.66
1229          LS       0       87
1230          UD    1.49

1231          KK
1232          KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1233          HC       2

1234          KKRRBRIDGE
1235          DRRRCHANNL

1236          KKDUMMY_AREA
1237          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
1238          BA   0.001
1239          PB    2.00
```

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1240          LS       0       80
1241          UD    1.00
1                                        HEC-1 INPUT                                        PAGE 31

          LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1242          KKDUMMY_COMBINE
1243          KM    Combine dummy subarea with recalled RRCHANNEL diversion
1244          HC        2

1245          KKRRCHANNL
1246          RK     4900    .0041      .03        0     TRAP       40        2

1247          KK     I-15
1248          DR    KCHAR

1249          KKDUMMY_AREA
1250          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
1251          BA    0.001
1252          PB     2.00
1253          LS        0       80
1254          UD    1.00

1255          KKDUMMY_COMBINE
1256          KM    Combine dummy subarea with recalled KCHAR diversion
1257          HC        2

1258          KK ACHANNL
1259          KM    COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
1260          HC        5

1261          KK AC1/AC2
1262          KM    COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
1263          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
1264          RK     2350  0.0074    0.035        0     TRAP       30        2

1265          KK      AC3
1266          RK     1600    .0065     .030        0     TRAP       52      1.5

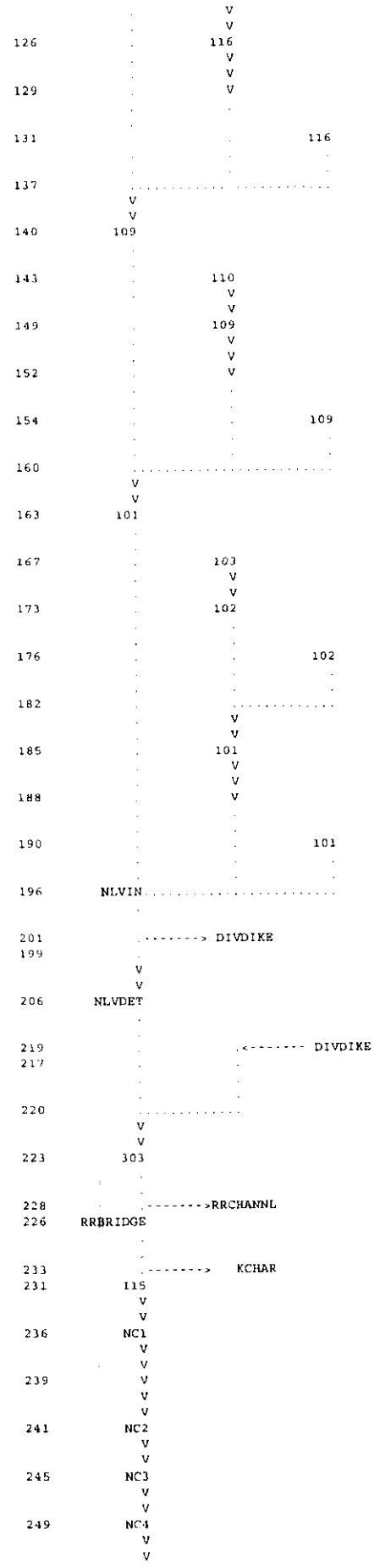
1267          KK      AC4
1268          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
1269          RK     1650    .0053     .030        0     TRAP       70      1.5

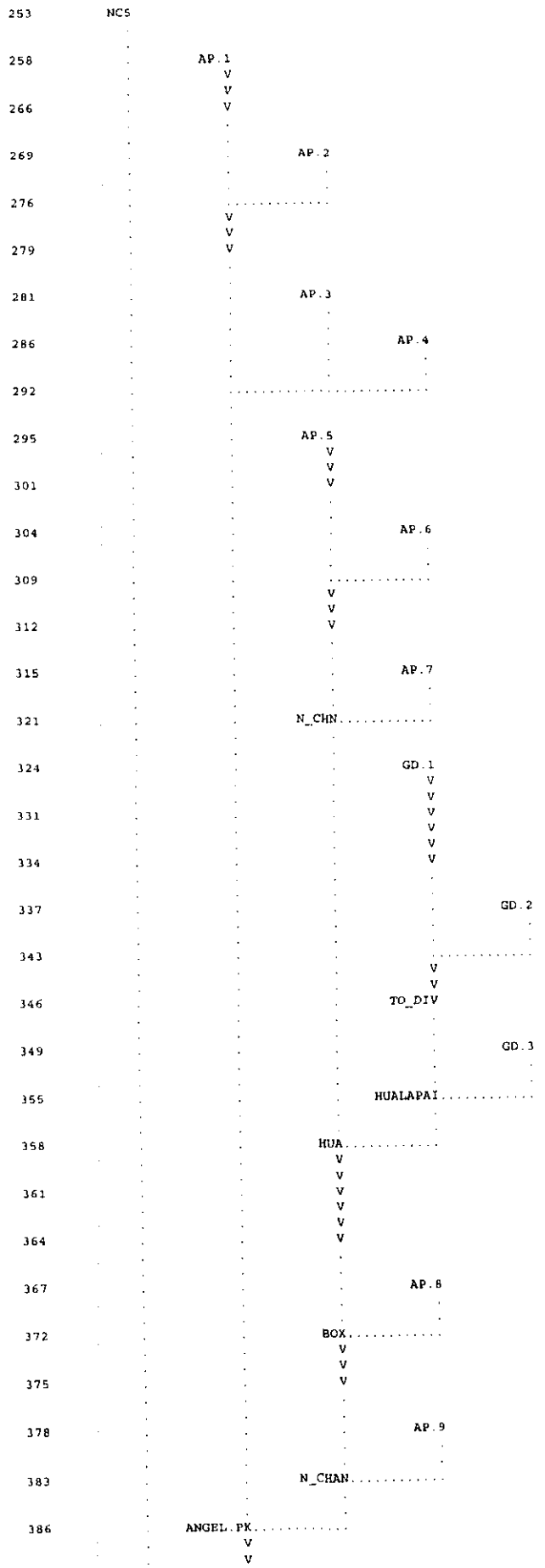
1270          KK NCHANNL
1271          KM    COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
1272          HC        2
              * Truncate this run at NCHANNL
1273          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

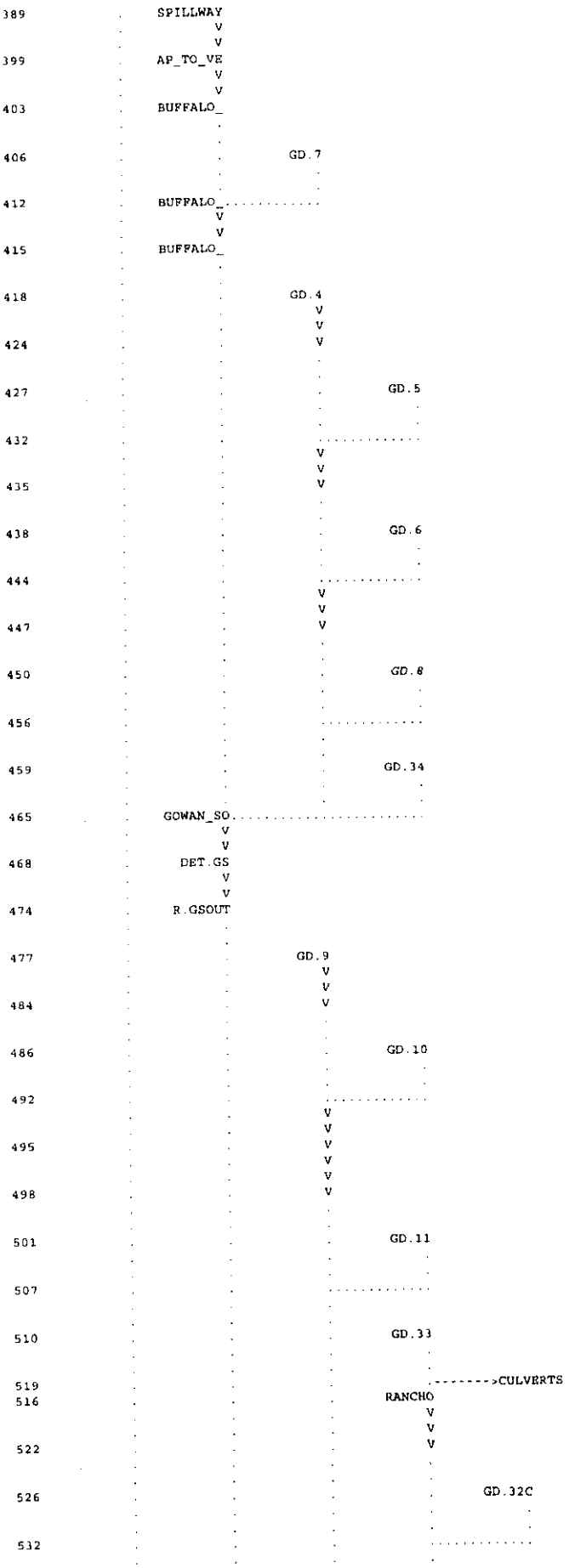
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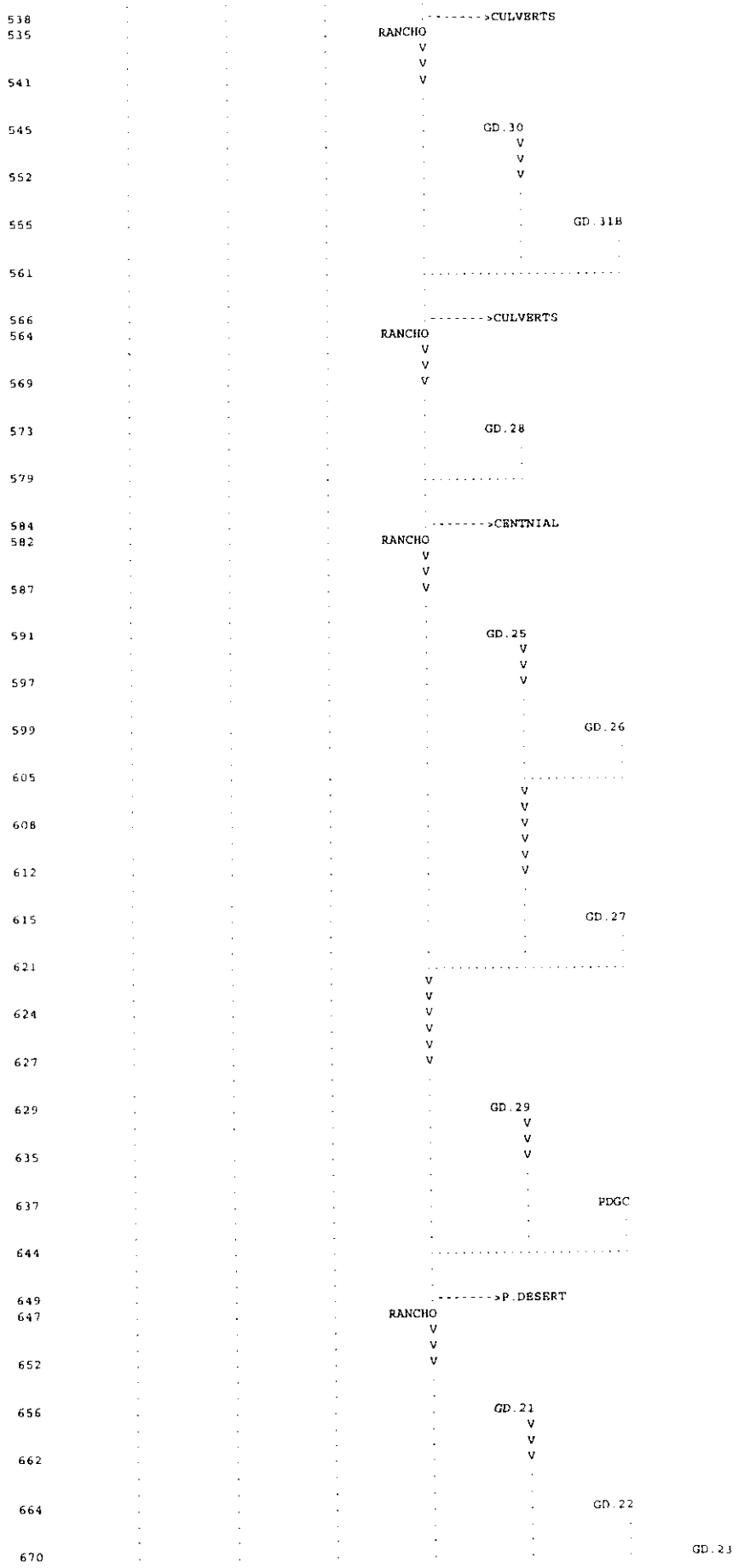
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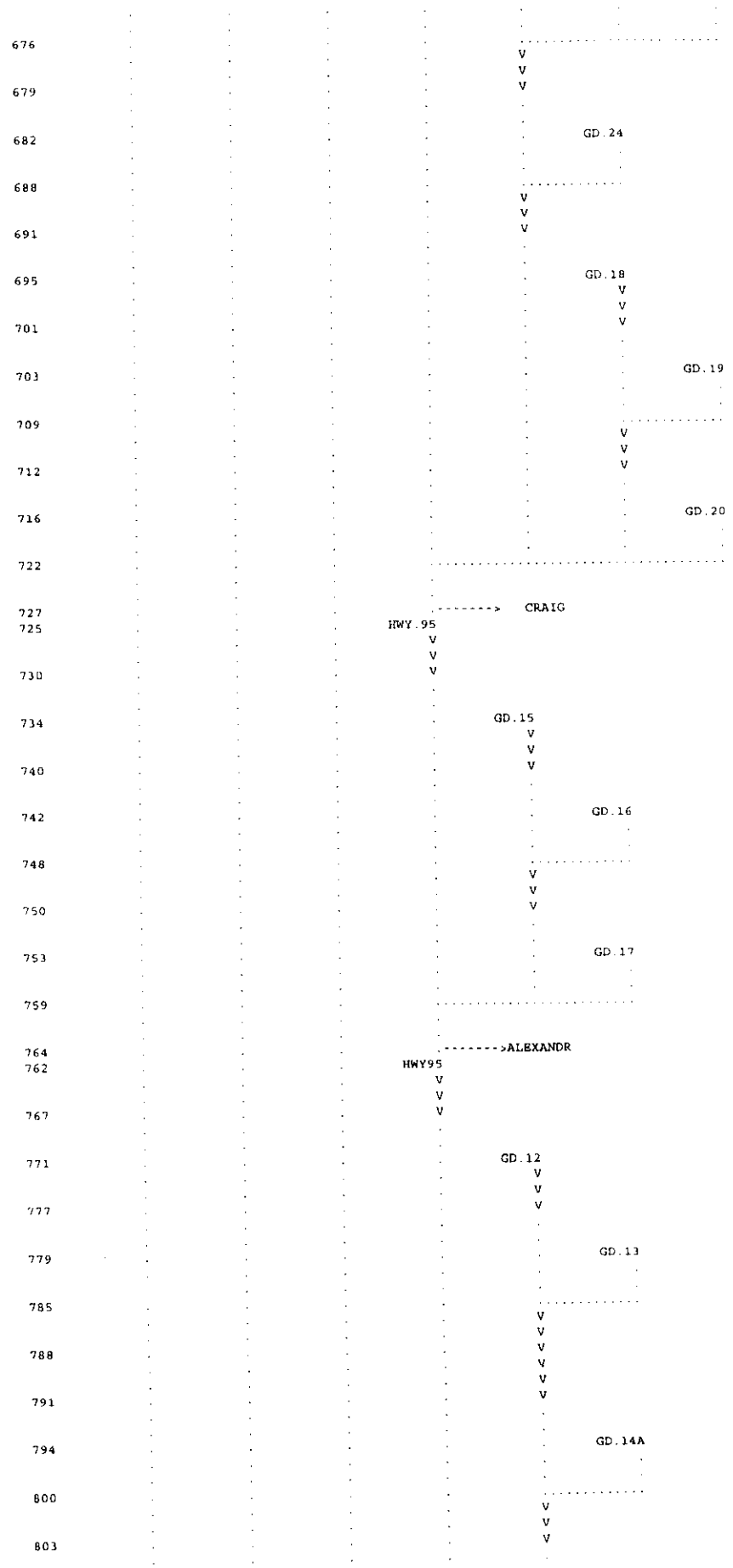
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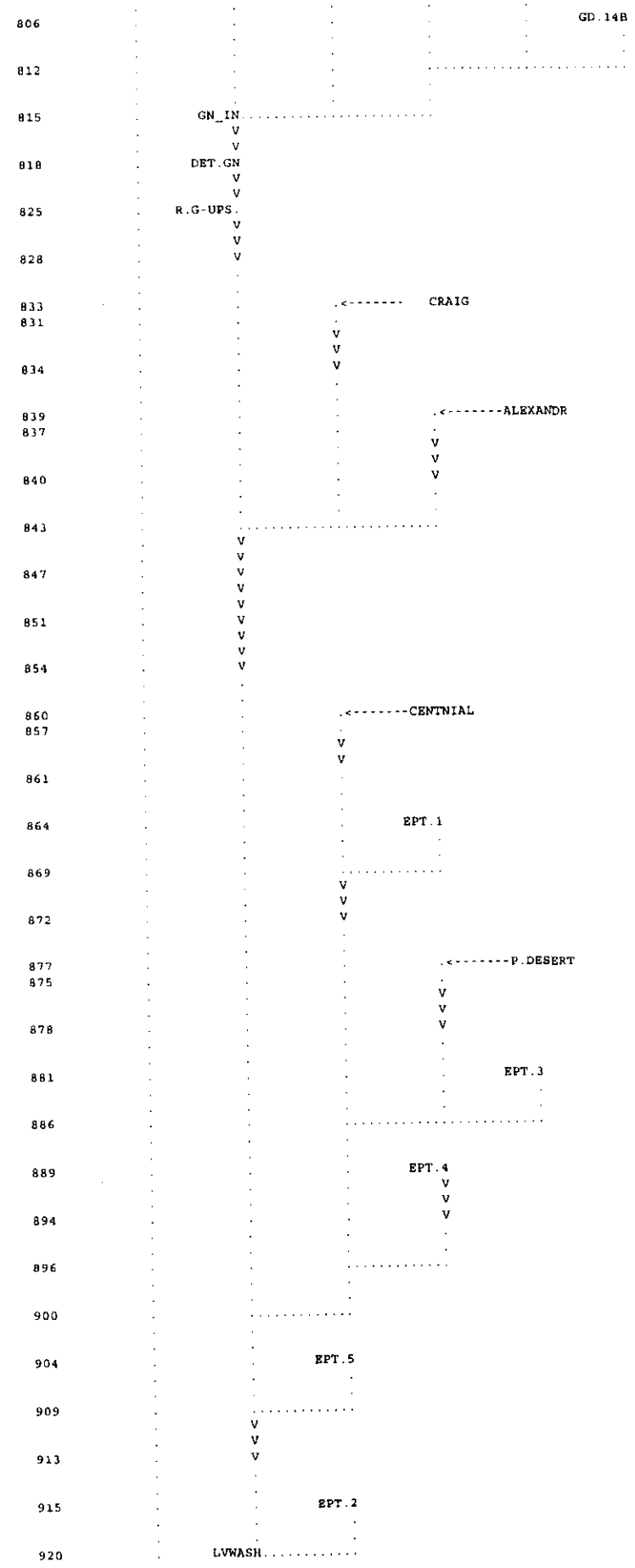

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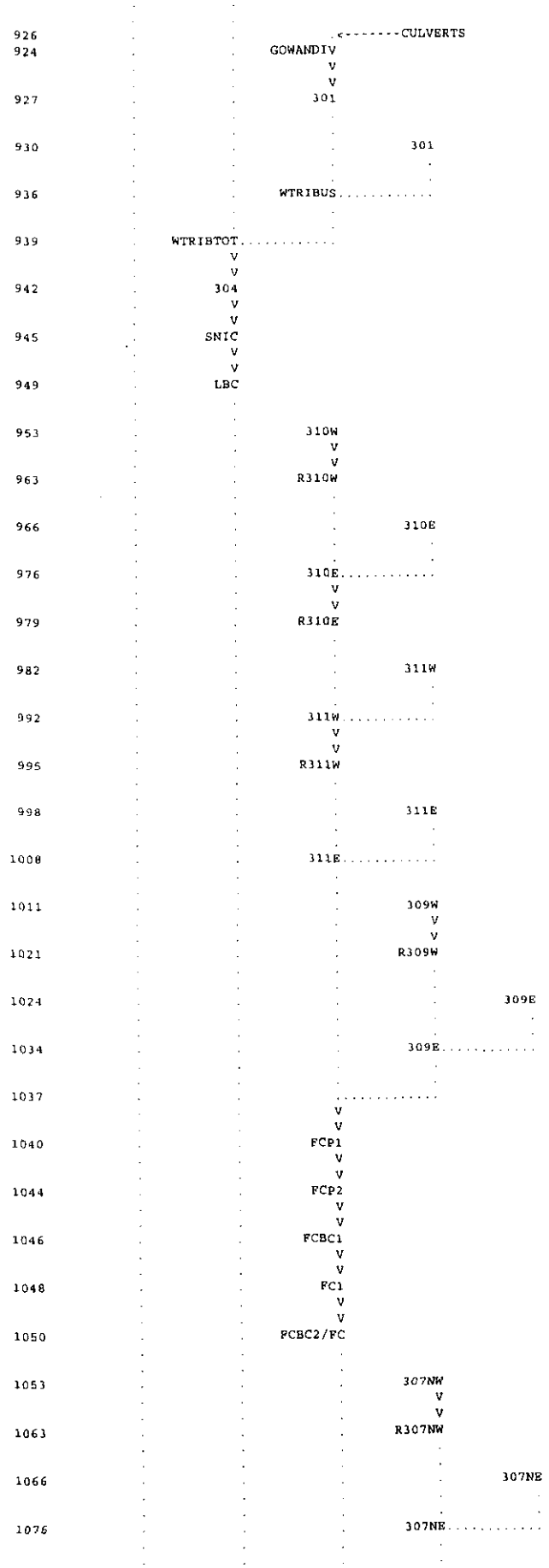

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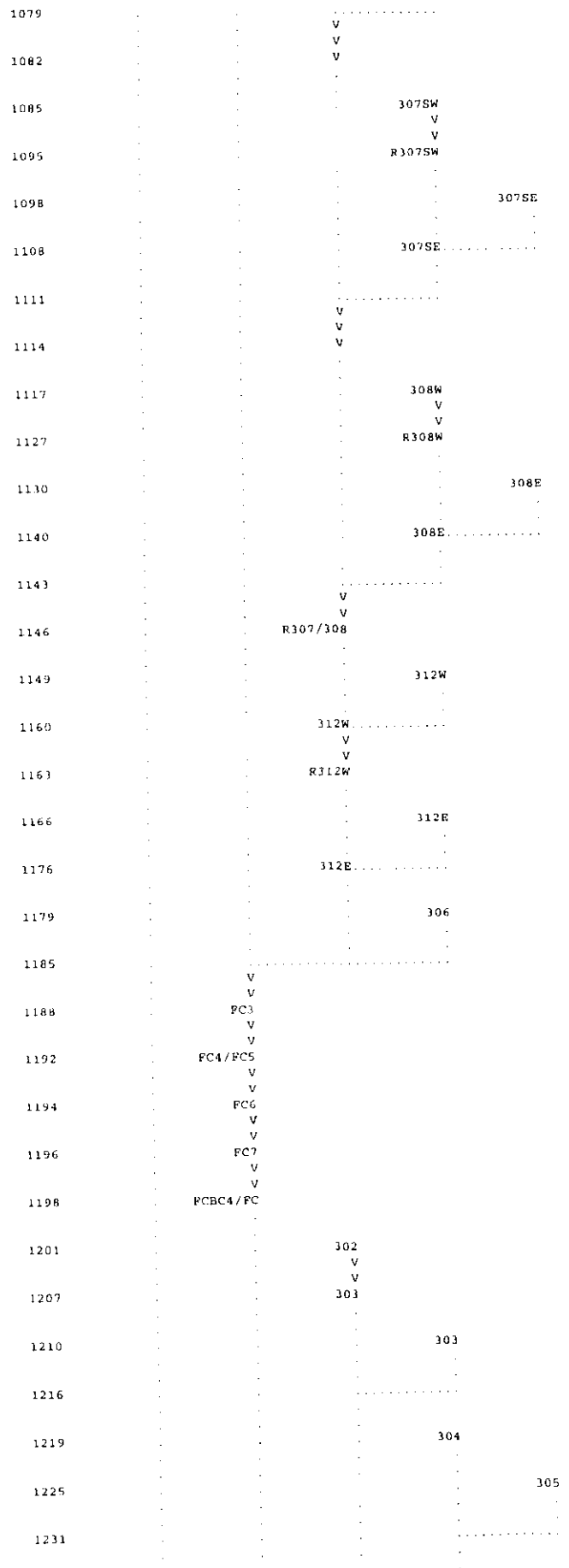

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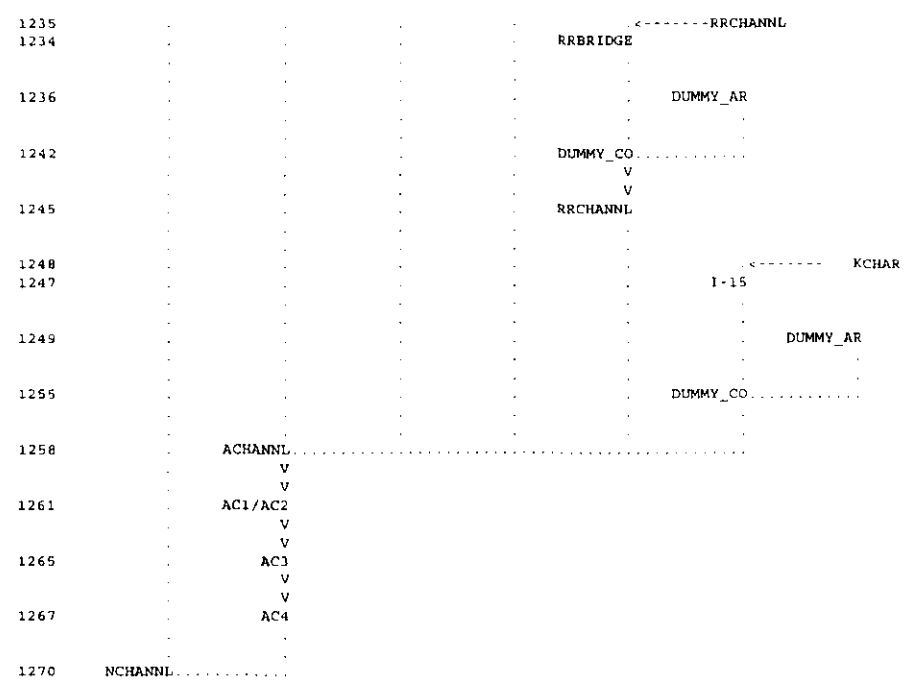

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635
637
PDGC
644
649
647
RANCHO
652
656
GD.21
662
664
GD.22
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GD.23


676
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682
688
691
695
701
703
709
712
716
722
727
725
730
734
740
742
748
750
753
759
764
762
767
771
777
779
785
788
791
794
800
803
GD.24
GD.18
GD.19
GD.20
CRAIG
HWY.95
GD.15
GD.16
GD.17
ALEXANDR
HWY95
GD.12
GD.13
GD.14A


806
GD.14B
812
815
GN_IN
818
DET.GN
825
R.G-UPS
828
833
CRAIG
831
834
839
ALEXANDR
837
840
843
847
851
854
860
CENTNIAL
857
861
864
EPT.1
869
872
877
P.DESERT
875
878
881
EPT.3
886
889
EPT.4
894
896
900
904
EPT.5
909
913
915
EPT.2
920
LVWASH


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924
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982
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1008
1011
1021
1024
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1076
CULVERTS
GOWANDIV
301
301
WTRIBUS
WTRIBTOT
304
SNIC
LBC
310W
R310W
310E
310E
R310E
311W
311W
R311W
311E
311E
309W
R309W
309E
309E
FCP1
FCP2
FCBC1
FC1
FCBC2/FC
307NW
R307NW
307NE
307NE


1079
1082
1085
307SW
1095
R307SW
1098
307SE
1108
307SE
1111
1114
1117
308W
1127
R308W
1130
308E
1140
308E
1143
1146
R307/308
1149
312W
1160
312W
1163
R312W
1166
312E
1176
312E
1179
306
1185
1188
FC3
1192
FC4/FC5
1194
FC6
1196
FC7
1198
FCBC4/FC
1201
302
1207
303
1210
303
1216
1219
304
1225
305
1231



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:20:51   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
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FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89 Lower Central Valley 100-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. *The original B&V data file used a factor of 0.62; ratios* of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
50 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN            6  MINUTES IN COMPUTATION INTERVAL
                     IDATE       1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE       1    0  ENDING DATE
                    NDTIME        1954  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                       TOTAL TIME BASE    19.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                     NPLAN           1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                 1.06      0.95      0.85

      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.06	RATIO 2 0.95	RATIO 3 0.85
HYDROGRAPH AT							
+	112	5.33	1	FLOW	1466.	1172.	918.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	119	2.74	1	FLOW	932.	746.	586.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	8.07	1	FLOW	2363.	1888.	1477.
				TIME	3.80	3.80	3.80
ROUTED TO							

+	120	8.07	1	FLOW	2218.	1774.	1390.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	125UDB	8.07	1	FLOW	1987.	1593.	1251.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	117	8.07	1	FLOW	1868.	1494.	1171.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT							
+	118	5.08	1	FLOW	1822.	1466.	1157.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	117	5.08	1	FLOW	1625.	1307.	1036.
				TIME	3.70	3.80	3.80
ROUTED TO							
+	V	5.08	1	FLOW	1504.	1209.	953.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	5.08	1	FLOW	1361.	1095.	865.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT							
+	117	7.37	1	FLOW	551.	419.	310.
				TIME	5.80	5.90	5.90
3 COMBINED AT							
+	.	20.52	1	FLOW	2948.	2358.	1865.
				TIME	5.20	5.30	5.40
ROUTED TO							
+	ULWDB	20.52	1	FLOW	2241.	1907.	1632.
				TIME	6.10	6.10	5.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2349.51	2346.72	2344.69
				TIME	6.10	6.10	5.90
ROUTED TO							
+	116	20.52	1	FLOW	2230.	1898.	1615.
				TIME	6.60	6.60	6.40
HYDROGRAPH AT							
+	111	4.08	1	FLOW	1580.	1278.	1015.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	116	4.08	1	FLOW	1479.	1196.	949.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	4.08	1	FLOW	1330.	1074.	854.
				TIME	3.90	3.90	4.00
HYDROGRAPH AT							
+	116	5.19	1	FLOW	419.	320.	238.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	.	29.79	1	FLOW	2827.	2329.	1871.
				TIME	5.30	5.40	6.30
ROUTED TO							
+	109	29.79	1	FLOW	2733.	2279.	1859.
				TIME	5.80	5.90	6.60
HYDROGRAPH AT							
+	110	2.94	1	FLOW	1195.	979.	789.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	109	2.94	1	FLOW	1132.	927.	748.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	2.94	1	FLOW	1034.	847.	683.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	348.	266.	199.
				TIME	5.50	5.50	5.60
3 COMBINED AT							
+	.	36.91	1	FLOW	3230.	2644.	2095.
				TIME	5.70	5.80	5.70
ROUTED TO							
+	101	36.91	1	FLOW	3160.	2601.	2068.
				TIME	6.30	6.30	6.40
HYDROGRAPH AT							
+	103	6.20	1	FLOW	2309.	1877.	1500.
				TIME	3.70	3.70	3.70

ROUTED TO							
+	102	6.20	1	FLOW	2181.	1771.	1413.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	2291.	1827.	1427.
				TIME	3.80	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	4472.	3598.	2840.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	101	14.65	1	FLOW	4291.	3449.	2718.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	3995.	3209.	2541.
				TIME	4.10	4.20	4.20
HYDROGRAPH AT							
+	101	9.08	1	FLOW	661.	498.	364.
				TIME	5.70	5.70	5.80
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	5575.	4502.	3576.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	5575.	4502.	3576.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	2048.	1797.	1561.
				TIME	8.60	8.40	8.20
			** PEAK STAGES IN FEET **				
			1	STAGE	20.03	16.12	12.87
				TIME	8.60	8.40	8.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	2048.	1797.	1561.
				TIME	8.60	8.40	8.20
ROUTED TO							
+	303	60.65	1	FLOW	2044.	1793.	1557.
				TIME	9.90	9.70	9.50
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	2044.	1793.	1557.
				TIME	9.90	9.70	9.50
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC1	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	V	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC2	60.65	1	FLOW	409.	359.	311.
				TIME	10.00	9.80	9.50
ROUTED TO							
+	NC3	60.65	1	FLOW	409.	359.	311.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC4	60.65	1	FLOW	409.	359.	311.
				TIME	10.10	9.90	9.60
ROUTED TO							
+	NC5	60.65	1	FLOW	409.	359.	311.
				TIME	10.10	9.90	9.70
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	354.	294.	240.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.85	1	FLOW	354.	294.	241.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.85	1	FLOW	279.	232.	190.
				TIME	4.80	4.80	4.90
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	595.	502.	419.
				TIME	6.30	6.30	6.30
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.50	4.50
3 COMBINED AT							
+	.	4.47	1	FLOW	760.	642.	537.
				TIME	6.10	6.10	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	0.	0.	0.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.20	5.20	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	291.	239.	193.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	291.	239.	193.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.60
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	1.	1.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	326.	270.	221.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	326.	270.	221.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUA	1.82	1	FLOW	566.	466.	378.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	1.82	1	FLOW	562.	461.	372.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	1.82	1	FLOW	557.	456.	371.
				TIME	4.00	4.10	4.10

HYDROGRAPH AT							
+	AP.8	0.93	1	FLOW	309.	260.	215.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	BOX	2.75	1	FLOW	866.	713.	585.
				TIME	4.00	4.00	4.10
ROUTED TO							
+	V	2.75	1	FLOW	861.	713.	580.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	AP.9	0.68	1	FLOW	177.	148.	122.
				TIME	4.20	4.30	4.30
2 COMBINED AT							
+	N_CHAN	3.43	1	FLOW	1033.	856.	698.
				TIME	4.10	4.10	4.20
2 COMBINED AT							
+	ANGEL.PK	7.91	1	FLOW	1382.	1165.	970.
				TIME	5.30	5.30	5.30
ROUTED TO							
+	SPILLWAY	7.91	1	FLOW	67.	64.	62.
				TIME	10.40	10.30	10.10
			** PEAK STAGES IN FEET **				
			1	STAGE	2612.01	2610.66	2609.36
				TIME	10.50	10.30	10.10
ROUTED TO							
+	AP_TO_VE	7.91	1	FLOW	67.	64.	62.
				TIME	10.50	10.30	10.10
ROUTED TO							
+	BUFFALO_	7.91	1	FLOW	67.	64.	62.
				TIME	10.50	10.40	10.20
HYDROGRAPH AT							
+	GD.7	1.23	1	FLOW	225.	188.	157.
				TIME	5.00	5.10	5.20
2 COMBINED AT							
+	BUFFALO_	9.04	1	FLOW	281.	244.	210.
				TIME	5.10	5.20	5.30
ROUTED TO							
+	BUFFALO_	9.04	1	FLOW	281.	244.	210.
				TIME	5.30	5.40	5.50
HYDROGRAPH AT							
+	GD.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.5	3.31	1	FLOW	604.	500.	409.
				TIME	5.20	5.30	5.30
2 COMBINED AT							
+	.	3.31	1	FLOW	604.	500.	409.
				TIME	5.20	5.30	5.30
ROUTED TO							
+	V	3.31	1	FLOW	600.	496.	406.
				TIME	5.60	5.70	5.70
HYDROGRAPH AT							
+	GD.6	1.60	1	FLOW	316.	258.	207.
				TIME	4.40	4.40	4.50
2 COMBINED AT							
+	.	4.91	1	FLOW	858.	709.	580.
				TIME	5.40	5.50	5.50
ROUTED TO							
+	V	4.91	1	FLOW	857.	709.	579.
				TIME	5.50	5.50	5.50
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	233.	188.	148.
				TIME	4.70	4.70	4.80
2 COMBINED AT							
+	.	6.44	1	FLOW	1074.	886.	724.
				TIME	5.40	5.50	5.50
HYDROGRAPH AT							
+	GD.34	3.84	1	FLOW	468.	378.	300.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	GOWAN_SO	19.32	1	FLOW	1811.	1498.	1224.
				TIME	5.50	5.50	5.60

ROUTED TO							
+	DET.GS	19.32	1	FLOW	413.	385.	361.
				TIME	7.90	7.90	7.70
			** PEAK STAGES IN FEET **				
			1	STAGE	2346.19	2344.29	2342.52
				TIME	7.90	7.90	7.70
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	413.	385.	361.
				TIME	8.00	7.90	7.80
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.90	4.90	4.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	374.	306.	246.
				TIME	6.40	6.40	6.50
2 COMBINED AT							
+	.	3.17	1	FLOW	375.	306.	246.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	7.90	7.90
HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50
3 COMBINED AT							
+	.	1.03	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50

HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.40	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	6.20	6.30	6.30
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	105.	81.	61.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	.	2.16	1	FLOW	105.	81.	61.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	2.16	1	FLOW	105.	81.	61.
				TIME	5.80	5.90	5.90
ROUTED TO							
+	V	2.16	1	FLOW	105.	81.	61.
				TIME	5.90	6.00	6.10
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	67.	52.	39.
				TIME	5.60	5.70	5.70
ROUTED TO							
+	V	0.76	1	FLOW	67.	52.	38.
				TIME	5.90	6.00	6.10
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	55.	43.	33.
				TIME	5.30	5.40	5.50
3 COMBINED AT							
+	.	3.45	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.90	5.00	5.00
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.30	5.30
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.30	5.30
3 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	5.00	5.00	5.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	60.	47.	35.
				TIME	5.50	5.50	5.60
2 COMBINED AT							
+	.	0.64	1	FLOW	61.	47.	36.
				TIME	5.50	5.50	5.60
ROUTED TO							
+	V	0.64	1	FLOW	60.	47.	35.
				TIME	6.00	6.10	6.20
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.30	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	199.	157.	122.
				TIME	6.50	6.60	6.60
4 COMBINED AT							
+	.	6.45	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.50	5.50	5.60
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	60.	48.	37.
				TIME	6.10	6.10	6.10
3 COMBINED AT							
+	.	7.01	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10

DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	246.	191.	144.
				TIME	4.40	4.40	4.40
2 COMBINED AT							
+	.	1.71	1	FLOW	247.	191.	144.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	1.71	1	FLOW	236.	183.	140.
				TIME	5.00	5.00	5.80
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	79.	63.	50.
				TIME	5.70	5.70	5.80
3 COMBINED AT							
+	.	9.40	1	FLOW	304.	239.	190.
				TIME	5.00	5.70	5.80
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	1022.	881.	759.
				TIME	6.00	6.10	6.10
ROUTED TO							
+	DET.GN	31.90	1	FLOW	329.	309.	290.
				TIME	17.40	15.30	13.40
			** PEAK STAGES IN FEET **				
			1	STAGE	2316.91	2316.16	2315.47
				TIME	17.30	15.30	13.30
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	329.	309.	290.
				TIME	17.40	15.30	13.40
ROUTED TO							
+	V	31.90	1	FLOW	329.	309.	290.
				TIME	19.90	15.40	13.40
HYDROGRAPH AT							
+	.	0.00	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
ROUTED TO							
+	V	0.00	1	FLOW	254.	200.	154.
				TIME	6.80	6.80	6.90
HYDROGRAPH AT							
+	.	0.00	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10
ROUTED TO							
+	V	0.00	1	FLOW	59.	47.	36.
				TIME	7.00	7.00	7.00
3 COMBINED AT							
+	.	31.90	1	FLOW	593.	516.	450.
				TIME	7.00	7.00	7.00
ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	450.
				TIME	7.00	7.10	7.10

ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	449.
				TIME	7.00	7.10	7.10
ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	449.
				TIME	7.10	7.10	7.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
ROUTED TO							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	8.50	8.50	8.70
HYDROGRAPH AT							
+	EPT.1	3.76	1	FLOW	316.	256.	204.
				TIME	7.30	7.30	7.40
2 COMBINED AT							
+	.	3.76	1	FLOW	316.	256.	204.
				TIME	7.30	7.30	7.40
ROUTED TO							
+	V	3.76	1	FLOW	313.	254.	202.
				TIME	8.00	8.10	8.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
ROUTED TO							
+	V	0.00	1	FLOW	211.	162.	121.
				TIME	7.80	7.90	8.00
HYDROGRAPH AT							
+	EPT.3	4.39	1	FLOW	420.	348.	284.
				TIME	7.50	7.50	7.50
3 COMBINED AT							
+	.	8.15	1	FLOW	936.	756.	602.
				TIME	7.80	7.80	7.90
HYDROGRAPH AT							
+	EPT.4	1.37	1	FLOW	176.	147.	122.
				TIME	6.50	6.60	6.60
ROUTED TO							
+	V	1.37	1	FLOW	174.	145.	120.
				TIME	7.40	7.50	7.50
2 COMBINED AT							
+	.	9.52	1	FLOW	1106.	898.	719.
				TIME	7.70	7.80	7.80
2 COMBINED AT							
+	.	41.42	1	FLOW	1674.	1394.	1153.
				TIME	7.50	7.60	7.70
HYDROGRAPH AT							
+	EPT.5	3.01	1	FLOW	218.	179.	145.
				TIME	8.50	8.60	8.60
2 COMBINED AT							
+	.	44.42	1	FLOW	1875.	1559.	1287.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	V	44.42	1	FLOW	1874.	1559.	1287.
				TIME	7.70	7.70	7.80
HYDROGRAPH AT							
+	EPT.2	1.49	1	FLOW	156.	126.	101.
				TIME	6.50	6.50	6.50
2 COMBINED AT							
+	LVWASH	45.92	1	FLOW	1993.	1654.	1362.
				TIME	7.60	7.60	7.70
HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.40	9.30	9.30
HYDROGRAPH AT							
+	301	18.62	1	FLOW	1563.	1278.	1029.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	1564.	1278.	1029.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	3520.	2903.	2371.
				TIME	7.80	7.80	7.90

ROUTED TO							
+	304	64.53	1	FLOW	3513.	2897.	2366.
				TIME	8.10	8.10	8.20
ROUTED TO							
+	SNIC	64.53	1	FLOW	3513.	2897.	2366.
				TIME	8.10	8.10	8.20
ROUTED TO							
+	LBC	64.53	1	FLOW	3512.	2896.	2364.
				TIME	8.10	8.20	8.20
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	172.	129.	95.
				TIME	4.20	4.40	4.60
ROUTED TO							
+	R310W	0.80	1	FLOW	169.	125.	94.
				TIME	4.50	4.80	5.00
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	205.	148.	113.
				TIME	4.30	4.50	5.20
2 COMBINED AT							
+	310E	2.04	1	FLOW	356.	260.	204.
				TIME	4.50	4.80	5.10
ROUTED TO							
+	R310E	2.04	1	FLOW	354.	259.	204.
				TIME	4.60	4.90	5.20
HYDROGRAPH AT							
+	311W	0.96	1	FLOW	165.	120.	88.
				TIME	4.20	4.30	5.20
2 COMBINED AT							
+	311W	3.00	1	FLOW	483.	361.	292.
				TIME	4.60	4.90	5.20
ROUTED TO							
+	R311W	3.00	1	FLOW	475.	360.	291.
				TIME	4.70	5.10	5.40
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	51.	35.	21.
				TIME	5.50	5.80	6.20
2 COMBINED AT							
+	311E	3.77	1	FLOW	487.	378.	296.
				TIME	4.80	5.40	5.40
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	30.	17.	8.
				TIME	6.10	6.70	7.60
ROUTED TO							
+	R309W	0.81	1	FLOW	30.	17.	8.
				TIME	7.60	8.50	10.10
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	155.	124.	96.
				TIME	5.10	5.30	5.50
2 COMBINED AT							
+	309E	2.00	1	FLOW	155.	124.	96.
				TIME	5.10	5.30	5.50
2 COMBINED AT							
+	.	5.77	1	FLOW	636.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCP1	5.77	1	FLOW	635.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCP2	5.77	1	FLOW	634.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCBC1	5.77	1	FLOW	633.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FC1	5.77	1	FLOW	631.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	630.	501.	391.
				TIME	4.80	5.40	5.50
HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	272.	201.	146.
				TIME	4.20	4.40	4.60
ROUTED TO							
+	R307NW	1.33	1	FLOW	270.	200.	146.
				TIME	4.30	4.50	4.70

HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	134.	100.	73.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	307NE	1.97	1	FLOW	402.	299.	218.
				TIME	4.30	4.40	4.70
2 COMBINED AT							
+	.	7.74	1	FLOW	930.	751.	594.
				TIME	4.80	5.30	5.40
ROUTED TO							
+	V	7.74	1	FLOW	918.	741.	580.
				TIME	5.50	5.70	5.80
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	9.	3.	1.
				TIME	7.80	9.60	13.70
ROUTED TO							
+	R307SW	1.10	1	FLOW	9.	3.	1.
				TIME	8.60	10.90	16.10
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	312.	235.	169.
				TIME	4.30	4.40	4.60
2 COMBINED AT							
+	307SE	2.68	1	FLOW	312.	235.	169.
				TIME	4.30	4.40	4.60
2 COMBINED AT							
+	.	10.42	1	FLOW	1150.	910.	709.
				TIME	5.30	5.60	5.70
ROUTED TO							
+	V	10.42	1	FLOW	1143.	905.	703.
				TIME	5.50	5.70	5.90
HYDROGRAPH AT							
+	308W	0.81	1	FLOW	30.	17.	8.
				TIME	6.10	6.70	7.60
ROUTED TO							
+	R308W	0.81	1	FLOW	30.	17.	8.
				TIME	6.50	7.20	8.30
HYDROGRAPH AT							
+	308E	0.72	1	FLOW	144.	107.	77.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	308E	1.53	1	FLOW	144.	107.	77.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	.	11.95	1	FLOW	1242.	976.	756.
				TIME	5.40	5.70	5.90
ROUTED TO							
+	R307/308	11.95	1	FLOW	1241.	974.	755.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	312W	0.77	1	FLOW	83.	66.	48.
				TIME	5.20	5.30	5.50
2 COMBINED AT							
+	312W	12.72	1	FLOW	1319.	1031.	796.
				TIME	5.50	5.70	6.00
ROUTED TO							
+	R312W	12.72	1	FLOW	1317.	1031.	795.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	312E	0.70	1	FLOW	63.	47.	32.
				TIME	5.30	5.40	5.60
2 COMBINED AT							
+	312E	13.42	1	FLOW	1377.	1072.	824.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	306	5.07	1	FLOW	412.	330.	260.
				TIME	7.00	7.00	7.10
3 COMBINED AT							
+	.	83.02	1	FLOW	4256.	3532.	2891.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	FC3	83.02	1	FLOW	4256.	3532.	2890.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	4256.	3532.	2890.
				TIME	7.70	7.70	7.70

ROUTED TO							
+	FC6	83.02	1	FLOW	4255.	3530.	2890.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	FC7	83.02	1	FLOW	4254.	3530.	2889.
				TIME	7.70	7.80	7.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	4253.	3529.	2888.
				TIME	7.80	7.80	7.90
HYDROGRAPH AT							
+	302	12.11	1	FLOW	1109.	904.	726.
				TIME	7.00	7.00	7.10
ROUTED TO							
+	303	12.11	1	FLOW	1098.	895.	719.
				TIME	7.90	7.90	7.90
HYDROGRAPH AT							
+	303	10.22	1	FLOW	629.	503.	395.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	.	22.33	1	FLOW	1722.	1394.	1111.
				TIME	7.90	8.00	8.00
HYDROGRAPH AT							
+	304	2.90	1	FLOW	359.	294.	237.
				TIME	5.90	6.00	6.00
HYDROGRAPH AT							
+	305	3.30	1	FLOW	495.	408.	333.
				TIME	5.40	5.40	5.50
2 COMBINED AT							
+	.	6.20	1	FLOW	837.	687.	557.
				TIME	5.60	5.60	5.70
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	7735.	6470.	5326.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	7734.	6469.	5326.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC3	111.56	1	FLOW	7734.	6468.	5325.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC4	111.56	1	FLOW	7733.	6467.	5324.
				TIME	7.80	7.90	7.90
2 COMBINED AT							
+	NCHANNL	172.20	1	FLOW	8100.	6797.	5610.
				TIME	7.80	7.90	8.00

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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.06									
NC1	MANE	0.37	408.85	594.70	0.11	6.00	408.84	594.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3435E+03 EXCESS=0.0000E+00 OUTFLOW=0.3433E+03 BASIN STORAGE=0.1099E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC1	MANE	0.44	358.60	582.57	0.08	6.00	358.59	582.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2726E+03 EXCESS=0.0000E+00 OUTFLOW=0.2726E+03 BASIN STORAGE=0.6440E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC1	MANE	0.44	311.34	569.94	0.07	6.00	311.34	570.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2106E+03 EXCESS=0.0000E+00 OUTFLOW=0.2106E+03 BASIN STORAGE=0.5238E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.34	408.83	596.13	0.11	6.00	408.80	594.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3433E+03 EXCESS=0.0000E+00 OUTFLOW=0.3428E+03 BASIN STORAGE=0.6045E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.32	358.59	584.22	0.08	6.00	358.57	582.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2726E+03 EXCESS=0.0000E+00 OUTFLOW=0.2723E+03 BASIN STORAGE=0.3681E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.36	311.34	572.22	0.07	6.00	311.33	570.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2106E+03 EXCESS=0.0000E+00 OUTFLOW=0.2102E+03 BASIN STORAGE=0.2993E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	0.94	408.80	595.89	0.11	6.00	408.80	600.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3427E+03 EXCESS=0.0000E+00 OUTFLOW=0.3424E+03 BASIN STORAGE=0.3421E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	0.84	358.57	583.71	0.08	6.00	358.55	588.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2722E+03 EXCESS=0.0000E+00 OUTFLOW=0.2719E+03 BASIN STORAGE=0.2048E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	0.88	311.32	572.16	0.06	6.00	311.30	570.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2102E+03 EXCESS=0.0000E+00 OUTFLOW=0.2101E+03 BASIN STORAGE=0.1600E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	2.51	408.79	604.64	0.11	6.00	408.77	600.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3423E+03 EXCESS=0.0000E+00 OUTFLOW=0.3414E+03 BASIN STORAGE=0.1116E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	2.62	358.54	592.61	0.08	6.00	358.53	588.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2719E+03 EXCESS=0.0000E+00 OUTFLOW=0.2713E+03 BASIN STORAGE=0.6817E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	2.74	311.30	575.47	0.06	6.00	311.29	576.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2100E+03 EXCESS=0.0000E+00 OUTFLOW=0.2096E+03 BASIN STORAGE=0.5193E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	0.77	408.77	601.60	0.11	6.00	408.77	606.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3410E+03 EXCESS=0.0000E+00 OUTFLOW=0.3407E+03 BASIN STORAGE=0.3218E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	0.78	358.53	589.61	0.08	6.00	358.52	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2712E+03 EXCESS=0.0000E+00 OUTFLOW=0.2709E+03 BASIN STORAGE=0.1975E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	0.72	311.29	577.93	0.06	6.00	311.26	576.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2095E+03 EXCESS=0.0000E+00 OUTFLOW=0.2093E+03 BASIN STORAGE=0.1466E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC5	MANE	0.50	408.76	606.32	0.11	6.00	408.76	606.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3407E+03 EXCESS=0.0000E+00 OUTFLOW=0.3405E+03 BASIN STORAGE=0.1802E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC5	MANE	0.54	358.52	594.18	0.08	6.00	358.52	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2709E+03 EXCESS=0.0000E+00 OUTFLOW=0.2708E+03 BASIN STORAGE=0.1106E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC5	MANE	0.48	311.26	577.23	0.06	6.00	311.25	582.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2093E+03 EXCESS=0.0000E+00 OUTFLOW=0.2092E+03 BASIN STORAGE=0.8155E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.48	565.06	235.24	0.89	6.00	561.86	234.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8612E+02 EXCESS=0.0000E+00 OUTFLOW=0.8633E+02 BASIN STORAGE=0.7206E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V	MANE	3.74	465.14	235.82	0.73	6.00	460.81	234.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7078E+02 EXCESS=0.0000E+00 OUTFLOW=0.7095E+02 BASIN STORAGE=0.6199E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.85

V	MANE	4.03	375.82	235.23	0.59	6.00	372.10	234.00	0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5747E+02 EXCESS=0.0000E+00 OUTFLOW=0.5766E+02 BASIN STORAGE=0.7762E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.53	557.46	240.14	0.89	6.00	556.84	240.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8633E+02 EXCESS=0.0000E+00 OUTFLOW=0.8641E+02 BASIN STORAGE=0.8356E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V	MANE	3.78	460.26	241.49	0.73	6.00	455.96	246.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7095E+02 EXCESS=0.0000E+00 OUTFLOW=0.7101E+02 BASIN STORAGE=0.8245E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	3.98	371.76	245.74	0.59	6.00	371.45	246.00	0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5766E+02 EXCESS=0.0000E+00 OUTFLOW=0.5774E+02 BASIN STORAGE=0.8090E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.55	864.34	244.19	0.94	6.00	861.39	246.00	0.94

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1380E+03 EXCESS=0.0000E+00 OUTFLOW=0.1381E+03 BASIN STORAGE=0.1196E-01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.79	712.74	244.38	0.78	6.00	712.64	246.00	0.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1141E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=0.1204E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.92	583.52	249.23	0.64	6.00	560.13	246.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9339E+02 EXCESS=0.0000E+00 OUTFLOW=0.9340E+02 BASIN STORAGE=0.1120E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AP_TO_VE	MANE	1.79	66.74	632.85	0.23	6.00	66.74	636.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9552E+02 EXCESS=0.0000E+00 OUTFLOW=0.9526E+02 BASIN STORAGE=0.3113E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

AP_TO_VE	MANE	1.68	64.38	622.51	0.22	6.00	64.38	624.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9210E+02 EXCESS=0.0000E+00 OUTFLOW=0.9176E+02 BASIN STORAGE=0.3188E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AP_TO_VE	MANE	1.81	62.01	609.91	0.21	6.00	62.01	612.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8856E+02 EXCESS=0.0000E+00 OUTFLOW=0.8828E+02 BASIN STORAGE=0.2928E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	1.34	66.74	637.76	0.22	6.00	66.74	636.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9513E+02 EXCESS=0.0000E+00 OUTFLOW=0.9481E+02 BASIN STORAGE=0.2981E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	1.34	64.38	626.84	0.22	6.00	64.38	624.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9173E+02 EXCESS=0.0000E+00 OUTFLOW=0.9144E+02 BASIN STORAGE=0.2923E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	1.34	62.01	614.25	0.21	6.00	62.01	612.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8820E+02 EXCESS=0.0000E+00 OUTFLOW=0.8799E+02 BASIN STORAGE=0.2865E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	4.02	281.30	315.96	0.31	6.00	281.26	318.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1522E+03 EXCESS=0.0000E+00 OUTFLOW=0.1509E+03 BASIN STORAGE=0.1645E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	4.11	243.64	320.29	0.29	6.00	243.61	324.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1392E+03 EXCESS=0.0000E+00 OUTFLOW=0.1377E+03 BASIN STORAGE=0.1601E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	4.42	209.86	329.05	0.26	6.00	209.78	330.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1272E+03 EXCESS=0.0000E+00 OUTFLOW=0.1259E+03 BASIN STORAGE=0.1455E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.35	857.68	327.02	0.83	6.00	856.85	330.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2184E+03 EXCESS=0.0000E+00 OUTFLOW=0.2184E+03 BASIN STORAGE=0.2821E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.32	709.43	332.16	0.68	6.00	709.40	330.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1787E+03 EXCESS=0.0000E+00 OUTFLOW=0.1787E+03 BASIN STORAGE=0.2405E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.47	579.99	332.23	0.55	6.00	579.47	330.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+03 EXCESS=0.0000E+00 OUTFLOW=0.1444E+03 BASIN STORAGE=0.2612E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

R.GSOUT	MANE	1.00	412.54	479.97	0.46	6.00	412.54	480.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4762E+03 EXCESS=0.0000E+00 OUTFLOW=0.4754E+03 BASIN STORAGE=0.7008E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.GSOUT	MANE	1.02	384.80	474.78	0.41	6.00	384.80	474.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4197E+03 EXCESS=0.0000E+00 OUTFLOW=0.4192E+03 BASIN STORAGE=0.5230E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.GSOUT	MANE	1.01	361.33	464.52	0.35	6.00	361.33	468.00	0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3625E+03 EXCESS=0.0000E+00 OUTFLOW=0.3620E+03 BASIN STORAGE=0.4237E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	2.98	105.08	348.96	0.23	6.00	105.02	348.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2622E+02 EXCESS=0.0000E+00 OUTFLOW=0.2622E+02 BASIN STORAGE=0.1064E-02 PERCENT ERROR= 0.0

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.24     81.14    353.49      0.17      6.00     81.11    354.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2002E+02 EXCESS=0.0000E+00 OUTFLOW=0.2002E+02 BASIN STORAGE=0.1075E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          3.59     61.14    356.78      0.13      6.00     61.07    354.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1491E+02 EXCESS=0.0000E+00 OUTFLOW=0.1491E+02 BASIN STORAGE=0.1025E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          3.58    104.97    356.01      0.23      6.00    104.82    354.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2622E+02 EXCESS=0.0000E+00 OUTFLOW=0.2622E+02 BASIN STORAGE=0.1099E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.87     81.03    360.13      0.17      6.00     81.03    360.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2003E+02 EXCESS=0.0000E+00 OUTFLOW=0.2003E+02 BASIN STORAGE=0.1222E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.18     61.06    362.97      0.13      6.00     61.04    366.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1491E+02 EXCESS=0.0000E+00 OUTFLOW=0.1491E+02 BASIN STORAGE=0.1235E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          6.00     67.38    359.35      0.40      6.00     67.37    354.00         0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1620E+02 EXCESS=0.0000E+00 OUTFLOW=0.1621E+02 BASIN STORAGE=0.1127E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          6.00     51.55    357.99      0.30      6.00     51.53    360.00         0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1224E+02 EXCESS=0.0000E+00 OUTFLOW=0.1225E+02 BASIN STORAGE=0.1147E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          5.77     38.47    369.09      0.22      6.00     38.44    366.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8994E+01 EXCESS=0.0000E+00 OUTFLOW=0.8996E+01 BASIN STORAGE=0.1031E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          R.G-UPS.  MANE          0.75    328.91   1045.76      0.24      6.00    328.91   1050.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4010E+03 EXCESS=0.0000E+00 OUTFLOW=0.4003E+03 BASIN STORAGE=0.6315E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          R.G-UPS.  MANE          0.75    308.77    919.48      0.22      6.00    308.77    918.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3745E+03 EXCESS=0.0000E+00 OUTFLOW=0.3738E+03 BASIN STORAGE=0.5978E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          R.G-UPS.  MANE          0.76    290.37    805.18      0.21      6.00    290.37    804.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3492E+03 EXCESS=0.0000E+00 OUTFLOW=0.3487E+03 BASIN STORAGE=0.5589E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.61    332.10   1194.83      0.23      6.00    328.98   1194.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4002E+03 EXCESS=0.0000E+00 OUTFLOW=0.3983E+03 BASIN STORAGE=0.2225E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.69    308.77    921.72      0.22      6.00    308.77    924.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3738E+03 EXCESS=0.0000E+00 OUTFLOW=0.3723E+03 BASIN STORAGE=0.2096E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.71    290.37    806.34      0.20      6.00    290.37    804.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3485E+03 EXCESS=0.0000E+00 OUTFLOW=0.3468E+03 BASIN STORAGE=0.2003E+01 PERCENT ERROR=  -0.1
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          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.69    593.09    420.49      0.29      6.00    593.09    420.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4945E+03 EXCESS=0.0000E+00 OUTFLOW=0.4920E+03 BASIN STORAGE=0.2968E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.66    515.58    423.77      0.26      6.00    515.31    426.00        0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4470E+03 EXCESS=0.0000E+00 OUTFLOW=0.4448E+03 BASIN STORAGE=0.2809E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.72    449.62    423.95      0.24      6.00    449.61    426.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4042E+03 EXCESS=0.0000E+00 OUTFLOW=0.4017E+03 BASIN STORAGE=0.2662E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          0.91    593.02    421.33      0.29      6.00    592.83    420.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4915E+03 EXCESS=0.0000E+00 OUTFLOW=0.4901E+03 BASIN STORAGE=0.1563E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.02    515.30    425.92      0.26      6.00    515.30    426.00        0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4442E+03 EXCESS=0.0000E+00 OUTFLOW=0.4430E+03 BASIN STORAGE=0.1480E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.04    449.56    428.50      0.24      6.00    449.42    426.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4016E+03 EXCESS=0.0000E+00 OUTFLOW=0.4005E+03 BASIN STORAGE=0.1405E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          0.98    592.79    422.48      0.29      6.00    592.60    426.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4900E+03 EXCESS=0.0000E+00 OUTFLOW=0.4889E+03 BASIN STORAGE=0.1566E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          0.99    515.25    427.21      0.26      6.00    515.18    426.00        0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4428E+03 EXCESS=0.0000E+00 OUTFLOW=0.4413E+03 BASIN STORAGE=0.1482E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          0.91    449.42    428.04      0.23      6.00    449.32    432.00        0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4002E+03 EXCESS=0.0000E+00 OUTFLOW=0.3990E+03 BASIN STORAGE=0.1404E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.01   1875.36    458.09      0.44      6.00   1874.32    462.00        0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1046E+04 EXCESS=0.0000E+00 OUTFLOW=0.1043E+04 BASIN STORAGE=0.2998E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.12   1559.13    463.40      0.38      6.00   1558.97    462.00        0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8945E+03 EXCESS=0.0000E+00 OUTFLOW=0.8924E+03 BASIN STORAGE=0.2845E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.28   1287.14    464.19      0.32      6.00   1286.83    468.00        0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7622E+03 EXCESS=0.0000E+00 OUTFLOW=0.7601E+03 BASIN STORAGE=0.2685E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
              SNIC  MANE          0.63   3512.94    487.03      0.55      6.00   3512.68    486.00        0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1880E+04 EXCESS=0.0000E+00 OUTFLOW=0.1878E+04 BASIN STORAGE=0.1808E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              SNIC  MANE          0.66   2897.38    487.67      0.46      6.00   2896.50    486.00        0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1572E+04 EXCESS=0.0000E+00 OUTFLOW=0.1570E+04 BASIN STORAGE=0.1693E+01 PERCENT ERROR=   0.0
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FOR PLAN = 1 RATIO= 0.85

SNIC	MANE	0.76	2365.71	493.23	0.38	6.00	2365.50	492.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1304E+04 EXCESS=0.0000E+00 OUTFLOW=0.1303E+04 BASIN STORAGE=0.1582E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

LBC	MANE	1.01	3512.40	487.52	0.54	6.00	3511.56	486.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1879E+04 EXCESS=0.0000E+00 OUTFLOW=0.1875E+04 BASIN STORAGE=0.3599E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

LBC	MANE	1.22	2896.46	488.82	0.46	6.00	2896.26	492.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1570E+04 EXCESS=0.0000E+00 OUTFLOW=0.1567E+04 BASIN STORAGE=0.3384E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

LBC	MANE	1.26	2365.33	494.70	0.38	6.00	2364.50	492.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1303E+04 EXCESS=0.0000E+00 OUTFLOW=0.1300E+04 BASIN STORAGE=0.3176E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

310W	MANE	5.94	148.70	260.63	0.64	6.00	147.96	258.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2768E+02 OUTFLOW=0.2718E+02 BASIN STORAGE=0.1537E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 1.06

310W	MANE	5.70	174.39	253.92	0.71	6.00	171.81	252.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3081E+02 OUTFLOW=0.3032E+02 BASIN STORAGE=0.1527E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

310W	MANE	6.00	129.01	260.11	0.58	6.00	128.62	264.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2514E+02 OUTFLOW=0.2466E+02 BASIN STORAGE=0.1607E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.85

310W	MANE	5.59	95.31	275.19	0.46	6.00	94.99	276.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2025E+02 OUTFLOW=0.1980E+02 BASIN STORAGE=0.1654E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R310W	MANE	5.75	171.16	271.50	0.71	6.00	168.82	270.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3028E+02 EXCESS=0.0000E+00 OUTFLOW=0.3047E+02 BASIN STORAGE=0.1820E+00 PERCENT ERROR= -1.2

FOR PLAN = 1 RATIO= 0.95

R310W	MANE	6.00	127.17	285.27	0.57	6.00	124.76	288.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2464E+02 EXCESS=0.0000E+00 OUTFLOW=0.2449E+02 BASIN STORAGE=0.1756E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

R310W	MANE	5.82	94.60	295.90	0.47	6.00	94.06	300.00	0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1980E+02 EXCESS=0.0000E+00 OUTFLOW=0.2003E+02 BASIN STORAGE=0.1824E+00 PERCENT ERROR= -2.1

FOR PLAN = 1 RATIO= 1.06

310E	MANE	5.28	174.02	263.95	0.52	6.00	173.97	264.00	0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3515E+02 OUTFLOW=0.3452E+02 BASIN STORAGE=0.2076E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

310E	MANE	6.29	205.07	254.21	0.59	6.00	205.02	258.00	0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3952E+02 OUTFLOW=0.3887E+02 BASIN STORAGE=0.1776E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.95

310E	MANE	5.61	147.73	269.85	0.47	6.00	147.63	270.00	0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3163E+02 OUTFLOW=0.3101E+02 BASIN STORAGE=0.2099E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.85

310E	MANE	6.00	113.70	314.93	0.37	6.00	113.36	312.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2491E+02 OUTFLOW=0.2434E+02 BASIN STORAGE=0.2074E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	3.07	354.32	275.93	0.64	6.00	354.21	276.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6929E+02 EXCESS=0.0000E+00 OUTFLOW=0.6908E+02 BASIN STORAGE=0.1423E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	3.37	259.85	295.07	0.51	6.00	258.99	294.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5548E+02 EXCESS=0.0000E+00 OUTFLOW=0.5531E+02 BASIN STORAGE=0.1158E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	3.70	204.09	312.03	0.41	6.00	204.09	312.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4434E+02 EXCESS=0.0000E+00 OUTFLOW=0.4417E+02 BASIN STORAGE=0.1364E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	3.87	139.84	256.28	0.53	6.00	138.81	258.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2679E+02 OUTFLOW=0.2635E+02 BASIN STORAGE=0.1283E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

311W	MANE	3.64	165.70	250.86	0.58	6.00	165.26	252.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3015E+02 OUTFLOW=0.2970E+02 BASIN STORAGE=0.1218E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

311W	MANE	4.11	119.52	257.33	0.46	6.00	119.52	258.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2408E+02 OUTFLOW=0.2367E+02 BASIN STORAGE=0.1236E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

311W	MANE	4.71	88.23	313.09	0.36	6.00	88.10	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1892E+02 OUTFLOW=0.1853E+02 BASIN STORAGE=0.1236E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R311W	MANE	3.75	478.05	285.17	0.62	6.00	474.86	282.00	0.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9885E+02 EXCESS=0.0000E+00 OUTFLOW=0.9849E+02 BASIN STORAGE=0.2496E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R311W	MANE	4.18	360.06	304.62	0.49	6.00	359.63	306.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7896E+02 EXCESS=0.0000E+00 OUTFLOW=0.7866E+02 BASIN STORAGE=0.2474E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R311W	MANE	4.63	291.79	322.46	0.39	6.00	291.33	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6269E+02 EXCESS=0.0000E+00 OUTFLOW=0.6244E+02 BASIN STORAGE=0.2437E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

311E	MANE	5.50	42.24	339.06	0.20	6.00	42.15	336.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8698E+01 OUTFLOW=0.8411E+01 BASIN STORAGE=0.1319E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 1.06

311E	MANE	6.00	51.46	331.45	0.24	6.00	51.34	330.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1034E+02 OUTFLOW=0.1003E+02 BASIN STORAGE=0.1243E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

311E	MANE	5.96	35.14	346.37	0.17	6.00	34.98	348.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7413E+01 OUTFLOW=0.7150E+01 BASIN STORAGE=0.1274E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.85

311E	MANE	6.00	21.61	368.74	0.12	6.00	21.47	372.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5095E+01 OUTFLOW=0.4858E+01 BASIN STORAGE=0.1257E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.90	22.64	384.32	0.12	6.00	22.62	384.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5639E+01 OUTFLOW=0.5349E+01 BASIN STORAGE=0.1648E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.95	30.35	366.98	0.15	6.00	30.26	366.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6969E+01 OUTFLOW=0.6651E+01 BASIN STORAGE=0.1689E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.95

309W	MANE	5.80	17.04	402.23	0.10	6.00	17.03	402.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4621E+01 OUTFLOW=0.4342E+01 BASIN STORAGE=0.1618E+00 PERCENT ERROR= 2.5

FOR PLAN = 1 RATIO= 0.85

309W	MANE	6.00	8.21	455.90	0.06	6.00	8.21	456.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2853E+01 OUTFLOW=0.2592E+01 BASIN STORAGE=0.1650E+00 PERCENT ERROR= 3.4

FOR PLAN = 1 RATIO= 1.06

R309W	MANE	6.00	30.15	455.84	0.17	6.00	30.13	456.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6646E+01 EXCESS=0.0000E+00 OUTFLOW=0.7351E+01 BASIN STORAGE=0.5630E+00 PERCENT ERROR= -19.1

FOR PLAN = 1 RATIO= 0.95

R309W	MANE	6.00	16.92	514.39	0.11	6.00	16.88	510.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4332E+01 EXCESS=0.0000E+00 OUTFLOW=0.4879E+01 BASIN STORAGE=0.5540E+00 PERCENT ERROR= -25.4

FOR PLAN = 1 RATIO= 0.85

R309W	MANE	6.00	8.17	606.06	0.06	6.00	8.17	606.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2584E+01 EXCESS=0.0000E+00 OUTFLOW=0.2722E+01 BASIN STORAGE=0.5666E+00 PERCENT ERROR= -27.2

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	138.51	314.78	0.50	6.00	138.45	312.00	0.50

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3261E+02 OUTFLOW=0.3180E+02 BASIN STORAGE=0.4115E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	155.36	308.43	0.56	6.00	155.32	306.00	0.56

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3668E+02 OUTFLOW=0.3583E+02 BASIN STORAGE=0.4399E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	124.60	316.82	0.45	6.00	124.50	318.00	0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2932E+02 OUTFLOW=0.2852E+02 BASIN STORAGE=0.4342E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	95.78	328.15	0.35	6.00	95.73	330.00	0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2307E+02 OUTFLOW=0.2235E+02 BASIN STORAGE=0.4099E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

FCP1	MANE	0.21	635.52	288.38	0.49	6.00	635.01	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.4616E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP1	MANE	0.21	502.01	324.23	0.39	6.00	501.96	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.4563E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP1	MANE	0.21	391.20	330.09	0.30	6.00	391.19	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9225E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.4510E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCP2	MANE	0.36	634.69	288.58	0.49	6.00	633.60	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.8037E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP2	MANE	0.32	501.91	324.57	0.39	6.00	501.78	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.7944E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP2	MANE	0.43	391.11	330.51	0.30	6.00	391.08	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9225E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.7859E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC1	MANE	0.23	633.42	288.55	0.49	6.00	632.61	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1831E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC1	MANE	0.30	501.72	324.28	0.39	6.00	501.66	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1816E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC1	MANE	0.19	391.05	330.28	0.30	6.00	390.98	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.1799E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC1	MANE	0.31	632.44	288.57	0.49	6.00	631.43	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1975E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC1	MANE	0.29	501.60	324.46	0.39	6.00	501.53	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1958E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC1	MANE	0.21	390.95	330.44	0.30	6.00	390.84	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9223E+02 BASIN STORAGE=0.1943E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC2/FC	MANE	0.27	631.31	288.73	0.49	6.00	630.16	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1517E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1891E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC2/FC	MANE	0.32	501.47	324.39	0.39	6.00	501.39	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1192E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1873E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC2/FC	MANE	0.22	390.78	330.29	0.30	6.00	390.68	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9223E+02 BASIN STORAGE=0.1859E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	4.04	232.72	257.22	0.61	6.00	232.09	258.00	0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4392E+02 OUTFLOW=0.4318E+02 BASIN STORAGE=0.2276E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	3.83	272.05	251.40	0.68	6.00	271.79	252.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4899E+02 OUTFLOW=0.4824E+02 BASIN STORAGE=0.2273E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

307NW	MANE	4.23	202.53	262.82	0.55	6.00	201.37	264.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3980E+02 OUTFLOW=0.3912E+02 BASIN STORAGE=0.2137E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307NW	MANE	4.81	146.02	270.47	0.44	6.00	145.66	276.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3189E+02 OUTFLOW=0.3121E+02 BASIN STORAGE=0.2248E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R307NW	MANE	2.66	269.92	256.48	0.68	6.00	269.81	258.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4826E+02 EXCESS=0.0000E+00 OUTFLOW=0.4809E+02 BASIN STORAGE=0.7468E-01 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R307NW	MANE	2.94	201.30	268.45	0.55	6.00	200.28	270.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3908E+02 EXCESS=0.0000E+00 OUTFLOW=0.3896E+02 BASIN STORAGE=0.7315E-01 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R307NW	MANE	3.39	145.64	279.69	0.44	6.00	145.55	282.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3120E+02 EXCESS=0.0000E+00 OUTFLOW=0.3111E+02 BASIN STORAGE=0.7527E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	3.33	115.50	257.68	0.64	6.00	115.42	258.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2215E+02 OUTFLOW=0.2177E+02 BASIN STORAGE=0.1199E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	3.24	134.35	254.63	0.71	6.00	134.27	252.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2465E+02 OUTFLOW=0.2427E+02 BASIN STORAGE=0.1182E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.95

307NE	MANE	3.50	100.43	263.17	0.58	6.00	100.17	264.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2011E+02 OUTFLOW=0.1976E+02 BASIN STORAGE=0.1192E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307NE	MANE	3.95	73.34	271.72	0.46	6.00	73.17	276.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1620E+02 OUTFLOW=0.1584E+02 BASIN STORAGE=0.1174E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

307SW	MANE	6.00	5.33	515.28	0.04	6.00	5.33	516.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2491E+01 OUTFLOW=0.2148E+01 BASIN STORAGE=0.2070E+00 PERCENT ERROR= 5.5

FOR PLAN = 1 RATIO= 1.06

307SW	MANE	5.53	9.18	468.60	0.05	6.00	9.17	468.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3486E+01 OUTFLOW=0.3127E+01 BASIN STORAGE=0.2125E+00 PERCENT ERROR= 4.2

FOR PLAN = 1 RATIO= 0.95

307SW	MANE	5.90	3.08	577.78	0.02	6.00	3.08	576.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1781E+01 OUTFLOW=0.1448E+01 BASIN STORAGE=0.2032E+00 PERCENT ERROR= 7.3

FOR PLAN = 1 RATIO= 0.85

307SW	MANE	5.95	0.68	823.08	0.01	6.00	0.68	822.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7071E+00 OUTFLOW=0.3969E+00 BASIN STORAGE=0.1963E+00 PERCENT ERROR= 16.1

FOR PLAN = 1 RATIO= 1.06

R307SW	MANE	6.00	9.17	516.90	0.05	6.00	9.16	516.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3123E+01 EXCESS=0.0000E+00 OUTFLOW=0.2935E+01 BASIN STORAGE=0.1820E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R307SW	MANE	6.00	3.08	655.40	0.02	6.00	3.07	654.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1443E+01 EXCESS=0.0000E+00 OUTFLOW=0.1266E+01 BASIN STORAGE=0.1841E+00 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 0.85

R307SW	MANE	6.00	0.68	973.72	0.00	6.00	0.68	972.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3963E+00 EXCESS=0.0000E+00 OUTFLOW=0.2282E+00 BASIN STORAGE=0.1770E+00 PERCENT ERROR= -2.3

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.32	268.90	258.33	0.60	6.00	268.20	258.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5155E+02 OUTFLOW=0.5063E+02 BASIN STORAGE=0.2951E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.07	314.78	256.60	0.67	6.00	312.31	256.00	0.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5754E+02 OUTFLOW=0.5660E+02 BASIN STORAGE=0.2981E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

307SE	MANE	4.66	235.05	263.94	0.54	6.00	235.01	264.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4669E+02 OUTFLOW=0.4583E+02 BASIN STORAGE=0.2817E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307SE	MANE	5.29	169.18	276.50	0.43	6.00	168.87	276.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3736E+02 OUTFLOW=0.3650E+02 BASIN STORAGE=0.2999E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	22.21	385.17	0.12	6.00	22.16	384.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5616E+01 OUTFLOW=0.5315E+01 BASIN STORAGE=0.1688E+00 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	29.67	367.58	0.15	6.00	29.53	366.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6944E+01 OUTFLOW=0.6616E+01 BASIN STORAGE=0.1717E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 0.95

308W	MANE	5.97	16.65	403.34	0.10	6.00	16.62	402.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4601E+01 OUTFLOW=0.4320E+01 BASIN STORAGE=0.1636E+00 PERCENT ERROR= 2.6

FOR PLAN = 1 RATIO= 0.85

308W	MANE	6.00	7.97	457.44	0.06	6.00	7.97	456.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2837E+01 OUTFLOW=0.2569E+01 BASIN STORAGE=0.1643E+00 PERCENT ERROR= 3.7

FOR PLAN = 1 RATIO= 1.06

R308W	MANE	5.87	29.52	390.00	0.15	6.00	29.52	390.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6616E+01 EXCESS=0.0000E+00 OUTFLOW=0.6489E+01 BASIN STORAGE=0.1162E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R308W	MANE	6.00	16.61	433.08	0.10	6.00	16.53	432.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4309E+01 EXCESS=0.0000E+00 OUTFLOW=0.4182E+01 BASIN STORAGE=0.1180E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.85

R308W	MANE	6.00	7.95	501.06	0.06	6.00	7.94	498.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2566E+01 EXCESS=0.0000E+00 OUTFLOW=0.2445E+01 BASIN STORAGE=0.1207E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

308E	MANE	4.97	124.60	256.26	0.58	6.00	124.01	258.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2281E+02 OUTFLOW=0.2242E+02 BASIN STORAGE=0.1245E+00 PERCENT ERROR= 1.2

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          FOR PLAN = 1  RATIO= 1.06
              308E  MANE          4.63    144.34    250.59      0.65      6.00    144.19    252.00         0.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2550E+02 OUTFLOW=0.2510E+02 BASIN STORAGE=0.1202E+00 PERCENT ERROR=   1.1

          FOR PLAN = 1  RATIO= 0.95
              308E  MANE          5.24    107.88    261.65      0.53      6.00    106.79    264.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2063E+02 OUTFLOW=0.2026E+02 BASIN STORAGE=0.1187E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.85
              308E  MANE          5.97     77.23    274.53      0.42      6.00     76.91    276.00         0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1646E+02 OUTFLOW=0.1610E+02 BASIN STORAGE=0.1166E+00 PERCENT ERROR=   1.5

          FOR PLAN = 1  RATIO= 1.06
          R307/308  MANE          2.14   1241.63    328.39      0.49      6.00   1240.77    330.00         0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3149E+03 EXCESS=0.0000E+00 OUTFLOW=0.3142E+03 BASIN STORAGE=0.5224E+00 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.95
          R307/308  MANE          2.32    975.40    346.04      0.39      6.00    974.25    348.00         0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2491E+03 EXCESS=0.0000E+00 OUTFLOW=0.2485E+03 BASIN STORAGE=0.5040E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          R307/308  MANE          2.57    755.73    358.50      0.30      6.00    754.90    360.00         0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1942E+03 EXCESS=0.0000E+00 OUTFLOW=0.1937E+03 BASIN STORAGE=0.4962E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              312W  MANE          5.78     73.39    318.46      0.36      6.00     73.36    318.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1537E+02 OUTFLOW=0.1495E+02 BASIN STORAGE=0.1484E+00 PERCENT ERROR=   1.8

          FOR PLAN = 1  RATIO= 1.06
              312W  MANE          5.41     83.66    314.47      0.42      6.00     83.36    312.00         0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1762E+02 OUTFLOW=0.1721E+02 BASIN STORAGE=0.1430E+00 PERCENT ERROR=   1.6

          FOR PLAN = 1  RATIO= 0.95
              312W  MANE          6.00     65.88    322.34      0.32      6.00     65.63    318.00         0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1357E+02 OUTFLOW=0.1320E+02 BASIN STORAGE=0.1372E+00 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 0.85
              312W  MANE          5.26     48.38    329.47      0.24      6.00     48.36    330.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1021E+02 OUTFLOW=0.9868E+01 BASIN STORAGE=0.1466E+00 PERCENT ERROR=   1.9

          FOR PLAN = 1  RATIO= 1.06
             R312W  MANE          2.08   1318.81    333.46      0.49      6.00   1316.84    330.00         0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3314E+03 EXCESS=0.0000E+00 OUTFLOW=0.3308E+03 BASIN STORAGE=0.5518E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             R312W  MANE          2.30   1031.08    347.06      0.38      6.00   1030.80    348.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2616E+03 EXCESS=0.0000E+00 OUTFLOW=0.2610E+03 BASIN STORAGE=0.5454E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
             R312W  MANE          2.52    795.39    362.64      0.30      6.00    795.05    360.00         0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2034E+03 EXCESS=0.0000E+00 OUTFLOW=0.2028E+03 BASIN STORAGE=0.5431E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              312E  MANE          5.01     54.52    322.70      0.29      6.00     54.42    318.00         0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1099E+02 OUTFLOW=0.1072E+02 BASIN STORAGE=0.1012E+00 PERCENT ERROR=   1.6
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          FOR PLAN = 1  RATIO= 1.06
              312E  MANE          6.00     63.19    317.91       0.33       6.00     63.18    318.00         0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1278E+02 OUTFLOW=0.1248E+02 BASIN STORAGE=0.1050E+00 PERCENT ERROR=   1.6

          FOR PLAN = 1  RATIO= 0.95
              312E  MANE          5.27     46.70    327.72       0.25       6.00     46.67    324.00         0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9573E+01 OUTFLOW=0.9311E+01 BASIN STORAGE=0.9888E-01 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 0.85
              312E  MANE          6.00     32.30    335.77       0.18       6.00     32.29    336.00         0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6960E+01 OUTFLOW=0.6722E+01 BASIN STORAGE=0.1039E+00 PERCENT ERROR=   1.9

          FOR PLAN = 1  RATIO= 1.06
               FC3  MANE          0.33   4256.33    456.92       0.54       6.00   4255.81    456.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2374E+04 EXCESS=0.0000E+00 OUTFLOW=0.2374E+04 BASIN STORAGE=0.8051E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               FC3  MANE          0.44   3531.80    462.48       0.44       6.00   3531.75    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1961E+04 EXCESS=0.0000E+00 OUTFLOW=0.1961E+04 BASIN STORAGE=0.7540E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               FC3  MANE          0.35   2890.49    462.70       0.36       6.00   2890.12    462.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1606E+04 EXCESS=0.0000E+00 OUTFLOW=0.1606E+04 BASIN STORAGE=0.7039E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
            FC4/FC5  MANE          0.33   4255.80    456.64       0.54       6.00   4255.57    462.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2374E+04 EXCESS=0.0000E+00 OUTFLOW=0.2373E+04 BASIN STORAGE=0.6313E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
            FC4/FC5  MANE          0.25   3531.68    462.43       0.44       6.00   3531.61    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1961E+04 EXCESS=0.0000E+00 OUTFLOW=0.1960E+04 BASIN STORAGE=0.5931E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
            FC4/FC5  MANE          0.26   2890.10    462.62       0.36       6.00   2889.82    462.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1606E+04 EXCESS=0.0000E+00 OUTFLOW=0.1605E+04 BASIN STORAGE=0.5557E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               FC6  MANE          1.73   4255.49    463.12       0.53       6.00   4255.46    462.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2373E+04 EXCESS=0.0000E+00 OUTFLOW=0.2367E+04 BASIN STORAGE=0.5128E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               FC6  MANE          1.74   3531.15    464.39       0.44       6.00   3530.20    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1960E+04 EXCESS=0.0000E+00 OUTFLOW=0.1956E+04 BASIN STORAGE=0.4803E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               FC6  MANE          1.78   2889.78    466.26       0.36       6.00   2889.67    468.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1605E+04 EXCESS=0.0000E+00 OUTFLOW=0.1602E+04 BASIN STORAGE=0.4491E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
               FC7  MANE          0.86   4255.20    463.34       0.53       6.00   4254.44    462.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2367E+04 EXCESS=0.0000E+00 OUTFLOW=0.2365E+04 BASIN STORAGE=0.2585E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               FC7  MANE          0.83   3530.18    463.95       0.44       6.00   3530.03    468.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1955E+04 EXCESS=0.0000E+00 OUTFLOW=0.1952E+04 BASIN STORAGE=0.2430E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
```

FC7	MANE	0.92	2889.47	469.39	0.36	6.00	2888.91	468.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1600E+04 EXCESS=0.0000E+00 OUTFLOW=0.1598E+04 BASIN STORAGE=0.2273E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC4/FC	MANE	1.05	4254.29	463.95	0.53	6.00	4253.47	468.00	0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2365E+04 EXCESS=0.0000E+00 OUTFLOW=0.2361E+04 BASIN STORAGE=0.3538E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC4/FC	MANE	1.15	3529.96	470.29	0.44	6.00	3529.49	468.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1952E+04 EXCESS=0.0000E+00 OUTFLOW=0.1949E+04 BASIN STORAGE=0.3320E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC4/FC	MANE	1.20	2888.80	471.04	0.36	6.00	2888.33	474.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1598E+04 EXCESS=0.0000E+00 OUTFLOW=0.1594E+04 BASIN STORAGE=0.3112E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

RRCHANNL	MANE	5.97	0.16	463.63	0.87	6.00	0.16	462.00	0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95

RRCHANNL	MANE	5.97	0.12	484.09	0.71	6.00	0.12	486.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85

RRCHANNL	MANE	6.00	0.09	550.79	0.57	6.00	0.09	552.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06

AC1/AC2	MANE	0.62	7734.44	468.74	0.79	6.00	7734.33	468.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4713E+04 EXCESS=0.0000E+00 OUTFLOW=0.4709E+04 BASIN STORAGE=0.3515E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC1/AC2	MANE	0.64	6469.86	469.13	0.64	6.00	6468.73	468.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3828E+04 EXCESS=0.0000E+00 OUTFLOW=0.3825E+04 BASIN STORAGE=0.2868E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC1/AC2	MANE	0.67	5326.02	475.43	0.51	6.00	5325.69	474.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3063E+04 EXCESS=0.0000E+00 OUTFLOW=0.3060E+04 BASIN STORAGE=0.2605E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC3	MANE	0.44	7734.12	468.50	0.79	6.00	7733.87	468.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4709E+04 EXCESS=0.0000E+00 OUTFLOW=0.4706E+04 BASIN STORAGE=0.2607E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC3	MANE	0.52	6468.60	469.24	0.64	6.00	6467.53	468.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3825E+04 EXCESS=0.0000E+00 OUTFLOW=0.3823E+04 BASIN STORAGE=0.2143E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC3	MANE	0.46	5325.53	474.67	0.51	6.00	5325.12	474.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3061E+04 EXCESS=0.0000E+00 OUTFLOW=0.3059E+04 BASIN STORAGE=0.1946E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC4	MANE	0.54	7733.59	469.15	0.79	6.00	7733.10	468.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4706E+04 EXCESS=0.0000E+00 OUTFLOW=0.4703E+04 BASIN STORAGE=0.3175E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC4	MANE	0.51	6467.52	469.28	0.64	6.00	6467.33	474.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3823E+04 EXCESS=0.0000E+00 OUTFLOW=0.3820E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC4	MANE	0.57	5325.02	475.24	0.51	6.00	5324.25	474.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3059E+04 EXCESS=0.0000E+00 OUTFLOW=0.3057E+04 BASIN STORAGE=0.2368E+01 PERCENT ERROR= 0.0

*** NORMAL END OF HEC-1 ***

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)*
*         FEBRUARY 1991             *
*          VERSION 4.0.1 (LOCAL)    *
*                                   *
*  RUN DATE  05/10/96  TIME  16:22:53*
*                                   *
*************************************
```


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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 551-1748           *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X       XX
X     X  X        X             X
XXXXXXX  XXXX     X       XXXXX X
X     X  X        X             X
X     X  X        X     X       X
X     X  XXXXXXX   XXXXX        XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT *INFILTRATION*
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID          FEMA FLOOD INSURANCE STUDY, 1996
    2         ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
    3         ID          LOWER CENTRAL VALLEY 500-YEAR STORM
    4         ID
    5         ID          Current (05/96) model based on a HEC-1 model prepared by James M
    6         ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
    7         ID          Study *Hydrology Report* dated 9/91.  Three modifications were made
    8         ID          to the source model.  First, Upper Las Vegas Detention Basin storage
    9         ID          and outflow characteristics were revised to reflect the as-built
   10         ID          configuration described by construction drawings dated 5/91 and HEC-1
   11         ID          models prepared in 1993 by *Black & Veatch*.  Second, the stage-outflow
   12         ID          relationship for the North Las Vegas Detention Basin was revised
   13         ID          to reflect the current three-pipe outlet condition (two of the five
   14         ID          pipes were blocked following construction of the upper basin) and the
   15         ID          hydraulic control created by the *4-foot high barrier* wall located
   16         ID          upstream from the pipe inlets.  Third, the source 100-year model
   17         ID          was converted to reflect 500-year conditions by replacing all PB
   18         ID          cards with 500-year amounts.  500-year rainfall amounts were
   19         ID          determined for each subbasin by *frequency extrapolation of the*
   20         ID          amounts presented by JMM in the 10-, 50-, and 100-year Lower Central
   21         ID          Valley Storm models.
   22         ID
   23         ID          Remaining comments are from the original model dated *1/91*.
   24         ID
   25         ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
   26         ID          Northern Las Vegas Wash - FIS FLOWS
   27         ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
   28         ID
   29         ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
   30         ID          *Lower Central* Valley 100-Year Storm, Existing Conditions
   31         ID          Additional subareas and facilities from Wallace, 7/88 (BAP.H1) & 8/88
   32         ID          (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
   33         ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
   34         ID
   35         ID          All routing steps immediately d/s of a diversion converted to
   36         ID          Muskingum routing to avoid zero flow, 8/90
   37         ID
   38         ID          Gowan-North & *Gowan-South Detention Basins* & Outfall Channel, Buffalo
   39         ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
   40         ID          Channel and Hualapai Diversion included, 8/90
   41         ID
   42         ID          This data file models DARF's at *certain locations where* FIS flows are
   43         ID          required.  The original B&V data file used a factor of 0.62; ratios
   44         ID          of this factor are used in the JR card to model DA's at the points
   45         ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
   46         ID
   47         ID           PT OF                AREA          DARF      DARF/0.62     RATIO
   48         ID          INTEREST             (SQ MI)
   49         *ID*
   50         ID     RRBRIDGE, NC5, & 304    60.7 - 64.5      0.66        1.06          1
   51         ID          ACHANNL              111.6          0.59        0.95          2
   52         ID          NCHANNL              172.2          0.53        0.85          3
   53         ID
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*** FREE ***

1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   54         IT      6       0       0     200
   55         IO      5       0       0
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 56          IN      5       0       0
 57          JR    PREC    1.06    0.95    0.85

 58          KK     112
 59          KM   RUNOFF FROM SUBBASIN 112
 60          BA   5.333
 61          PB    2.63
 62          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
 63          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
 64          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
 65          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
 66          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
 67          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
 68          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
 69          PC    .997    .999   1.00
 70          LS      0      82
 71          UD    .462

 72          KK     119
 73          KM   RUNOFF FROM SUBBASIN 119
 74          BA   2.719
 75          PB    2.84
 76          LS      0      82
 77          UD    .346

 78          KK      .
 79          KM   COMBINE SUBBASINS 112 & 119
 80          HC      2

 81          KK     120
 82          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
 83          RM      3    0.27    0.15

 84          KK  125UDB
 85          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
 86          RM      5    0.53    0.15

 87          KK     117
 88          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
 89          RM      4    0.43    0.15

 90          KK     118
 91          KM   RUNOFF FROM SUBBASIN 118
 92          BA   5.079
 93          PB    2.43
 94          LS      0      84
 95          UD    .233
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 96          KK     117
 97          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
 98          RM      1    0.13    0.15

 99          KK      V
100          RM      3    0.25    0.15

101          KK      V
102          RM      4    0.37    0.15

103          KK     117
104          KM   RUNOFF FROM SUBBASIN 117
105          BA   7.366
106          PB    2.23
107          LS      0      78
108          UD   1.699

109          KK      .
110          KM   COMBINE SUBBASINS 112, 117, 118, & 119
111          HC      3

112          KK   ULWDB
             *  *** lines from 1/91 model removed 5/96
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
113          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
114          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
115          RS      1    STOR      -1
116          SV      0      12      80     170     320     560    1000    1610    1800    1980
117          SV   2150    2330    2500    2690    2900    3100    3600    4950    6680
118          SE   2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
119          SE   2373    2374    2375    2376    2377    2378    2380    2385    2390
120          SQ      0     600    1700    2300    2800    3300    3750    4100    4170    4240
121          SQ   6200    9960   15150   21140   28320   36220   54120  110170  180730

122          KK     116
123          KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
124          RM      5    0.50    0.15

125          KK     111
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126          KM   RUNOFF FROM SUBBASIN 111
127          BA    4.08
128          PB    2.54
129          LS       0       84
130          UD    .239
                                        HEC-1 INPUT                                        PAGE  4
1
          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


131          KK     116
132          KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
133          RM       1     0.10     0.15

134          KK       V
135          RM       2     0.21     0.15

136          KK     116
137          KM   RUNOFF FROM SUBBASIN 116
138          BA   5.189
139          PB    2.13
140          LS       0       78
141          UD   1.418

142          KK       .
143          KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
144          HC       3

145          KK     109
146          KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
147          RM       4     0.42     0.15

148          KK     110
149          KM   RUNOFF FROM SUBBASIN 110
150          BA   2.945
151          PB    2.38
152          LS       0       86
153          UD    .237

154          KK     109
155          KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
156          RM       1     0.09     0.15

157          KK       V
158          RM       2     0.19     0.15

159          KK     109
160          KM   RUNOFF FROM SUBBASIN 109
161          BA   4.183
162          PB    2.13
163          LS       0       78
164          UD   1.281

165          KK       .
166          KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
167          HC       3

168          KK     101
169          KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
170          KM   THRU SUBBASIN 101
171          RM       5     0.54     0.15
                                        HEC-1 INPUT                                        PAGE  5
1
          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


172          KK     103
173          KM   RUNOFF FROM SUBBASIN 103
174          BA   6.195
175          PB    2.58
176          LS       0       84
177          UD    .324

178          KK     102
179          KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
180          RM       1     0.11     0.15

181          KK     102
182          KM   RUNOFF FROM SUBBASIN 102
183          BA   8.455
184          PB    2.38
185          LS       0       83
186          UD    .369

187          KK       .
188          KM   COMBINE SUBBASINS 102 & 103
189          HC       2

190          KK     101
191          KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
192          RM       1     0.11     0.15

193          KK       V
194          RM       2     0.22     0.15

195          KK     101
196          KM   RUNOFF FROM SUBBASIN 101
197          BA   9.082
198          PB    2.13
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          199          LS       0      77
          200          UD   1.505

          201          KK   NLVIN
          202          KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
          203          HC       3

          204          KK       .
          205          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          206          DT DIVDIKE
          207          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          208          DI   17775   20135   23000
          209          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          210          DQ    6775    8635   11000

          211          KK  NLVDET
          212          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
          213          KM    117, 118, & 119 THRU NLV DETENTION BASIN
          214          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          215          RS       1    STOR      -1
          216          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                                HEC-1 INPUT                                          PAGE  6

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          217          SV    1650    1825    1920    2000    2110    2200    2310    2430
          218          SE       0       2       4       6      10      14      21      24      26      27
          219          SE      28      30      31      32      33      34      35      36
                       *  *** lines from 1/91 model removed 5/96
                       * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
                       * SQ 4180 5968 7095 8334 9676 11101 12630 14294
          220          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          221          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          222          KK       .
          223          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          224          DR DIVDIKE

          225          KK       .
          226          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          227          HC       2

          228          KK     303
          229          KM   ROUTE OUTFLOW THRU SUBBASIN 303
          230          RM      13    1.28    0.15

          231          KKRRBRIDGE
          232          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
          233          DTRRCHANNL
          234          DI       0    6000   20000
          235          DQ       0       0   13500

          236          KK     I15
          237          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
          238          DT   KCHAR
          239          DI       0    1000   10000
          240          DQ       0     800    8000

          241          KK     NC1
          242          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
          243          RK     700  0.0058   0.016       0    TRAP      10       2

          244          KK       V
          245          RK    2000  0.0100   0.035       0    TRAP      30       2

          246          KK     NC2
          247          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
          248          KM   TO GOWAN AVE.
          249          RK    1300   .0056    .030       0    TRAP      12       2

          250          KK     NC3
          251          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
          252          KM   TO CHEYENNE AVE.
          253          RK    2600   .0021    .030       0    TRAP      20     2.5
1                                                HEC-1 INPUT                                          PAGE  7

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          254          KK     NC4
          255          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
          256          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
          257          RK    1300    .003    .016       0    TRAP      18       2

          258          KK     NC5
          259          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
          260          KM   TO "A" CHANNEL (LINED CHANNEL)
          261          RK     500    .001    .016       0    TRAP      18       2
          262          KK   ********************** BEGIN GOWAN MODEL (by others) **********************

          263          KK    AP.1
          264          KM       Begin subareas tributary to Gowan-South Detention Basin
          265          KM       Begin subareas tributary to Angel Park Detention Basin
          266          KM       From Wallace Angel Park Model
          267          BA   0.001
          268          PB    2.71
          269          LS       0      89
          270          UD    0.62
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271          KK       V
272          KM   Route AP.1
273          RM       7    0.67    0.15

274          KK    AP.2
275          KM   One-third of subbasin AP.2
276          KM   From Wallace Angel Park Model
277          BA   0.853
278          PB    2.54
279          LS       0       87
280          UD   0.363

281          KK       .
282          KM   Combine AP.1 & AP.2
283          HC       2

284          KK       V
285          RM      11    1.06    0.15

286          KK    AP.3
287          BA    3.62
288          PB    2.42
289          LS       0       89
290          UD    2.41

291          KK    AP.4
292          KM   From Wallace Angel Park Model
293          BA   0.001
294          PB    2.29
295          LS       0       89
296          UD    1.03
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

297          KK       .
298          KM   Combine AP.1, AP.2, AP.3, AP.4
299          HC       3

300          KK    AP.5
301          KM   From Wallace Angel Park Model
302          BA   0.001
303          PB    2.71
304          LS       0       89
305          UD    0.39

306          KK       V
307          KM   Route AP.5
308          RM       8    0.82    0.15

309          KK    AP.6
310          BA   0.001
311          PB    2.71
312          LS       0       88
313          UD    0.75

314          KK       .
315          KM   Combine AP.5 & AP.6
316          HC       2

317          KK       V
318          KM   Route AP.5 & AP.6
319          RM       7    0.66    0.15

320          KK    AP.7
321          KM      One-half of subbasin AP.7
322          BA    1.02
323          PB    2.33
324          LS       0       86
325          UD    0.59

326          KK   N_CHN
327          KM   COMBINE NORTH CHANNEL FLOWS
328          HC       2

329          KK    GD.1
330          KM   Begin subareas tributary to Hualapai Diversion
331          KM   From VTN (PB & CN from B&V-La Madre)
332          BA   0.001
333          PB    2.82
334          LS       0       87
335          UD    0.62

336          KK       V
337          KM   Route GD.1
338          RM       2    0.24    0.15
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

339          KK       V
340          KM   Routing Cont'd
341          RM       3    0.27    0.15

342          KK    GD.2
343          KM   From VTN
344          BA   0.001
```

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345          PB    2.60
346          LS       0      89
347          UD    0.83

348          KK
349          KM   Combine GD.1 & GD.2
350          HC       2

351          KK  TO_DIV
352          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
353          RM       3    0.34    0.15

354          KK    GD.3(=AP.12)
355          KM   From VTN
356          BA    0.80
357          PB    2.46
358          LS       0      87
359          UD    0.32

360          KKHUALAPAI
361          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
362          HC       2

363          KK     HUA& NO.CH
364          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
365          HC       2

366          KK       V
367          KM   Route Combined Flows
368          RK    5500    .023     .04       0    TRAP     100       2

369          KK       V
370          KM   Routing Cont'd
371          RK    4500    .004     .03       0    TRAP      30       4

372          KK    AP.8
373          BA    0.93
374          PB    2.41
375          LS       0      89
376          UD    0.62

377          KK     BOX
378          KM   SUMMERLIN PARKWAY CULVERT
379          HC       2
```

1 HEC-1 INPUT PAGE 10

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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

380          KK       V
381          KM   ROUTE TO ANGEL PARK DETENTION BASIN
382          RK    3000    .027     .04       0    TRAP     100       2

383          KK    AP.9
384          BA    0.68
385          PB    2.29
386          LS       0      89
387          UD     .83

388          KK  N_CHAN
389          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
390          HC       2

391          KKANGEL.PK
392          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
393          HC       2

394          KKSPILLWAY
395          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
396          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
397          RS       1    STOR      -1
398          SV       0       3      22      45      80     125     190     270     369     492
399          SV     630     780     942    1115    1209
400          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
401          SE    2616    2618    2620    2622    2623
402          SL  2592.5    3.14     0.6     0.5
403          SS  2619.1    1275     3.2     1.5

404          KKAP_TO_VEGAS/PIONEER
405          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
406          KM   From VTN
407          RK    7500    0.03   0.012       0    CIRC       5       0

408          KKBUFFALO_1
409          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
410          RK    1500    0.02    0.03       0    TRAP      20       4

411          KK    GD.7
412          KM   INTERSECTION OF LAKE MEAD & BUFFALO
413          BA    1.13
414          PB    2.29
415          LS       0      89
416          UD    1.38

417          KKBUFFALO_1
418          KM   Combine GD.7 W/ Buffalo Channel
419          HC       2
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1 HEC-1 INPUT PAGE 11

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

420       KKBUFFALO_2
421       KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
422       RK    5000   0.005   0.025       0    TRAP      30       4

423       KK    GD.4
424       KM   From B&V-La Madre
425       BA   0.001
426       PB    2.60
427       LS       0      88
428       UD    0.62

429       KK       V
430       KM   ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
431       RM       7    0.74    0.15

432       KK    GD.5
433       BA    3.31
434       PB    2.41
435       LS       0      86
436       UD    1.38

437       KK       .
438       KM   Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
439       HC       2

440       KK       V
441       KM   ROUTE NORTH ALONG RAMPART
442       RM       4    0.43    0.15

443       KK    GD.6
444       KM   DEL WEBB-SUN CITY SUMMERLIN
445       BA    1.6
446       PB    2.25
447       LS       0      86
448       UD     .96

449       KK       .
450       KM   Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
451       HC       2

452       KK       V
453       KM   ROUTE TO BUFFALO along Cheyenne Channel
454       RK    5500    .015    .015       0    TRAP      20       2

455       KK    GD.8
456       KM   R.A. HOMES-DESERT SHORES
457       BA    1.53
458       PB    2.17
459       LS       0      85
460       UD    1.11
1                                    HEC-1 INPUT                                    PAGE 12

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

461       KK       .
462       KM   INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
463       HC       2

464       KK   GD.34
465       KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
466       BA    3.84
467       PB    2.17
468       LS       0      84
469       UD    1.72

470       KKGOWAN_SOUTH
471       KM   TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
472       HC       3

473       KK  DET.GS
474       KM   Gowan-South Detention Basin data from VTN
475       RS       1    STOR      -1
476       SV       0     9.8     113     435     454     680
477       SE    2326    2330    2340  2349.6    2350    2354
478       SQ       0     112     328     455     459   30700

479       KK R.GSOUT
480       KM   ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
481       RK    3200   0.007   0.012       0    CIRC       5       0

482       KK    GD.9
483       KM   Begin subareas tributary to Gowan-North Detention Basin
484       KM   From B&V-LaMadre
485       BA   0.001
486       PB    2.71
487       LS       0      89
488       UD    0.30

489       KK       V
490       RM       5    0.52    0.15

491       KK   GD.10
492       KM   From B&V-LaMadre
493       BA   0.001
494       PB    2.41
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495         LS       0      88
496         UD    0.90

497         KK        .
498         KM    Combine GD.9 & GD.10
499         HC        2

500         KK        V
501         KM    ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
502         RM        6    0.61    0.15
```



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LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

503         KK        V
504         KM    Routing Cont'd
505         RM        7    0.74    0.15

506         KK    GD.11
507         KM    From B&V-LaMadre
508         BA     3.17
509         PB     2.25
510         LS        0      85
511         UD     2.44

512         KK        .
513         KM    INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
514         HC        2

515         KK    GD.33
516         KM    From Wallace EPT.H1
517         BA    0.001
518         PB     2.41
519         LS        0      89
520         UD      3.5

521         KK  RANCHO
522         KM    DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
523         KM    From Wallace
524         DTCULVERTS
525         DI        0    1545    3129    4000    8000
526         DQ        0    1545    1545    2416    6416

527         KK        V
528         KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
529         KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
530         RM        2    0.15    0.15

531         KK  GD.32C
532         KM    One-half of subbasin GD.32C
533         BA    0.365
534         PB     2.38
535         LS        0      86
536         UD     0.27

537         KK        .
538         KM    Combine GD.32 & GD.33
539         HC        2

540         KK  RANCHO
541         KM    DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
542         KM    From Wallace
543         DTCULVERTS
544         DI        0     900    2484    4000    8000
545         DQ        0     900     900    2416    6416
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LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

546         KK        V
547         KM    ROUTE SOUTH ALONG WEST SIDE OF HWY 95
548         KM    Convert from kinematic wave to Muskingum routing to avoid zero flow
549         RM        1    0.14    0.15

550         KK    GD.30
551         KM    From Wallace
552         KM    LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
553         BA    0.001
554         PB     2.85
555         LS        0      80
556         UD     2.69

557         KK        V
558         KM    ROUTE WEST TO RANCHO (HWY 95)
559         RM       12    1.23    0.15

560         KK  GD.31B
561         KM    One-half of subbasin GD.31B
562         BA    0.665
563         PB     2.37
564         LS        0      81
565         UD     0.97

566         KK        .
567         KM    Combine GD.30 - GD.33
568         HC        3
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569          KK  RANCHO
570          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
571          DTCULVERTS
572          DI       0     520    1889    4000    8000
573          DQ       0     520     520    2631    6631

574          KK       V
575          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
576          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
577          RM       1    0.14    0.15

578          KK   GD.28
579          KM   From Wallace
580          BA   0.001
581          PB    2.23
582          LS       0      77
583          UD    2.52

584          KK       .
585          KM   Combine GD.28 & GD.30 - GD.33
586          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

587          KK  RANCHO
588          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
589          DTCENTNIAL
590          DI       0    1040    5456    8000
591          DQ       0    1040    1040    3585

592          KK       V
593          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
594          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
595          RM       1    0.07    0.15

596          KK   GD.25
597          KM   From Wallace
598          BA   0.001
599          PB    2.53
600          LS       0      89
601          UD    1.09

602          KK       V
603          RM       7    0.69    0.15

604          KK   GD.26
605          KM   From Wallace
606          BA   0.001
607          PB    2.35
608          LS       0      78
609          UD    1.23

610          KK       .
611          KM   Combine GD.25 & GD.26
612          HC       2

613          KK       V
614          KM   ROUTE WEST TO ANN ROAD AND HWY 95
615          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
616          RM       4    0.43    0.15

617          KK       V
618          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
619          RM       5    0.49    0.15

620          KK   GD.27
621          KM   From Wallace
622          BA    1.13
623          PB    2.26
624          LS       0      78
625          UD    1.61

626          KK       .
627          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
628          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

629          KK       V
630          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
631          RK    3000   0.009   0.025       0    TRAP      50       3

632          KK       V
633          RK    3000   0.004   0.022       0    TRAP      25       8

634          KK   GD.29
635          KM   From Wallace
636          BA    0.76
637          PB    2.26
638          LS       0      77
639          UD    1.49

640          KK       V
641          RK    8000    0.01   0.025       0    TRAP      20       8
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642          KK    PDGC
643          KM   PAINTED DESERT GOLF COURSE
644          KM   From Wallace
645          BA    0.53
646          PB    2.17
647          LS       0       80
648          UD     1.2

649          KK        .
650          KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
651          HC        3

652          KK  RANCHO
653          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
654          DTP.DESERT
655          DI        0      233     1318     8000
656          DQ        0      233      233     6915

657          KK        V
658          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
659          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
660          RM        1     0.14     0.15

661          KK   GD.21
662          KM   From Wallace
663          BA   0.001
664          PB    2.71
665          LS       0       89
666          UD    0.72

667          KK        V
668          RM        8     0.81     0.15
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

669          KK   GD.22
670          KM   From Wallace
671          BA   0.001
672          PB    2.49
673          LS       0       86
674          UD     1.5

675          KK   GD.23
676          KM   From Wallace
677          BA   0.001
678          PB    2.53
679          LS       0       86
680          UD    1.41

681          KK        .
682          KM   Combine GD.21 - GD.23
683          HC        3

684          KK        V
685          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
686          RM        7     0.65     0.15

687          KK   GD.24
688          KM   From Wallace
689          BA    0.64
690          PB    2.23
691          LS       0       77
692          UD     1.2

693          KK        .
694          KM   Combine GD.21 - GD.24
695          HC        2

696          KK        V
697          KM   ROUTE WEST TO HWY 95
698          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
699          RM        7     0.65     0.15

700          KK   GD.18
701          KM   From Wallace
702          BA   0.001
703          PB    2.66
704          LS       0       89
705          UD    0.31

706          KK        V
707          RM        6     0.62     0.15

708          KK   GD.19
709          KM   From Wallace
710          BA   0.001
711          PB    2.39
712          LS       0       82
713          UD    1.24
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

714          KK        .
715          KM   Combine GD.18 & GD.19
716          HC        2
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```
717          KK       V
718          KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
719          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
720          RM       9    0.88    0.15

721          KK   GD.20
722          KM   From Wallace
723          BA    2.35
724          PB    2.17
725          LS       0      82
726          UD    2.51

727          KK       .
728          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
729          HC       4

730          KK  HWY.95
731          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
732          DT   CRAIG
733          DI       0     465    2056   10000
734          DQ       0     465     465    8409

735          KK       V
736          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
737          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
738          RM       1    0.07    0.15

739          KK   GD.15
740          KM   From Wallace
741          BA   0.001
742          PB    2.71
743          LS       0      88
744          UD    0.48

745          KK       V
746          RM       7    0.74    0.15

747          KK   GD.16
748          KM   From Wallace
749          BA   0.001
750          PB    2.62
751          LS       0      82
752          UD    1.63

753          KK       .
754          HC       2
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

755          KK       V
756          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
757          RM      10    1.01    0.15

758          KK   GD.17
759          KM   From Wallace
760          BA    0.56
761          PB    2.41
762          LS       0      80
763          UD     2.0

764          KK       .
765          KM   Combine GD.15 - GD.17
766          HC       3

767          KK   HWY95
768          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
769          DTALEXANDR
770          DI       0     155    1746   10000
771          DQ       0     155     155    8409

772          KK       V
773          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
774          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
775          RM       1    0.11    0.15

776          KK   GD.12
777          KM   From Wallace
778          BA   0.001
779          PB    2.69
780          LS       0      89
781          UD     0.3

782          KK       V
783          RM       4    0.42    0.15

784          KK   GD.13
785          KM   From Wallace
786          BA   0.001
787          PB    2.62
788          LS       0      86
789          UD    1.10

790          KK       .
791          KM   Combine GD.12 & GD.13
792          HC       2
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          793          KK       V
          794          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          795          RM       4     0.43     0.15
1                                          HEC-1 INPUT                                          PAGE 20

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          796          KK       V
          797          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          798          RM      11     1.06     0.15

          799          KK  GD.14A
          800          KM   From Wallace
          801          BA    1.71
          802          PB    2.29
          803          LS       0       81
          804          UD    0.88

          805          KK       .
          806          KM   Combine GD.12, GD.13 & GD.14A
          807          HC       2

          808          KK       V
          809          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          810          RM       5     0.53     0.15

          811          KK  GD.14B
          812          KM   From Wallace
          813          BA    0.68
          814          PB    2.15
          815          LS       0       83
          816          UD    1.67

          817          KK       .
          818          KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
          819          HC       3

          820          KK   GN_IN
          821          KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
          822          HC       3

          823          KK  DET.GN
          824          KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
          825          KM   From VTN
          826          RS       1     STOR       -1
          827          SV       0       28       46      113      774      805     1163
          828          SE    2308     2311     2312     2314     2324   2325.5     2329
          829          SQ       0        0      126      251      519      539    35800

          830          KKR.G-UPS.
          831          KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
          832          RK    2000    0.005    0.013        0     CIRC        6        0

          833          KK       V
          834          KM   Route Gowan outflow along Gowan Outfall Channel
          835          RK    7000    0.009    0.015        0     TRAP       10        0
1                                          HEC-1 INPUT                                          PAGE 21

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          836          KK       .
          837          KM   Recall flow diverted at Craig Road
          838          DR   CRAIG

          839          KK       V
          840          KM   Route to Rancho
          841          RM       4     0.42     0.15

          842          KK       .
          843          KM   Recall flow diverted at Alexander
          844          DRALEXANDR

          845          KK       V
          846          KM   Route to Rancho
          847          RM       9     0.92     0.15

          848          KK       .
          849          KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
          850          KM   at Rancho
          851          HC       3

          852          KK       V
          853          KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
          854          KM   App. F)
          855          RK    8400    0.007    0.015        0     TRAP       10        0

          856          KK       V
          857          KM   Routing Cont'd
          858          RK    4000    0.005    0.015        0     TRAP       10        0

          859          KK       V
          860          KM   Routing Cont'd
          861          RK    4000    0.005    0.015        0     TRAP       10        0

          862          KK       .
          863          KM   Begin modeling of subareas on the east side of Rancho Road
          864          KM   Recall flow diverted at Centenial
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865          DRCENTNIAL

866          KK       .
867          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
868          RM      20     2.03     0.15

869          KK   EPT.1
870          BA    3.76
871          PB    2.22
872          LS       0       85
873          UD    3.36
1                                        HEC-1 INPUT                                        PAGE 22

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


874          KK       .
875          KM   Combine EPT.1 & flow diverted at Centenial
876          HC       2

877          KK       V
878          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
879          RM       8     0.76     0.15

880          KK       .
881          KM   Recall flow diverted at Painted Desert
882          DRP.DESERT

883          KK       V
884          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
885          RM      20     2.03     0.15

886          KK   EPT.3
887          BA   4.391
888          PB    2.22
889          LS       0       88
890          UD    3.67

891          KK       .
892          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
893          HC       3

894          KK   EPT.4
895          BA   1.372
896          PB    2.22
897          LS       0       89
898          UD     2.7

899          KK       V
900          RM       9     0.88     0.15

901          KK       .
902          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
903          KM   Gowan Outfall Channel
904          HC       2

905          KK       .
906          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
907          KM   Alexander, Painted Desert & Centenial
908          HC       2

909          KK   EPT.5
910          BA   3.005
911          PB    2.22
912          LS       0       87
913          UD     4.7
1                                        HEC-1 INPUT                                        PAGE 23

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


914          KK       .
915          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
916          KM   Alexander, Painted Desert & Centenial
917          HC       2

918          KK       V
919          RK   10000     .013     .015        0     TRAP       10        0

920          KK   EPT.2
921          BA   1.492
922          PB    2.22
923          LS       0       85
924          UD    2.51

925          KK  LVWASH
926          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
927          HC       2
928          KM   ********************************* END GOWAN MODEL *********************************

929          KKGOWANDIV
930          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
931          DRCULVERTS

932          KK     301
933          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
934          RM      22     2.17     0.15

935          KK     301
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936          KM   RUNOFF FROM SUBBASIN 301
937          BA  18.616
938          PB   2.43
939          LS      0      85
940          UD    4.3

941          KK WTRIBUS
942          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
943          HC      2

944          KKWTRIBTOT
945          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
946          HC      2

947          KK    304
948          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
949          RM      3    0.28    0.15

950          KK    SNIC
951          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
952          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
953          RK    3850   .0122   0.016       0    TRAP      20       2
1                                      HEC-1 INPUT                                    PAGE 24

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


954          KK     LBC    .
955          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
956          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
957          RK    2800    .002   0.016       0    TRAP      80       2

958          KK    310W
959          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
960          BA      .8
961          PB    2.19
962          LS      0      87       0       0      87
963          UK    150    .010      .3      38
964          UK    300    .015     .25      62
965          RK   1000   .0075     .02    .013    TRAP      51       0
966          RK   2600   .0075     .02      .2    TRAP      80       0
967          RK   8700   .0150     .02       0    TRAP     100       0

968          KK   R310W
969          KM   ROUTE RUNOFF FROM 310W TO 310E
970          RK  10500    .015     .02       0    TRAP     100       0

971          KK    310E
972          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
973          BA   1.238
974          PB    2.19
975          LS      0      86       0       0      83
976          UK    150     .01      .3      46
977          UK    300    .015     .25      54
978          RK   1000   .0075     .02    .019    TRAP      51       0
979          RK   2000   .0075     .02     .31    TRAP      80       0
980          RK  10500    .015     .02       0    TRAP     100       0

981          KK    310E
982          KM   COMBINE ROUTED 310W WITH 310E
983          HC      2

984          KK   R310E
985          KM   ROUTE FROM 310E TO 311W
986          RK   5300   .0132     .02       0    TRAP     100       0

987          KK    311W
988          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
989          BA     .96
990          PB    2.19
991          LS      0      85       0       0      83
992          UK    150    .010      .3      60
993          UK    300   .0132     .25      40
994          RK    650   .0065     .02     .01    TRAP      51       0
995          RK   2200   .0065     .02     .14    TRAP      80       0
996          RK   5300   .0132     .02       0    TRAP     100       0
1                                      HEC-1 INPUT                                    PAGE 25

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


997          KK    311W
998          KM   COMBINE ROUTED 310E WITH 311W
999          HC      2

1000         KK   R311W
1001         KM   ROUTE FROM 311W TO 311E
1002         RK   7500   .0132     .02       0    TRAP     100       0

1003         KK    311E
1004         KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311
1005         BA     .77
1006         PB    2.19
1007         LS      0      75       0       0      72
1008         UK    150    .010      .3      75
1009         UK    300   .0132     .25      25
1010         RK    650   .0065     .02    .008    TRAP      51
1011         RK   2200   .0065     .02     .11    TRAP      80       0
1012         RK   7500   .0132     .02       0    TRAP     100       0
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1013          KK    311E
1014          KM    COMBINE ROUTED 311W WITH 311E
1015          HC       2

1016          KK    309W
1017          KM    RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1018          BA     .81
1019          PB    2.19
1020          LS       0       71        0        0       70
1021          UK     150      .01       .3       22
1022          UK     300     .0144      .25       78
1023          RK    1000      .007      .02     .013     TRAP       51        0
1024          RK    2600      .007      .02      .20     TRAP       80        0
1025          RK    8700     .0144      .02        0     TRAP      100        0

1026          KK    R309W
1027          KM    ROUTE FROM 309W TO 309E
1028          RK   21000     .0144      .02        0     TRAP      100        0

1029          KK    309E
1030          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1031          BA    1.19
1032          PB    2.19
1033          LS       0       87        0        0       80
1034          UK     150      .01       .3       52
1035          UK     300     .0144      .25       48
1036          RK    1000      .007      .02     .019     TRAP       51        0
1037          RK    2600      .007      .02      .30     TRAP       80        0
1038          RK   21000     .0144      .02        0     TRAP      100        0
1                                        HEC-1 INPUT                                    PAGE 26

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1039          KK    309E
1040          KM    COMBINE ROUTED 309W WITH 309E
1041          HC       2

1042          KK       .
1043          KM    COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1044          HC       2

1045          KK     FCP1
1046          KM    ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1047          KM    TO LAKE MEAD BLVD.
1048          RK      410    .0045     .016        0     CIRC        5        0

1049          KK     FCP2
1050          RK      740    .0048     .016        0     CIRC      5.5        0

1051          KK    FCBC1
1052          RK      800    .0056     .016        0     TRAP        8        0

1053          KK     FC1
1054          RK     1250    .0195     .016        0     TRAP        8        0

1055          KKFCBC2/FC2/FCBC3
1056          KM    COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1057          RK     1430      .03     .016        0     TRAP        7        0

1058          KK    307NW
1059          KM    RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1060          BA    1.33
1061          PB    2.19
1062          LS       0       85        0        0       87
1063          UK     150     .010       .3       32
1064          UK     300     .011      .25       68
1065          RK    1000    .0055      .02     .017     TRAP       51        0
1066          RK    2600    .0055      .02      .27     TRAP       80        0
1067          RK    6400     .011      .02        0     TRAP      100        0

1068          KK   R307NW
1069          KM    ROUTE FROM 307NW TO 307NE
1070          RK    4000     .011      .02        0     TRAP      100        0

1071          KK    307NE
1072          KM    RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1073          BA      .64
1074          PB    2.19
1075          LS       0       87        0        0       87
1076          UK     150     .010       .3       11
1077          UK     300     .011      .25       89
1078          RK    1000    .0055      .02     .013     TRAP       51        0
1079          RK    2600    .0055      .02      .21     TRAP       80        0
1080          RK    4000     .011      .02        0     TRAP      100        0
1                                        HEC-1 INPUT                                    PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1081          KK    307NE
1082          KM    COMBINE ROUTED 307NW WITH 307NE
1083          HC       2

1084          KK       .
1085          KM    COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1086          HC       2
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1087          KK       V
1088          KM    ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1089          RM       4     0.37     0.15

1090          KK    307SW
1091          KM    RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1092          BA      1.1
1093          PB     2.19
1094          LS        0       61        0        0       64
1095          UK      150     .010       .3       16
1096          UK      300     .011      .25       84
1097          RK     1000    .0055      .02      .01     TRAP       51
1098          RK     2200    .0055      .02      .16     TRAP       80
1099          RK     6100     .011      .02        0     TRAP      100        0

1100          KK   R307SW
1101          KM    ROUTE FROM 307SW TO 307SE
1102          RK     7300     .011      .02        0     TRAP      100        0

1103          KK    307SE
1104          KM    RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1105          BA     1.58
1106          PB     2.19
1107          LS        0       85        0        0       87
1108          UK      150      .01       .3       40
1109          UK      300     .011      .25       60
1110          RK     1000    .0055      .02      .01     TRAP       51        0
1111          RK     2200    .0055      .02      .17     TRAP       80        0
1112          RK     7300     .011      .02        0     TRAP      100        0

1113          KK    307SE
1114          KM    COMBINE ROUTED 307SW WITH 307SE
1115          HC       2

1116          KK        .
1117          KM    COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1118          HC       2

1119          KK       V
1120          KM    ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1121          RM       2     0.18     0.15
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1122          KK    308W
1123          KM    RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1124          BA      .81
1125          PB     2.19
1126          LS        0       71        0        0       70
1127          UK      150      .01       .3       19
1128          UK      300    .0134      .25       81
1129          RK     1000     .006      .02     .017     TRAP       51        0
1130          RK     2600     .006      .02      .27     TRAP       80        0
1131          RK     8700    .0134      .02        0     TRAP      100        0

1132          KK   R308W
1133          KM    ROUTE FROM 308W TO 308E
1134          RK     6500    .0134      .02        0     TRAP      100        0

1135          KK    308E
1136          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1137          BA      .72
1138          PB     2.19
1139          LS        0       85        0        0       87
1140          UK      150      .01       .3       59
1141          UK      300    .0134      .25       41
1142          RK     1000     .006      .02     .015     TRAP       51        0
1143          RK     2600     .006      .02      .24     TRAP       80        0
1144          RK     6500    .0134      .02        0     TRAP      100        0

1145          KK    308E
1146          KM    COMBINE ROUTED 308W WITH 308E
1147          HC       2

1148          KK        .
1149          KM    COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1150          HC       2

1151          KKR307/308
1152          KM    ROUTE SUBBASINS 307 & 308 THRU 312W
1153          RK     6100    .0132      .02        0     TRAP      100        0

1154          KK    312W
1155          KM    RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1156          KM    ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1157          BA      .77
1158          PB     2.19
1159          LS        0       81        0        0       80
1160          UK      150      .010       .3       20
1161          UK      300    .0132      .25       80
1162          RK     1000    .0065      .02     .012     TRAP       51        0
1163          RK     2600    .0065      .02     .175     TRAP       80        0
1164          RK     6100    .0132      .02        0     TRAP      100        0
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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1165          KK    312W
1166          KM    COMBINE ROUTED 307 & 308 WITH 312W
1167          HC       2

1168          KK    R312W
1169          KM    ROUTE FROM 312W TO 312E
1170          RK     6100    .0132      .02        0     TRAP      100        0

1171          KK    312E
1172          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1173          BA       .7
1174          PB     2.19
1175          LS        0       79        0        0       76
1176          UK      150     .010       .3       50
1177          UK      300    .0132      .25       50
1178          RK      500    .0065      .02     .012     TRAP       51        0
1179          RK     2600    .0065      .02     .175     TRAP       80        0
1180          RK     6100    .0132      .02        0     TRAP      100        0

1181          KK    312E
1182          KM    COMBINE ROUTED 312W WITH 312E
1183          HC       2

1184          KK     306
1185          KM    RUNOFF FROM SUBBASIN 306
1186          BA    5.073
1187          PB     2.19
1188          LS        0       84
1189          UD     3.02

1190          KK
1191          KM    COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1192          HC       3

1193          KK     FC3
1194          KM    ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1195          KM    TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1196          RK      900    .0012      .016        0     TRAP       10      1.5

1197          KK FC4/FC5
1198          RK      600  0.0012    0.016        0     TRAP       24      1.5

1199          KK     FC6
1200          RK     5150    .0011      .016        0     TRAP       16      1.5

1201          KK     FC7
1202          RK     2400    .0010      .016        0     TRAP       20      1.5

1203          KKFCBC4/FC8
1204          KM    COMBINE FCBC4 & FC8 ROUTING STEPS
1205          RK     3475    .0012      .016        0     TRAP       20      1.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


1206          KK     302
1207          KM    RUNOFF SUBBASIN 302
1208          BA   12.213
1209          PB     2.19
1210          LS        0       86
1211          UD      3.1

1212          KK     303
1213          KM    ROUTE SUBBASIN 302 THRU SUBBASIN 303
1214          RM        8     0.83     0.15

1215          KK     303
1216          KM    RUNOFF FROM 303
1217          BA   10.217
1218          PB     2.19
1219          LS        0       84
1220          UD     4.24

1221          KK
1222          KM    COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1223          HC       2

1224          KK     304
1225          KM    RUNOFF FROM SUBBASIN 304
1226          BA    2.903
1227          PB     2.16
1228          LS        0       86
1229          UD     1.98

1230          KK     305
1231          KM    RUNOFF FROM SUBBASIN 305
1232          BA    3.298
1233          PB     2.19
1234          LS        0       87
1235          UD     1.49

1236          KK
1237          KM    COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1238          HC       2

1239          KKRRBRIDGE
1240          DRRRCHANNL
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          1241          KKDUMMY_AREA
          1242          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
          1243          BA   0.001
          1244          PB    2.00
          1245          LS       0       80
          1246          UD    1.00
1                                                  HEC-1 INPUT                                                    PAGE 31

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          1247          KKDUMMY_COMBINE
          1248          KM   Combine dummy subarea with recalled RRCHANNEL diversion
          1249          HC       2

          1250          KKRRCHANNL
          1251          RK    4900    .0041     .03       0    TRAP      40       2

          1252          KK    I-15
          1253          DR   KCHAR

          1254          KKDUMMY_AREA
          1255          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1256          BA   0.001
          1257          PB    2.00
          1258          LS       0       80
          1259          UD    1.00

          1260          KKDUMMY_COMBINE
          1261          KM   Combine dummy subarea with recalled KCHAR diversion
          1262          HC       2

          1263          KK ACHANNL
          1264          KM   COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1265          HC       5

          1266          KK AC1/AC2
          1267          KM   COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1268          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1269          RK    2350  0.0074   0.035       0    TRAP      30       2

          1270          KK     AC3
          1271          RK    1600    .0065     .030       0    TRAP      52     1.5

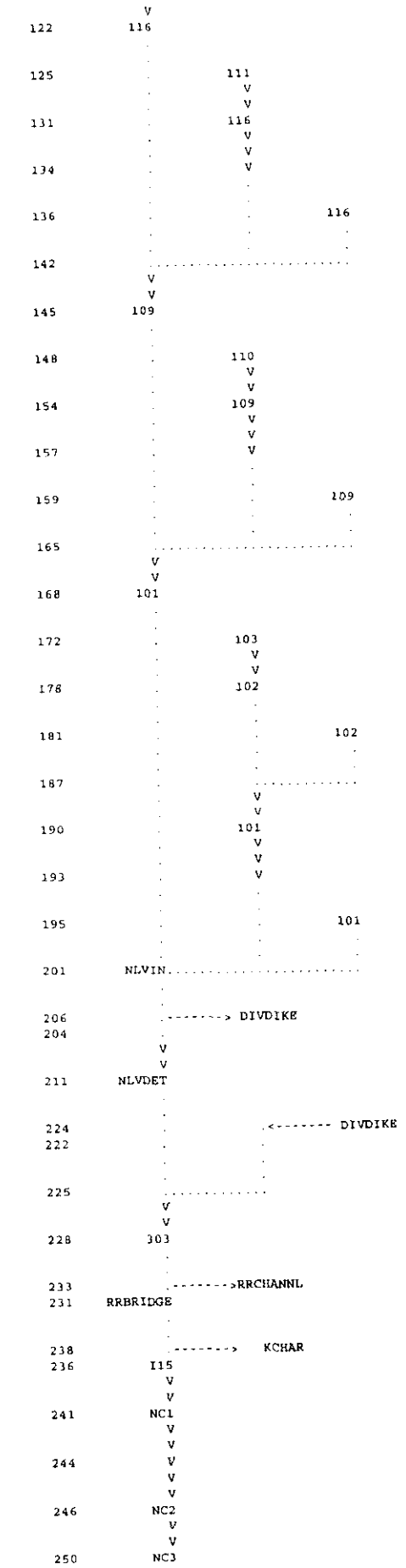
          1272          KK     AC4
          1273          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1274          RK    1650    .0053     .030       0    TRAP      70     1.5

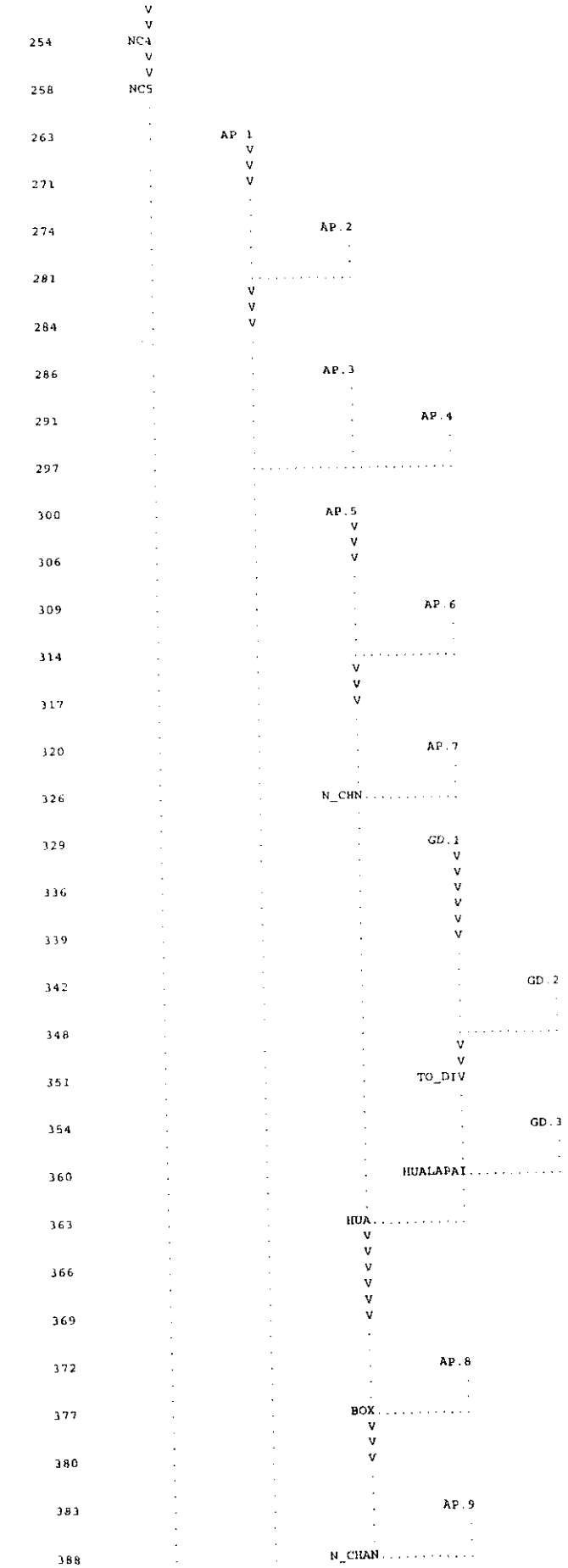
          1275          KK NCHANNL
          1276          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1277          HC       2
                        * Truncate this run at NCHANNL
          1278          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

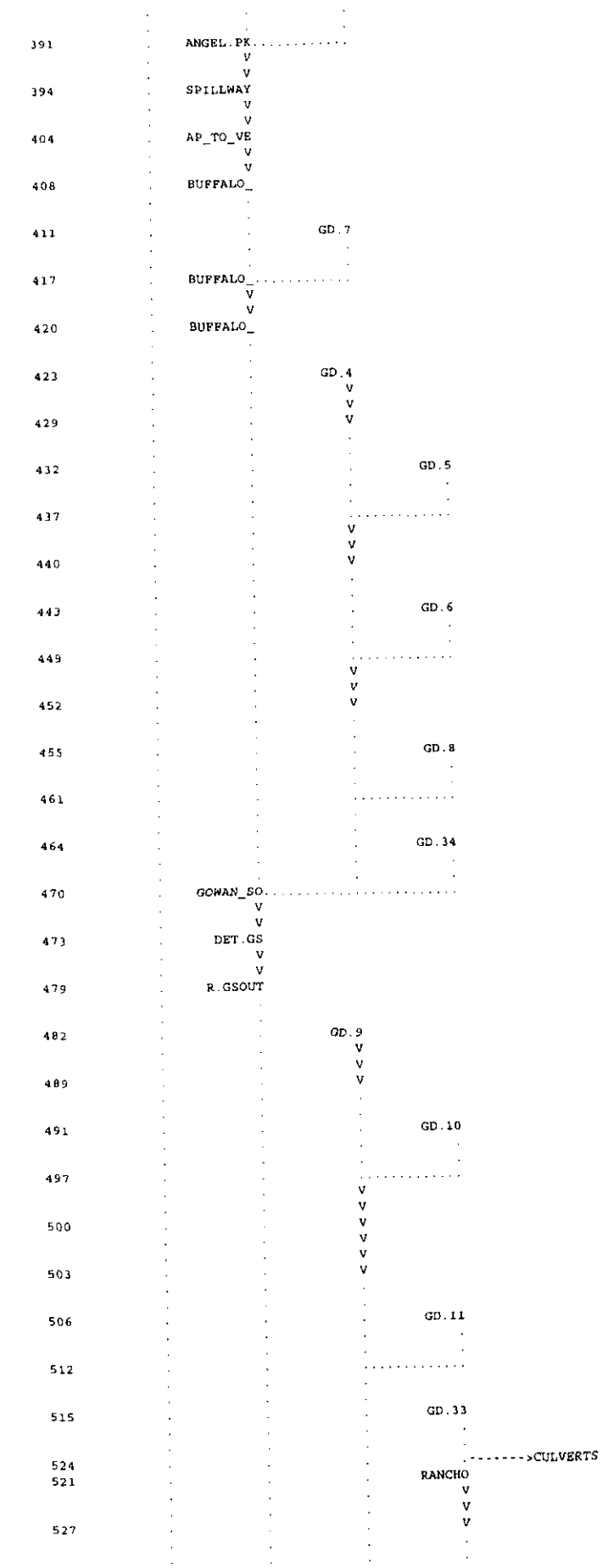
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  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

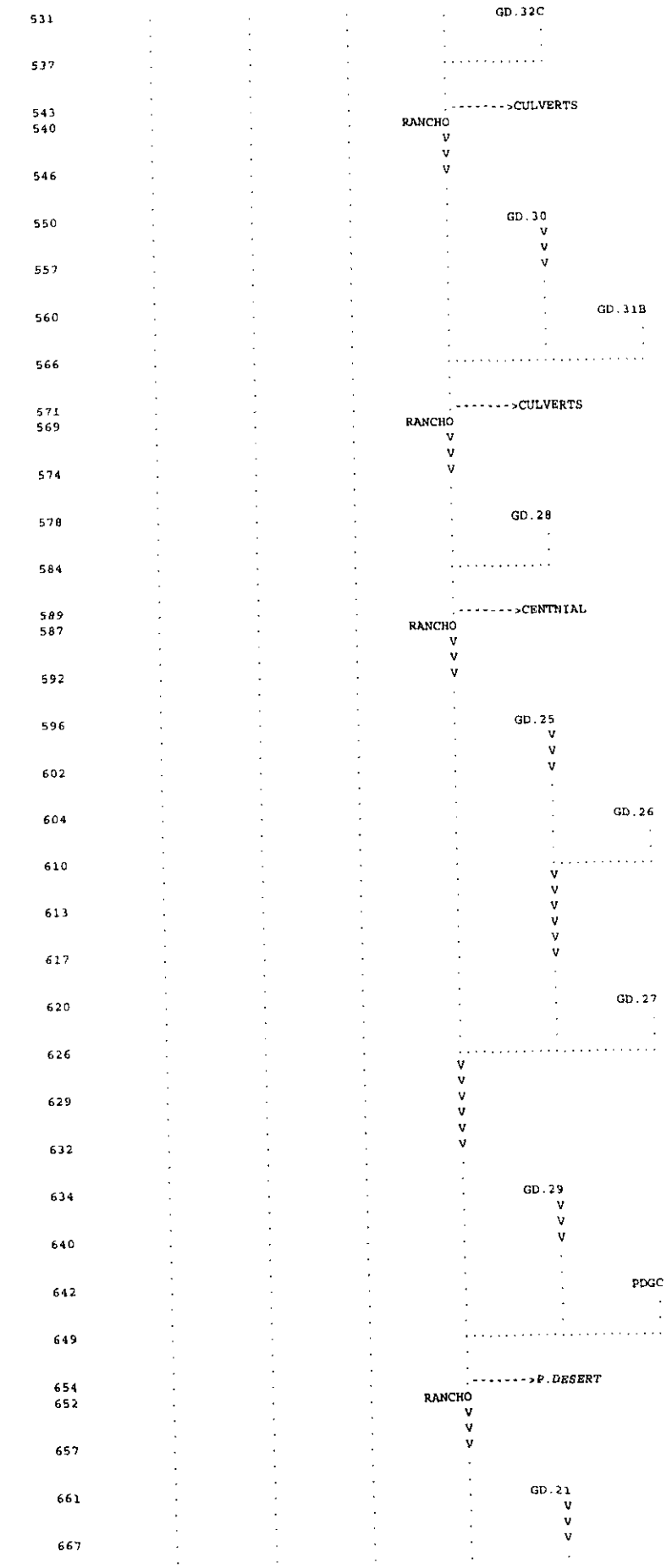
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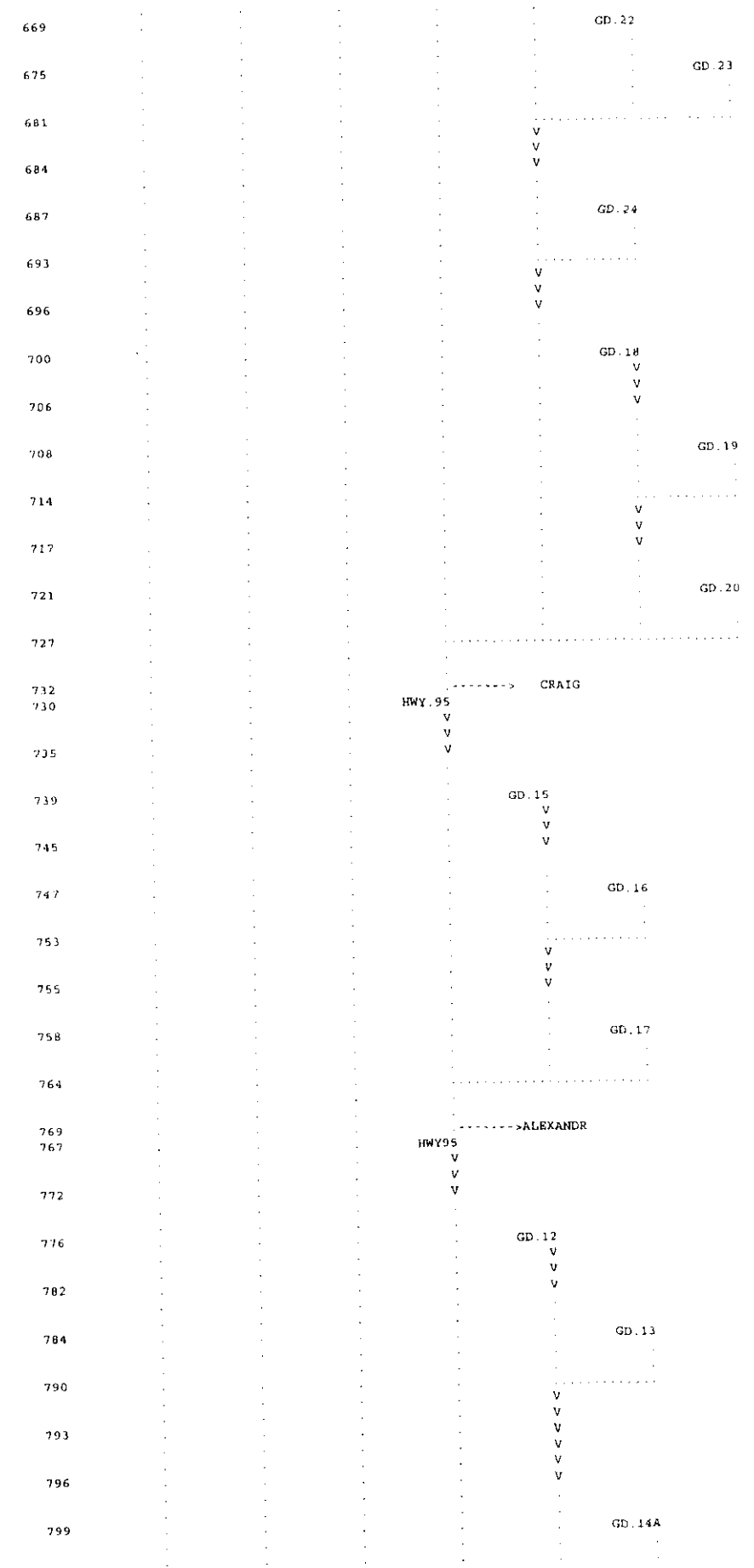
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                  V
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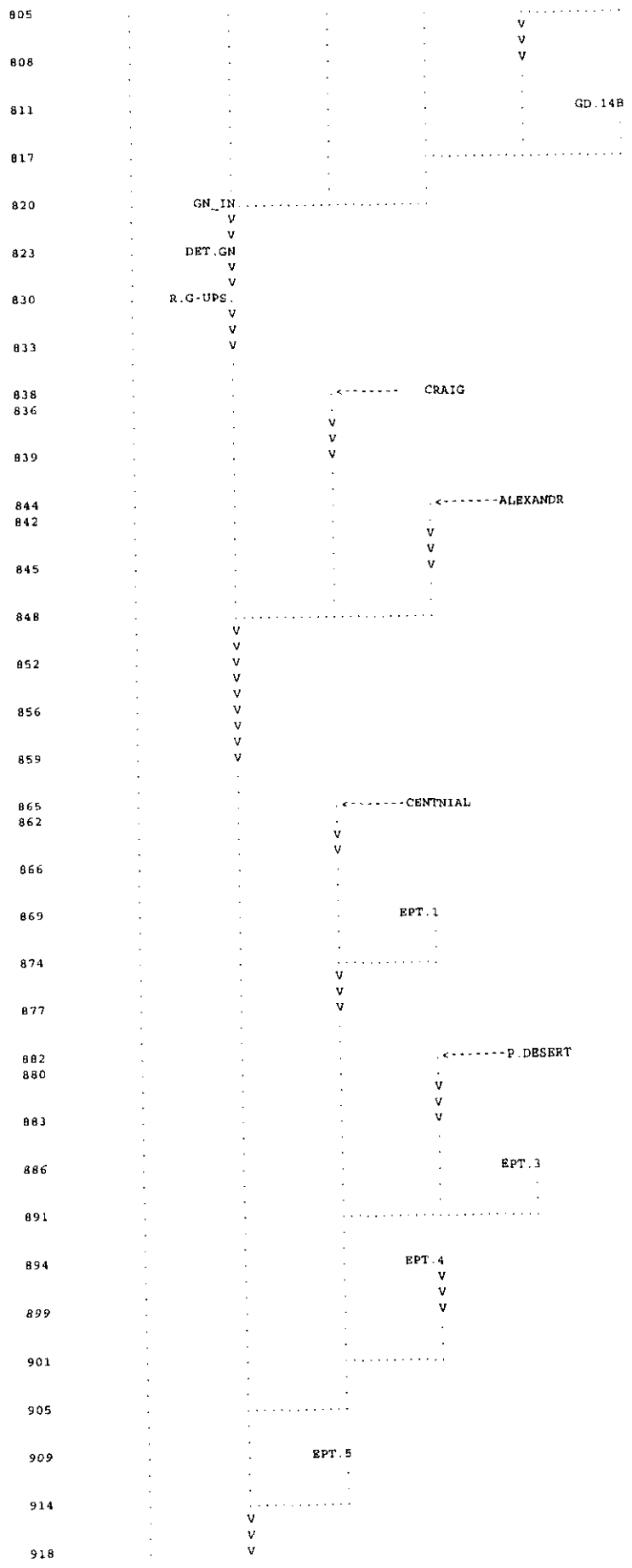

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111
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101
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303
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NC1
NC2
NC3

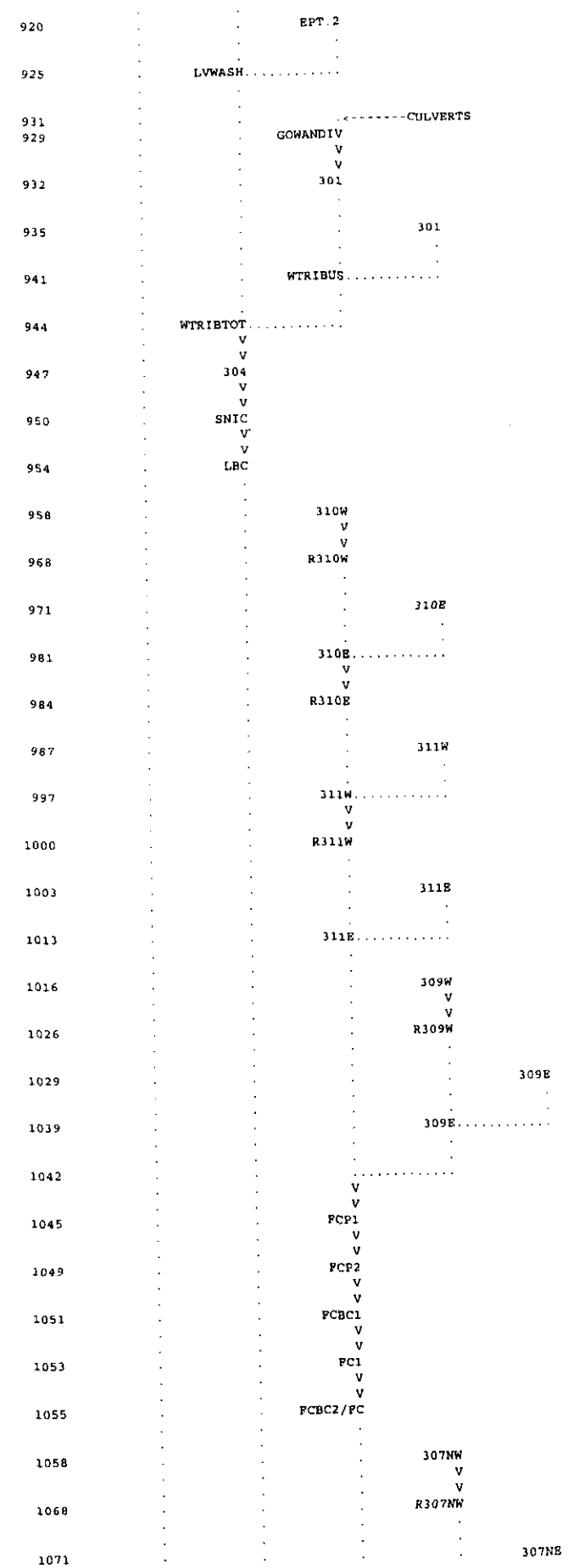

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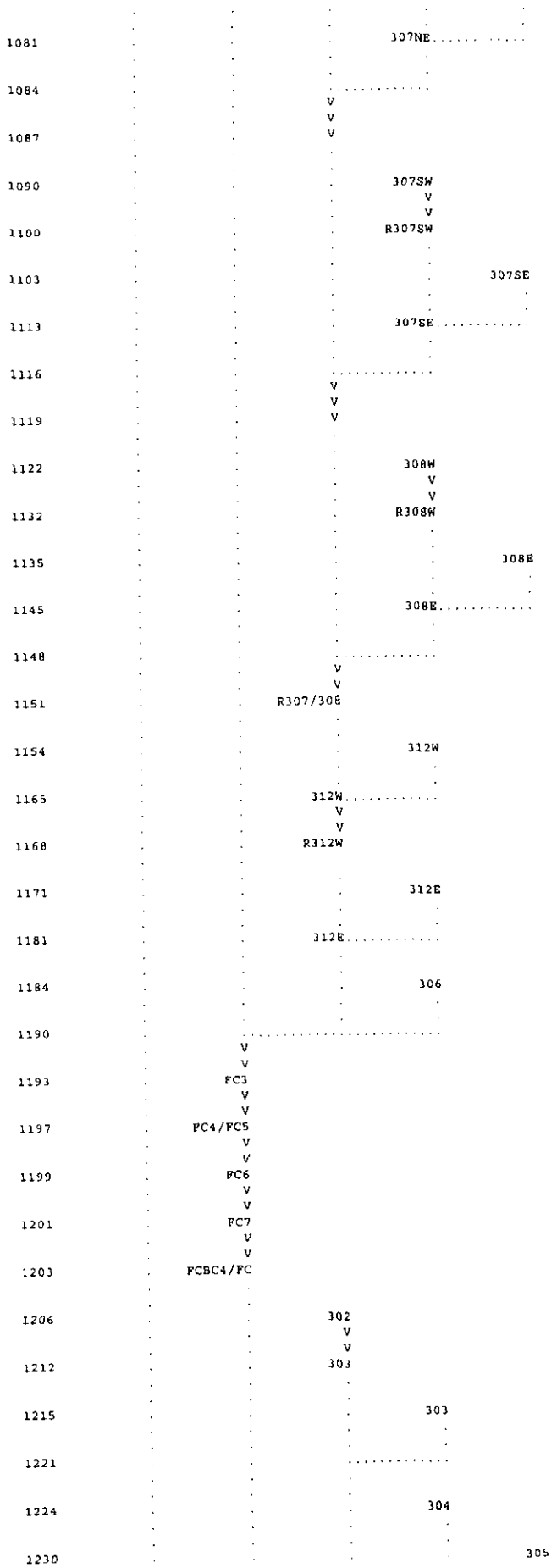

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GD.5
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GD.6
449
452
455
GD.8
461
464
GD.34
470
GOWAN_SO
473
DET.GS
479
R.GSOUT
482
GD.9
489
491
GD.10
497
500
503
506
GD.11
512
515
GD.33
524
CULVERTS
521
RANCHO
527

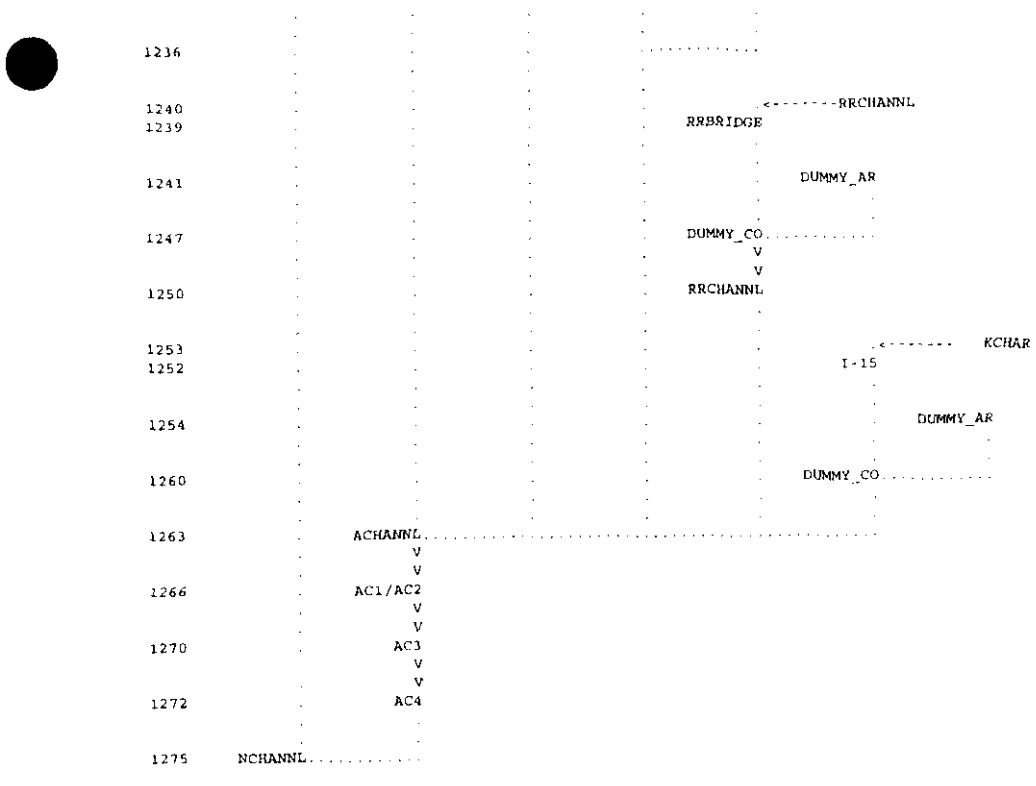

531
GD.32C
537
543
540
->CULVERTS
RANCHO
546
550
GD.30
557
560
GD.31B
566
571
569
->CULVERTS
RANCHO
574
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GD.28
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587
->CENTNIAL
RANCHO
592
596
GD.25
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604
GD.26
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613
617
620
GD.27
626
629
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634
GD.29
640
642
PDGC
649
654
652
->P.DESERT
RANCHO
657
661
GD.21
667


669
675
681
684
687
693
696
700
706
708
714
717
721
727
732
730
735
739
745
747
753
755
758
764
769
767
772
776
782
784
790
793
796
799
GD.22
GD.23
GD.24
GD.18
GD.19
GD.20
CRAIG
HWY.95
GD.15
GD.16
GD.17
ALEXANDR
HWY95
GD.12
GD.13
GD.14A


805
808
811
GD.14B
817
820
GN_IN
823
DET.GN
830
R.G-UPS.
833
838
CRAIG
836
839
844
ALEXANDR
842
845
848
852
856
859
865
CENTNIAL
862
866
869
EPT.1
874
877
882
P.DESERT
880
883
886
EPT.3
891
894
EPT.4
899
901
905
909
EPT.5
914
918


920
EPT.2
925
LVWASH
931
CULVERTS
929
GOWANDIV
932
301
935
301
941
WTRIBUS
944
WTRIBTOT
947
304
950
SNIC
954
LBC
958
310W
968
R310W
971
310E
981
310E
984
R310E
987
311W
997
311W
1000
R311W
1003
311E
1013
311E
1016
309W
1026
R309W
1029
309E
1039
309E
1042
1045
FCP1
1049
FCP2
1051
FCBC1
1053
FC1
1055
FCBC2/FC
1058
307NW
1068
R307NW
1071
307NE


1081
307NE
1084
1087
1090
307SW
1100
R307SW
1103
307SE
1113
307SE
1116
1119
1122
308W
1132
R308W
1135
308E
1145
308E
1148
1151
R307/308
1154
312W
1165
312W
1168
R312W
1171
312E
1181
312E
1184
306
1190
1193
FC3
1197
FC4/FC5
1199
FC6
1201
FC7
1203
FCBC4/FC
1206
302
1212
303
1215
303
1221
1224
304
1230
305



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*          FEBRUARY  1991            *
*           VERSION 4.0.1 (LOCAL)    *
*                                    *
*  RUN DATE  05/10/96  TIME  16:22:53*
*                                    *
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*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*         (916) 551-1748             *
*                                    *
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FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 500-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Three modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets. Third, the source 100-year model was converted to reflect 500-year conditions by replacing all PB cards with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency extrapolation of the amounts presented by JMM in the 10-, 50-, and 100-year Lower Central Valley Storm models.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 100-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistenc with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are

required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's excracted from FCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
55 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                    NMIN           6  MINUTES IN COMPUTATION INTERVAL
                   IDATE       1    0  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE       1    0  ENDING DATE
                   NDTIME        1954  ENDING TIME
                   ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     0.10 HOURS
                    TOTAL TIME BASE     19.90 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  1.06      0.95      0.85

     *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.06	RATIO 2 0.95	RATIO 3 0.85
HYDROGRAPH AT +	112	5.33	1	FLOW	2401.	1980.	1609.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT +	119	2.74	1	FLOW	1622.	1344.	1098.
				TIME	3.70	3.70	3.70
2 COMBINED AT +	.	8.07	1	FLOW	3971.	3278.	2667.
				TIME	3.80	3.80	3.80
ROUTED TO +	120	8.07	1	FLOW	3720.	3072.	2502.
				TIME	4.10	4.10	4.10
ROUTED TO +	125UDB	8.07	1	FLOW	3338.	2752.	2236.
				TIME	4.60	4.60	4.60
ROUTED TO +	117	8.07	1	FLOW	3130.	2585.	2105.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT +	118	5.08	1	FLOW	3024.	2508.	2052.
				TIME	3.60	3.60	3.60
ROUTED TO +	117	5.08	1	FLOW	2714.	2246.	1833.
				TIME	3.70	3.70	3.70
ROUTED TO +	V	5.08	1	FLOW	2498.	2071.	1694.
				TIME	4.00	4.00	4.00
ROUTED TO +	V	5.08	1	FLOW	2258.	1872.	1532.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT +	117	7.37	1	FLOW	1054.	840.	657.
				TIME	5.70	5.80	5.80
3 COMBINED AT +	.	20.52	1	FLOW	5062.	4146.	3353.
				TIME	5.00	5.00	5.10
ROUTED TO +	ULWDB	20.52	1	FLOW	2960.	2689.	2400.
				TIME	6.40	6.30	6.20
			** PEAK STAGES IN FEET **				
			1	STAGE	2356.60	2353.89	2351.00
				TIME	6.40	6.30	6.20
ROUTED TO +	116	20.52	1	FLOW	2953.	2680.	2393.
				TIME	6.90	6.80	6.70
HYDROGRAPH AT +	111	4.08	1	FLOW	2579.	2146.	1762.
				TIME	3.60	3.60	3.60
ROUTED TO +	116	4.08	1	FLOW	2417.	2010.	1650.
				TIME	3.70	3.70	3.70
ROUTED TO +	V	4.08	1	FLOW	2179.	1811.	1485.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT +	116	5.19	1	FLOW	726.	576.	448.
				TIME	5.50	5.50	5.60
3 COMBINED AT +	.	29.79	1	FLOW	4158.	3602.	3071.
				TIME	5.30	5.30	5.30
ROUTED TO +	109	29.79	1	FLOW	3999.	3474.	2967.
				TIME	5.70	5.80	5.80
HYDROGRAPH AT +	110	2.94	1	FLOW	1852.	1553.	1286.
				TIME	3.60	3.60	3.60
ROUTED TO +	109	2.94	1	FLOW	1755.	1471.	1219.
				TIME	3.70	3.70	3.70

ROUTED TO							
+	V	2.94	1	FLOW	1603.	1343.	1113.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	601.	477.	372.
				TIME	5.30	5.40	5.50
3 COMBINED AT							
+	.	36.91	1	FLOW	4879.	4164.	3505.
				TIME	5.60	5.60	5.70
ROUTED TO							
+	101	36.91	1	FLOW	4774.	4077.	3431.
				TIME	6.10	6.20	6.20
HYDROGRAPH AT							
+	103	6.20	1	FLOW	3554.	2959.	2434.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	102	6.20	1	FLOW	3363.	2798.	2299.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	3730.	3069.	2488.
				TIME	3.70	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	7093.	5867.	4787.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	301	14.65	1	FLOW	6819.	5637.	4595.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	6370.	5259.	4281.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	101	9.08	1	FLOW	1170.	920.	708.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	8942.	7354.	6014.
				TIME	4.30	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	430.	0.	0.
				TIME	4.30	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	8512.	7354.	6014.
				TIME	4.30	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	3411.	2436.	2151.
				TIME	8.30	9.00	8.80
			**	PEAK STAGES IN FEET **			
			1	STAGE	28.46	26.23	21.82
				TIME	8.30	9.00	8.80
HYDROGRAPH AT							
+	.	0.00	1	FLOW	430.	0.	0.
				TIME	4.30	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	3411.	2436.	2151.
				TIME	8.30	9.00	8.80
ROUTED TO							
+	303	60.65	1	FLOW	3386.	2426.	2148.
				TIME	9.60	10.30	10.10
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	3386.	2426.	2148.
				TIME	9.60	10.30	10.10
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	677.	485.	430.
				TIME	9.60	10.30	10.10
ROUTED TO							
+	NC1	60.65	1	FLOW	677.	485.	430.
				TIME	9.60	10.30	10.10
ROUTED TO							
+	V	60.65	1	FLOW	677.	485.	430.
				TIME	9.70	10.40	10.10

ROUTED TO	NC2	60.65	1	FLOW	677.	485.	430.
+				TIME	9.70	10.40	10.10
ROUTED TO	NC3	60.65	1	FLOW	677.	485.	430.
+				TIME	9.80	10.50	10.20
ROUTED TO	NC4	60.65	1	FLOW	677.	485.	430.
+				TIME	9.80	10.50	10.20
ROUTED TO	NC5	60.65	1	FLOW	677.	485.	430.
+				TIME	9.80	10.50	10.30
HYDROGRAPH AT	AP.1	0.00	1	FLOW	1.	0.	0.
+				TIME	4.00	4.00	4.00
ROUTED TO	V	0.00	1	FLOW	1.	0.	0.
+				TIME	4.70	4.70	4.70
HYDROGRAPH AT	AP.2	0.85	1	FLOW	515.	436.	364.
+				TIME	3.70	3.70	3.70
2 COMBINED AT	.	0.85	1	FLOW	515.	436.	364.
+				TIME	3.70	3.70	3.70
ROUTED TO	V	0.85	1	FLOW	406.	343.	287.
+				TIME	4.80	4.80	4.80
HYDROGRAPH AT	AP.3	3.62	1	FLOW	850.	726.	615.
+				TIME	6.20	6.20	6.30
HYDROGRAPH AT	AP.4	0.00	1	FLOW	0.	0.	0.
+				TIME	4.40	4.40	4.40
3 COMBINED AT	.	4.47	1	FLOW	1079.	923.	784.
+				TIME	6.00	6.00	6.10
HYDROGRAPH AT	AP.5	0.00	1	FLOW	1.	1.	1.
+				TIME	3.80	3.80	3.80
ROUTED TO	V	0.00	1	FLOW	1.	0.	0.
+				TIME	4.60	4.60	4.60
HYDROGRAPH AT	AP.6	0.00	1	FLOW	0.	0.	0.
+				TIME	4.10	4.10	4.10
2 COMBINED AT	.	0.00	1	FLOW	1.	1.	1.
+				TIME	4.50	4.50	4.50
ROUTED TO	V	0.00	1	FLOW	1.	1.	1.
+				TIME	5.10	5.10	5.20
HYDROGRAPH AT	AP.7	1.02	1	FLOW	409.	342.	282.
+				TIME	4.00	4.00	4.00
2 COMBINED AT	N_CHN	1.02	1	FLOW	410.	342.	283.
+				TIME	4.00	4.00	4.00
HYDROGRAPH AT	GD.1	0.00	1	FLOW	1.	0.	0.
+				TIME	4.00	4.00	4.00
ROUTED TO	V	0.00	1	FLOW	1.	0.	0.
+				TIME	4.30	4.30	4.30
ROUTED TO	V	0.00	1	FLOW	1.	0.	0.
+				TIME	4.50	4.50	4.50
HYDROGRAPH AT	GD.2	0.00	1	FLOW	0.	0.	0.
+				TIME	4.20	4.20	4.20
2 COMBINED AT	.	0.00	1	FLOW	1.	1.	1.
+				TIME	4.40	4.40	4.40
ROUTED TO	TO_DIV	0.00	1	FLOW	1.	1.	1.
+				TIME	4.80	4.80	4.80

HYDROGRAPH AT	GD.3	0.80	1	FLOW	491.	415.	347.
+				TIME	3.70	3.70	3.70
2 COMBINED AT	HUALAPAI	0.80	1	FLOW	491.	415.	347.
+				TIME	3.70	3.70	3.70
2 COMBINED AT	HUA	1.82	1	FLOW	828.	695.	577.
+				TIME	3.80	3.80	3.80
ROUTED TO	V	1.82	1	FLOW	825.	690.	573.
+				TIME	3.90	3.90	3.90
ROUTED TO	V	1.82	1	FLOW	820.	684.	567.
+				TIME	4.00	4.00	4.00
HYDROGRAPH AT	AP.8	0.93	1	FLOW	441.	376.	318.
+				TIME	4.00	4.00	4.00
2 COMBINED AT	BOX	2.75	1	FLOW	1261.	1060.	885.
+				TIME	4.00	4.00	4.00
ROUTED TO	V	2.75	1	FLOW	1246.	1048.	879.
+				TIME	4.00	4.10	4.10
HYDROGRAPH AT	AP.9	0.68	1	FLOW	256.	217.	183.
+				TIME	4.20	4.20	4.20
2 COMBINED AT	N_CHAN	3.43	1	FLOW	1491.	1260.	1057.
+				TIME	4.10	4.10	4.10
2 COMBINED AT	ANGEL.PK	7.91	1	FLOW	1956.	1673.	1419.
+				TIME	5.30	5.30	5.30
ROUTED TO	SPILLWAY	7.91	1	FLOW	72.	69.	67.
+				TIME	10.80	10.60	10.50
			** PEAK STAGES IN FEET **				
			1	STAGE	2614.91	2613.51	2612.20
				TIME	10.90	10.70	10.50
ROUTED TO	AP_TO_VE	7.91	1	FLOW	72.	69.	67.
+				TIME	10.90	10.70	10.50
ROUTED TO	BUFFALO_	7.91	1	FLOW	72.	69.	67.
+				TIME	10.90	10.70	10.50
HYDROGRAPH AT	GD.7	1.13	1	FLOW	323.	275.	232.
+				TIME	5.00	5.00	5.00
2 COMBINED AT	BUFFALO_	9.04	1	FLOW	384.	334.	289.
+				TIME	5.00	5.00	5.10
ROUTED TO	BUFFALO_	9.04	1	FLOW	383.	334.	289.
+				TIME	5.10	5.20	5.30
HYDROGRAPH AT	GD.4	0.00	1	FLOW	1.	0.	0.
+				TIME	4.00	4.00	4.00
ROUTED TO	V	0.00	1	FLOW	0.	0.	0.
+				TIME	4.80	4.80	4.80
HYDROGRAPH AT	GD.5	3.31	1	FLOW	889.	747.	621.
+				TIME	5.00	5.10	5.20
2 COMBINED AT	.	3.31	1	FLOW	890.	747.	622.
+				TIME	5.00	5.10	5.20
ROUTED TO	V	3.31	1	FLOW	883.	742.	618.
+				TIME	5.50	5.60	5.60
HYDROGRAPH AT	GD.6	1.60	1	FLOW	464.	386.	318.
+				TIME	4.40	4.40	4.40
2 COMBINED AT	.	4.91	1	FLOW	1250.	1052.	877.
+				TIME	5.40	5.40	5.40

ROUTED TO							
+	V	4.91	1	FLOW	1249.	1051.	876.
				TIME	5.40	5.40	5.50
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	364.	300.	244.
				TIME	4.60	4.60	4.70
2 COMBINED AT							
+	.	6.44	1	FLOW	1573.	1323.	1101.
				TIME	5.40	5.40	5.40
HYDROGRAPH AT							
+	GD.34	3.84	1	FLOW	724.	599.	489.
				TIME	5.70	5.70	5.70
3 COMBINED AT							
+	GOWAN_SO	19.32	1	FLOW	2665.	2240.	1866.
				TIME	5.40	5.40	5.50
ROUTED TO							
+	DET.GS	19.32	1	FLOW	1550.	452.	418.
				TIME	6.80	8.00	8.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2350.14	2349.36	2346.77
				TIME	6.80	8.00	8.00
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	1534.	452.	418.
				TIME	6.80	8.10	8.00
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	4.80	4.80	4.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	549.	457.	376.
				TIME	6.30	6.40	6.40
2 COMBINED AT							
+	.	3.17	1	FLOW	550.	458.	376.
				TIME	6.30	6.40	6.40
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10

HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	7.70	7.70
HYDROGRAPH AT							
+	GD.318	0.67	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
3 COMBINED AT							
+	.	1.03	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.30	5.30
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	5.20	5.30	5.30
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.70	5.70	5.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	6.20	6.20	6.20
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	170.	136.	106.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	2.16	1	FLOW	170.	136.	107.
				TIME	5.70	5.70	5.70
ROUTED TO							
+	V	2.16	1	FLOW	170.	136.	107.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	2.16	1	FLOW	170.	136.	107.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	111.	88.	69.
				TIME	5.50	5.60	5.60
ROUTED TO							
+	V	0.76	1	FLOW	111.	88.	68.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	90.	73.	58.
				TIME	5.00	5.20	5.30

3 COMBINED AT							
+	.	3.45	1	FLOW	363.	289.	227.
				TIME	5.70	5.70	5.80
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	233.	233.	227.
				TIME	4.60	4.90	5.80
HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	130.	56.	0.
				TIME	5.70	5.70	0.10
ROUTED TO							
+	V	3.45	1	FLOW	129.	55.	0.
				TIME	5.80	5.90	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	1.	0.	0.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.90	4.90	4.90
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.20	5.40
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.00	5.00	5.20
3 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	5.00	5.00	5.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	96.	76.	60.
				TIME	5.20	5.30	5.50
2 COMBINED AT							
+	.	0.64	1	FLOW	97.	77.	60.
				TIME	5.20	5.40	5.50
ROUTED TO							
+	V	0.64	1	FLOW	96.	76.	59.
				TIME	5.90	6.00	6.00
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.90
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	320.	260.	209.
				TIME	6.50	6.50	6.50
4 COMBINED AT							
+	.	6.45	1	FLOW	526.	378.	265.
				TIME	6.00	6.10	6.40
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	465.	378.	265.
				TIME	5.50	6.10	6.40
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	61.	0.	0.
				TIME	6.00	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	60.	0.	0.
				TIME	6.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	1.	1.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.60	4.60	4.60

HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.50	5.50	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	96.	78.	62.
				TIME	6.00	6.00	6.00
3 COMBINED AT							
+	.	7.01	1	FLOW	156.	78.	63.
				TIME	6.10	6.00	6.00
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	155.	78.	63.
				TIME	6.10	6.00	6.00
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	1.	0.	0.
				TIME	6.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	1.	0.	0.
				TIME	6.20	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.10	4.10	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	405.	326.	258.
				TIME	4.30	4.40	4.40
2 COMBINED AT							
+	.	1.71	1	FLOW	405.	326.	258.
				TIME	4.30	4.40	4.40
ROUTED TO							
+	V	1.71	1	FLOW	388.	312.	246.
				TIME	4.90	4.90	5.00
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	121.	100.	81.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	9.40	1	FLOW	495.	399.	316.
				TIME	5.00	5.00	5.00
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	2289.	1207.	1037.
				TIME	6.80	6.00	6.00
ROUTED TO							
+	DET.GN	31.90	1	FLOW	398.	355.	331.
				TIME	15.00	17.90	17.60
			** PEAK STAGES IN FEET **				
			1	STAGE	2319.50	2317.89	2317.00
				TIME	14.90	17.80	17.40
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	398.	356.	331.
				TIME	15.00	19.90	17.60
ROUTED TO							
+	V	31.90	1	FLOW	398.	356.	332.
				TIME	15.00	19.90	19.90
HYDROGRAPH AT							
+	.	0.00	1	FLOW	465.	378.	265.
				TIME	5.50	6.10	6.40

ROUTED TO	V	0.00	1	FLOW	465.	372.	263.
+				TIME	6.60	6.50	6.80
HYDROGRAPH AT	.	0.00	1	FLOW	155.	78.	63.
+				TIME	6.10	6.00	6.00
ROUTED TO	V	0.00	1	FLOW	142.	77.	61.
+				TIME	7.00	6.90	7.00
3 COMBINED AT	.	31.90	1	FLOW	921.	733.	606.
+				TIME	6.90	6.60	7.00
ROUTED TO	V	31.90	1	FLOW	920.	733.	606.
+				TIME	7.00	6.70	7.00
ROUTED TO	V	31.90	1	FLOW	919.	733.	605.
+				TIME	7.00	6.70	7.00
ROUTED TO	V	31.90	1	FLOW	918.	732.	605.
+				TIME	7.00	6.70	7.10
HYDROGRAPH AT	.	0.00	1	FLOW	0.	0.	0.
+				TIME	6.40	6.50	6.50
ROUTED TO	.	0.00	1	FLOW	0.	0.	0.
+				TIME	8.40	8.60	8.50
HYDROGRAPH AT	EPT.1	3.76	1	FLOW	506.	420.	344.
+				TIME	7.20	7.20	7.20
2 COMBINED AT	.	3.76	1	FLOW	506.	420.	344.
+				TIME	7.20	7.20	7.20
ROUTED TO	V	3.76	1	FLOW	502.	417.	341.
+				TIME	8.00	8.00	8.00
HYDROGRAPH AT	.	0.00	1	FLOW	233.	233.	227.
+				TIME	4.60	4.90	5.80
ROUTED TO	V	0.00	1	FLOW	233.	232.	216.
+				TIME	7.90	7.80	7.80
HYDROGRAPH AT	EPT.3	4.39	1	FLOW	644.	543.	453.
+				TIME	7.40	7.50	7.50
3 COMBINED AT	.	8.15	1	FLOW	1367.	1182.	1002.
+				TIME	7.70	7.70	7.80
HYDROGRAPH AT	EPT.4	1.37	1	FLOW	264.	225.	189.
+				TIME	6.50	6.50	6.50
ROUTED TO	V	1.37	1	FLOW	261.	222.	187.
+				TIME	7.40	7.40	7.40
2 COMBINED AT	.	9.52	1	FLOW	1625.	1400.	1185.
+				TIME	7.60	7.70	7.70
2 COMBINED AT	.	41.42	1	FLOW	2491.	2076.	1765.
+				TIME	7.20	7.40	7.50
HYDROGRAPH AT	EPT.5	3.01	1	FLOW	341.	286.	237.
+				TIME	8.50	8.50	8.50
2 COMBINED AT	.	44.42	1	FLOW	2791.	2336.	1984.
+				TIME	7.30	7.50	7.60
ROUTED TO	V	44.42	1	FLOW	2790.	2335.	1983.
+				TIME	7.30	7.50	7.60
HYDROGRAPH AT	EPT.2	1.49	1	FLOW	248.	206.	169.
+				TIME	6.40	6.40	6.50
2 COMBINED AT	LVWASH	45.92	1	FLOW	2999.	2498.	2112.
+				TIME	7.30	7.40	7.50

HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.40	9.40	9.40
HYDROGRAPH AT							
+	301	18.62	1	FLOW	2383.	1985.	1636.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	2383.	1986.	1636.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	5275.	4427.	3709.
				TIME	7.60	7.70	7.80
ROUTED TO							
+	304	64.53	1	FLOW	5266.	4420.	3701.
				TIME	7.90	8.00	8.10
ROUTED TO							
+	SNIC	64.53	1	FLOW	5266.	4419.	3701.
				TIME	7.90	8.00	8.10
ROUTED TO							
+	LBC	64.53	1	FLOW	5265.	4417.	3700.
				TIME	7.90	8.10	8.10
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	322.	256.	198.
				TIME	4.00	4.10	4.20
ROUTED TO							
+	R310W	0.80	1	FLOW	315.	251.	196.
				TIME	4.20	4.30	4.50
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	425.	323.	241.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	310E	2.04	1	FLOW	693.	541.	408.
				TIME	4.20	4.30	4.40
ROUTED TO							
+	R310E	2.04	1	FLOW	681.	533.	408.
				TIME	4.30	4.40	4.50
HYDROGRAPH AT							
+	311W	0.96	1	FLOW	339.	260.	196.
				TIME	3.90	4.00	4.10
2 COMBINED AT							
+	311W	3.00	1	FLOW	957.	729.	558.
				TIME	4.20	4.30	4.50
ROUTED TO							
+	R311W	3.00	1	FLOW	954.	725.	542.
				TIME	4.30	4.40	4.70
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	104.	81.	61.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	311E	3.77	1	FLOW	1027.	770.	567.
				TIME	4.30	4.50	4.70
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	83.	60.	39.
				TIME	5.40	5.60	5.90
ROUTED TO							
+	R309W	0.81	1	FLOW	83.	60.	39.
				TIME	6.30	6.70	7.20
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	307.	231.	176.
				TIME	4.40	4.60	4.80
2 COMBINED AT							
+	309E	2.00	1	FLOW	307.	231.	176.
				TIME	4.40	4.60	4.80
2 COMBINED AT							
+		5.77	1	FLOW	1323.	1000.	740.
				TIME	4.30	4.50	4.70
ROUTED TO							
+	FCP1	5.77	1	FLOW	1322.	999.	739.
				TIME	4.40	4.50	4.70
ROUTED TO							
+	FCP2	5.77	1	FLOW	1322.	996.	736.
				TIME	4.40	4.50	4.70

ROUTED TO	FCBC1	5.77	1	FLOW	1322.	995.	736.
+				TIME	4.40	4.50	4.70
ROUTED TO	FC1	5.77	1	FLOW	1321.	993.	733.
+				TIME	4.40	4.50	4.70
ROUTED TO	FCBC2/FC	5.77	1	FLOW	1320.	991.	731.
+				TIME	4.40	4.50	4.70
HYDROGRAPH AT	307NW	1.33	1	FLOW	516.	403.	312.
+				TIME	4.00	4.10	4.10
ROUTED TO	R307NW	1.33	1	FLOW	510.	401.	311.
+				TIME	4.00	4.10	4.20
HYDROGRAPH AT	307NE	0.64	1	FLOW	251.	198.	154.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	307NE	1.97	1	FLOW	761.	599.	465.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	.	7.74	1	FLOW	1929.	1441.	1068.
+				TIME	4.30	4.50	4.70
ROUTED TO	V	7.74	1	FLOW	1820.	1380.	1037.
+				TIME	4.70	4.80	5.10
HYDROGRAPH AT	307SW	1.10	1	FLOW	55.	31.	14.
+				TIME	5.90	6.40	7.20
ROUTED TO	R307SW	1.10	1	FLOW	55.	31.	14.
+				TIME	6.30	6.90	7.90
HYDROGRAPH AT	307SE	1.58	1	FLOW	606.	474.	365.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	307SE	2.68	1	FLOW	606.	474.	365.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	.	10.42	1	FLOW	2149.	1664.	1291.
+				TIME	4.70	4.80	5.10
ROUTED TO	V	10.42	1	FLOW	2112.	1645.	1283.
+				TIME	4.90	5.00	5.30
HYDROGRAPH AT	308W	0.81	1	FLOW	83.	60.	38.
+				TIME	5.40	5.60	5.90
ROUTED TO	R308W	0.81	1	FLOW	82.	59.	38.
+				TIME	5.60	5.90	6.30
HYDROGRAPH AT	308E	0.72	1	FLOW	278.	218.	168.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	308E	1.53	1	FLOW	278.	218.	168.
+				TIME	4.00	4.10	4.20
2 COMBINED AT	.	11.95	1	FLOW	2265.	1778.	1396.
+				TIME	4.90	5.10	5.30
ROUTED TO	R307/308	11.95	1	FLOW	2256.	1775.	1394.
+				TIME	5.00	5.10	5.40
HYDROGRAPH AT	312W	0.77	1	FLOW	177.	128.	92.
+				TIME	4.20	4.40	5.20
2 COMBINED AT	312W	12.72	1	FLOW	2388.	1888.	1484.
+				TIME	5.00	5.10	5.40
ROUTED TO	R312W	12.72	1	FLOW	2386.	1886.	1482.
+				TIME	5.00	5.20	5.40
HYDROGRAPH AT	312E	0.70	1	FLOW	129.	91.	72.
+				TIME	4.20	5.20	5.20

2 COMBINED AT							
+	312E	13.42	1	FLOW	2493.	1977.	1552.
				TIME	5.00	5.20	5.40
HYDROGRAPH AT							
+	306	5.07	1	FLOW	686.	565.	460.
				TIME	6.90	6.90	7.00
3 COMBINED AT							
+	.	83.02	1	FLOW	6518.	5453.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC3	83.02	1	FLOW	6517.	5452.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	6517.	5452.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC6	83.02	1	FLOW	6515.	5450.	4513.
				TIME	7.50	7.60	7.80
ROUTED TO							
+	FC7	83.02	1	FLOW	6514.	5450.	4512.
				TIME	7.50	7.60	7.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	6512.	5449.	4512.
				TIME	7.50	7.60	7.80
HYDROGRAPH AT							
+	302	12.11	1	FLOW	1787.	1489.	1228.
				TIME	6.90	6.90	7.00
ROUTED TO							
+	303	12.11	1	FLOW	1769.	1475.	1216.
				TIME	7.80	7.80	7.80
HYDROGRAPH AT							
+	303	10.22	1	FLOW	1053.	866.	702.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	.	22.33	1	FLOW	2814.	2334.	1913.
				TIME	7.90	7.90	7.90
HYDROGRAPH AT							
+	304	2.90	1	FLOW	561.	469.	388.
				TIME	5.90	5.90	5.90
HYDROGRAPH AT							
+	305	3.30	1	FLOW	777.	653.	545.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	.	6.20	1	FLOW	1310.	1099.	913.
				TIME	5.50	5.60	5.60
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	11748.	9884.	8274.
				TIME	7.70	7.60	7.80
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	11747.	9882.	8274.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	AC3	111.56	1	FLOW	11745.	9882.	8273.
				TIME	7.70	7.70	7.80

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 ROUTED TO
+                    AC4     111.56      1   FLOW        11745.     9881.     8272.
                                             TIME          7.80      7.70      7.80

  2 COMBINED AT
+                 NCHANNL    172.20      1   FLOW        12241.    10309.     8658.
                                             TIME          7.80      7.70      7.90

1
                                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK    TIME TO        VOLUME      DT        PEAK    TIME TO        VOLUME
                                                      PEAK                                        PEAK

                                  (MIN)      (CFS)     (MIN)        (IN)     (MIN)      (CFS)     (MIN)         (IN)

          FOR PLAN = 1  RATIO= 1.06
               NC1  MANE          0.38     677.14    576.75        0.17      6.00     677.10    576.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5521E+03 EXCESS=0.0000E+00 OUTFLOW=0.5518E+03 BASIN STORAGE=0.2504E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC1  MANE          0.28     485.15    618.46        0.14      6.00     485.13    618.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4545E+03 EXCESS=0.0000E+00 OUTFLOW=0.4542E+03 BASIN STORAGE=0.2143E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC1  MANE          0.42     429.59    606.28        0.12      6.00     429.59    606.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3758E+03 EXCESS=0.0000E+00 OUTFLOW=0.3756E+03 BASIN STORAGE=0.1412E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                 V  MANE          1.18     677.08    578.56        0.17      6.00     676.92    582.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5518E+03 EXCESS=0.0000E+00 OUTFLOW=0.5505E+03 BASIN STORAGE=0.1366E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                 V  MANE          1.26     485.12    620.48        0.14      6.00     485.04    624.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4543E+03 EXCESS=0.0000E+00 OUTFLOW=0.4532E+03 BASIN STORAGE=0.1124E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                 V  MANE          1.22     429.58    608.68        0.12      6.00     429.57    606.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3756E+03 EXCESS=0.0000E+00 OUTFLOW=0.3750E+03 BASIN STORAGE=0.7630E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               NC2  MANE          0.69     676.91    583.19        0.17      6.00     676.89    582.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5503E+03 EXCESS=0.0000E+00 OUTFLOW=0.5495E+03 BASIN STORAGE=0.7958E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC2  MANE          0.75     485.04    624.83        0.14      6.00     485.03    624.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4530E+03 EXCESS=0.0000E+00 OUTFLOW=0.4524E+03 BASIN STORAGE=0.6504E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC2  MANE          0.79     429.57    607.67        0.12      6.00     429.55    606.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3748E+03 EXCESS=0.0000E+00 OUTFLOW=0.3743E+03 BASIN STORAGE=0.4372E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               NC3  MANE          2.02     676.82    584.89        0.17      6.00     676.66    588.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5495E+03 EXCESS=0.0000E+00 OUTFLOW=0.5476E+03 BASIN STORAGE=0.2506E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
               NC3  MANE          2.25     485.03    628.17        0.14      6.00     484.95    630.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4523E+03 EXCESS=0.0000E+00 OUTFLOW=0.4502E+03 BASIN STORAGE=0.2074E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC3  MANE          2.37     429.55    610.82        0.12      6.00     429.55    612.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3743E+03 EXCESS=0.0000E+00 OUTFLOW=0.3729E+03 BASIN STORAGE=0.1424E+01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 1.06
               NC4  MANE          0.66    676.66    587.68       0.17       6.00    676.65    588.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5467E+03 EXCESS=0.0000E+00 OUTFLOW=0.5459E+03 BASIN STORAGE=0.7063E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
               NC4  MANE          0.67    484.95    630.33       0.14       6.00    484.95    630.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4500E+03 EXCESS=0.0000E+00 OUTFLOW=0.4496E+03 BASIN STORAGE=0.5827E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
               NC4  MANE          0.76    429.54    613.93       0.12       6.00    429.53    612.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3727E+03 EXCESS=0.0000E+00 OUTFLOW=0.3724E+03 BASIN STORAGE=0.4035E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
               NC5  MANE          0.46    676.64    588.23       0.17       6.00    676.63    588.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5459E+03 EXCESS=0.0000E+00 OUTFLOW=0.5455E+03 BASIN STORAGE=0.4054E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
               NC5  MANE          0.38    484.94    630.62       0.14       6.00    484.94    630.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4494E+03 EXCESS=0.0000E+00 OUTFLOW=0.4491E+03 BASIN STORAGE=0.3247E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
               NC5  MANE          0.52    429.53    613.08       0.12       6.00    429.52    618.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3723E+03 EXCESS=0.0000E+00 OUTFLOW=0.3721E+03 BASIN STORAGE=0.2259E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          3.08    825.75    234.44       1.30       6.00    824.94    234.00         1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1265E+03 EXCESS=0.0000E+00 OUTFLOW=0.1268E+03 BASIN STORAGE=0.8465E-02 PERCENT ERROR=   -0.2

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          3.21    690.23    235.61       1.09       6.00    689.89    234.00         1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1056E+03 EXCESS=0.0000E+00 OUTFLOW=0.1058E+03 BASIN STORAGE=0.6286E-02 PERCENT ERROR=   -0.2

          FOR PLAN = 1  RATIO= 0.85
                    V  MANE          3.50    573.71    233.74       0.90       6.00    573.40    234.00         0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8735E+02 EXCESS=0.0000E+00 OUTFLOW=0.8754E+02 BASIN STORAGE=0.8055E-02 PERCENT ERROR=   -0.2

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          3.04    822.02    239.20       1.30       6.00    819.88    240.00         1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1269E+03 EXCESS=0.0000E+00 OUTFLOW=0.1269E+03 BASIN STORAGE=0.8518E-02 PERCENT ERROR=   -0.1

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          3.19    684.84    241.88       1.09       6.00    683.61    240.00         1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1058E+03 EXCESS=0.0000E+00 OUTFLOW=0.1058E+03 BASIN STORAGE=0.8324E-02 PERCENT ERROR=   -0.1

          FOR PLAN = 1  RATIO= 0.85
                    V  MANE          3.44    572.29    241.28       0.90       6.00    567.21    240.00         0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8755E+02 EXCESS=0.0000E+00 OUTFLOW=0.8759E+02 BASIN STORAGE=0.7587E-02 PERCENT ERROR=   -0.1

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          1.37   1257.09    243.31       1.37       6.00   1245.82    240.00         1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2015E+03 EXCESS=0.0000E+00 OUTFLOW=0.2016E+03 BASIN STORAGE=0.1148E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          1.51   1058.49    243.26       1.15       6.00   1048.49    246.00         1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1690E+03 EXCESS=0.0000E+00 OUTFLOW=0.1690E+03 BASIN STORAGE=0.1182E-01 PERCENT ERROR=   -0.1
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          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.53    883.51    242.90      0.96      6.00    879.11    246.00        0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1406E+03 EXCESS=0.0000E+00 OUTFLOW=0.1407E+03 BASIN STORAGE=0.1124E-01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
          AP_TO_VE  MANE          1.78     71.50    656.88      0.24      6.00     71.50    660.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1028E+03 EXCESS=0.0000E+00 OUTFLOW=0.1026E+03 BASIN STORAGE=0.3291E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          AP_TO_VE  MANE          1.78     69.25    646.54      0.24      6.00     69.25    648.00        0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9939E+02 EXCESS=0.0000E+00 OUTFLOW=0.9914E+02 BASIN STORAGE=0.3212E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
          AP_TO_VE  MANE          1.79     67.05    634.39      0.23      6.00     67.05    636.00        0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9606E+02 EXCESS=0.0000E+00 OUTFLOW=0.9578E+02 BASIN STORAGE=0.3125E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          1.34     71.56   1195.32      0.24      6.00     71.50    660.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1024E+03 EXCESS=0.0000E+00 OUTFLOW=0.1022E+03 BASIN STORAGE=0.3097E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          1.25     69.25    650.72      0.23      6.00     69.25    648.00        0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9899E+02 EXCESS=0.0000E+00 OUTFLOW=0.9870E+02 BASIN STORAGE=0.3167E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          1.26     67.05    637.92      0.23      6.00     67.05    636.00        0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9567E+02 EXCESS=0.0000E+00 OUTFLOW=0.9545E+02 BASIN STORAGE=0.3099E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          3.67    383.53    309.26      0.38      6.00    383.36    306.00        0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1859E+03 EXCESS=0.0000E+00 OUTFLOW=0.1845E+03 BASIN STORAGE=0.1619E+01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          3.79    333.53    309.91      0.35      6.00    333.50    312.00        0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1695E+03 EXCESS=0.0000E+00 OUTFLOW=0.1681E+03 BASIN STORAGE=0.1691E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          4.02    288.66    315.45      0.32      6.00    288.59    318.00        0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1546E+03 EXCESS=0.0000E+00 OUTFLOW=0.1536E+03 BASIN STORAGE=0.1649E+01 PERCENT ERROR=  -0.4

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.23   1249.43    326.33      1.24      6.00   1248.94    324.00        1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3256E+03 EXCESS=0.0000E+00 OUTFLOW=0.3257E+03 BASIN STORAGE=0.3639E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.22   1052.00    325.97      1.04      6.00   1050.86    324.00        1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2711E+03 EXCESS=0.0000E+00 OUTFLOW=0.2711E+03 BASIN STORAGE=0.2602E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.35    876.33    327.30      0.85      6.00    875.53    330.00        0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2233E+03 EXCESS=0.0000E+00 OUTFLOW=0.2233E+03 BASIN STORAGE=0.3676E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
           R.GSOUT  MANE          0.71   1548.34    409.28      0.61      6.00   1534.44    408.00        0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6299E+03 EXCESS=0.0000E+00 OUTFLOW=0.6292E+03 BASIN STORAGE=0.9109E+00 PERCENT ERROR=   0.0
```

FOR PLAN = 1 RATIO= 0.95
R.GSOUT MANE 1.00 451.84 482.46 0.52 6.00 451.84 486.00 0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5321E+03 EXCESS=0.0000E+00 OUTFLOW=0.5314E+03 BASIN STORAGE=0.8758E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
R.GSOUT MANE 1.01 417.55 481.28 0.47 6.00 417.55 480.00 0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4848E+03 EXCESS=0.0000E+00 OUTFLOW=0.4841E+03 BASIN STORAGE=0.7222E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 2.60 170.47 343.59 0.38 6.00 170.45 342.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4358E+02 EXCESS=0.0000E+00 OUTFLOW=0.4359E+02 BASIN STORAGE=0.8848E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 2.76 136.20 347.18 0.30 6.00 136.10 348.00 0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3440E+02 EXCESS=0.0000E+00 OUTFLOW=0.3440E+02 BASIN STORAGE=0.9229E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 2.97 106.74 347.80 0.23 6.00 106.74 348.00 0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2665E+02 EXCESS=0.0000E+00 OUTFLOW=0.2665E+02 BASIN STORAGE=0.9610E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 3.05 170.38 349.32 0.38 6.00 170.27 348.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4360E+02 EXCESS=0.0000E+00 OUTFLOW=0.4359E+02 BASIN STORAGE=0.1117E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 3.36 136.03 354.89 0.30 6.00 136.01 354.00 0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3441E+02 EXCESS=0.0000E+00 OUTFLOW=0.3440E+02 BASIN STORAGE=0.1243E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 3.54 106.70 354.81 0.23 6.00 106.60 354.00 0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2666E+02 EXCESS=0.0000E+00 OUTFLOW=0.2665E+02 BASIN STORAGE=0.1288E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 5.43 111.02 350.43 0.68 6.00 110.99 348.00 0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2739E+02 EXCESS=0.0000E+00 OUTFLOW=0.2739E+02 BASIN STORAGE=0.1023E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 5.68 88.11 351.66 0.53 6.00 87.98 354.00 0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2145E+02 EXCESS=0.0000E+00 OUTFLOW=0.2146E+02 BASIN STORAGE=0.1071E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 6.00 68.47 358.41 0.41 6.00 68.41 354.00 0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1647E+02 EXCESS=0.0000E+00 OUTFLOW=0.1648E+02 BASIN STORAGE=0.8688E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
R.G-UPS. MANE 0.73 398.32 901.66 0.29 6.00 398.32 900.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4889E+03 EXCESS=0.0000E+00 OUTFLOW=0.4881E+03 BASIN STORAGE=0.7311E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
R.G-UPS. MANE 0.73 357.17 1194.25 0.25 6.00 356.38 1194.00 0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4340E+03 EXCESS=0.0000E+00 OUTFLOW=0.4332E+03 BASIN STORAGE=0.6794E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
R.G-UPS. MANE 0.75 331.44 1057.02 0.24 6.00 331.44 1056.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4041E+03 EXCESS=0.0000E+00 OUTFLOW=0.4034E+03 BASIN STORAGE=0.6335E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V MANE 1.43 400.38 1194.55 0.29 6.00 398.32 906.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4880E+03 EXCESS=0.0000E+00 OUTFLOW=0.4858E+03 BASIN STORAGE=0.2544E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95
V MANE 1.54 361.70 1195.33 0.25 6.00 356.40 1194.00 0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4332E+03 EXCESS=0.0000E+00 OUTFLOW=0.4314E+03 BASIN STORAGE=0.2355E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85
V MANE 1.60 336.13 1195.09 0.24 6.00 331.85 1194.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4034E+03 EXCESS=0.0000E+00 OUTFLOW=0.4016E+03 BASIN STORAGE=0.2238E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06
V MANE 1.34 920.33 416.38 0.39 6.00 919.63 420.00 0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6592E+03 EXCESS=0.0000E+00 OUTFLOW=0.6568E+03 BASIN STORAGE=0.3330E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95
V MANE 1.42 733.23 398.44 0.33 6.00 732.78 402.00 0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5624E+03 EXCESS=0.0000E+00 OUTFLOW=0.5595E+03 BASIN STORAGE=0.3118E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85
V MANE 1.55 605.61 421.32 0.29 6.00 605.61 420.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5013E+03 EXCESS=0.0000E+00 OUTFLOW=0.4985E+03 BASIN STORAGE=0.2984E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 0.80 919.42 420.76 0.38 6.00 919.21 420.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6559E+03 EXCESS=0.0000E+00 OUTFLOW=0.6546E+03 BASIN STORAGE=0.1751E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95
V MANE 0.86 732.68 402.59 0.33 6.00 732.63 402.00 0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5593E+03 EXCESS=0.0000E+00 OUTFLOW=0.5577E+03 BASIN STORAGE=0.1645E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 0.83 605.56 421.42 0.29 6.00 605.36 420.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4984E+03 EXCESS=0.0000E+00 OUTFLOW=0.4970E+03 BASIN STORAGE=0.1574E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 0.69 919.08 421.15 0.38 6.00 918.44 420.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6542E+03 EXCESS=0.0000E+00 OUTFLOW=0.6526E+03 BASIN STORAGE=0.1750E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 0.74 732.62 403.44 0.33 6.00 732.24 402.00 0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5577E+03 EXCESS=0.0000E+00 OUTFLOW=0.5563E+03 BASIN STORAGE=0.1649E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85
V MANE 0.94 605.30 421.65 0.29 6.00 605.08 426.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4968E+03 EXCESS=0.0000E+00 OUTFLOW=0.4954E+03 BASIN STORAGE=0.1575E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 0.96 2791.07 439.28 0.64 6.00 2790.29 438.00 0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1521E+04 EXCESS=0.0000E+00 OUTFLOW=0.1518E+04 BASIN STORAGE=0.3380E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 0.94 2336.17 451.73 0.54 6.00 2335.20 450.00 0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1285E+04 EXCESS=0.0000E+00 OUTFLOW=0.1282E+04 BASIN STORAGE=0.3171E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 1.10 1983.78 457.79 0.46 6.00 1982.97 456.00 0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1097E+04 EXCESS=0.0000E+00 OUTFLOW=0.1095E+04 BASIN STORAGE=0.3029E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

SNIC	MANE	0.59	5266.23	474.81	0.82	6.00	5265.94	474.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2813E+04 EXCESS=0.0000E+00 OUTFLOW=0.2811E+04 BASIN STORAGE=0.2091E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

SNIC	MANE	0.60	4419.37	481.05	0.68	6.00	4418.57	480.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2355E+04 EXCESS=0.0000E+00 OUTFLOW=0.2354E+04 BASIN STORAGE=0.1936E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

SNIC	MANE	0.63	3701.34	486.82	0.57	6.00	3701.24	486.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1974E+04 EXCESS=0.0000E+00 OUTFLOW=0.1972E+04 BASIN STORAGE=0.1826E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

LBC	MANE	0.93	5265.66	476.09	0.82	6.00	5264.70	474.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2811E+04 EXCESS=0.0000E+00 OUTFLOW=0.2807E+04 BASIN STORAGE=0.4125E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

LBC	MANE	1.03	4418.48	482.02	0.68	6.00	4417.32	486.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2353E+04 EXCESS=0.0000E+00 OUTFLOW=0.2349E+04 BASIN STORAGE=0.3838E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

LBC	MANE	1.03	3701.03	487.68	0.57	6.00	3700.39	486.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1972E+04 EXCESS=0.0000E+00 OUTFLOW=0.1968E+04 BASIN STORAGE=0.3634E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

310W	MANE	4.69	289.42	242.27	1.04	6.00	285.72	240.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4507E+02 OUTFLOW=0.4454E+02 BASIN STORAGE=0.1561E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 1.06

310W	MANE	4.44	323.09	240.77	1.15	6.00	321.93	240.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4963E+02 OUTFLOW=0.4905E+02 BASIN STORAGE=0.1603E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 0.95

310W	MANE	4.81	256.98	242.45	0.96	6.00	255.58	246.00	0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4134E+02 OUTFLOW=0.4080E+02 BASIN STORAGE=0.1552E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 0.85

310W	MANE	5.27	200.15	248.55	0.79	6.00	198.16	252.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3408E+02 OUTFLOW=0.3356E+02 BASIN STORAGE=0.1646E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

R310W	MANE	5.91	315.56	249.82	1.15	6.00	315.38	252.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4901E+02 EXCESS=0.0000E+00 OUTFLOW=0.4887E+02 BASIN STORAGE=0.1510E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R310W	MANE	6.54	251.79	255.61	0.95	6.00	250.92	258.00	0.95

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4077E+02 EXCESS=0.0000E+00 OUTFLOW=0.4064E+02 BASIN STORAGE=0.1563E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

R310W	MANE	5.33	195.60	269.95	0.78	6.00	195.52	270.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3352E+02 EXCESS=0.0000E+00 OUTFLOW=0.3345E+02 BASIN STORAGE=0.1808E+00 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.06

310E	MANE	4.97	371.71	243.48	0.89	6.00	365.95	246.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5975E+02 OUTFLOW=0.5901E+02 BASIN STORAGE=0.2014E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 1.06

310E	MANE	4.76	425.36	237.80	0.99	6.00	425.09	240.00	0.99

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6629E+02 OUTFLOW=0.6558E+02 BASIN STORAGE=0.2025E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 0.95

310E	MANE	5.23	325.00	243.45	0.81	6.00	323.40	246.00	0.81

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5441E+02 OUTFLOW=0.5369E+02 BASIN STORAGE=0.2023E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.85

310E	MANE	5.90	243.70	254.56	0.66	6.00	241.42	252.00	0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4412E+02 OUTFLOW=0.4346E+02 BASIN STORAGE=0.1858E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	2.27	688.57	257.11	1.05	6.00	681.47	258.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1144E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=0.1367E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	2.54	534.61	261.86	0.86	6.00	533.35	264.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9423E+02 EXCESS=0.0000E+00 OUTFLOW=0.9395E+02 BASIN STORAGE=0.1418E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	2.89	407.95	269.82	0.71	6.00	407.77	270.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7691E+02 EXCESS=0.0000E+00 OUTFLOW=0.7667E+02 BASIN STORAGE=0.1396E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	2.85	297.40	238.87	0.88	6.00	296.22	240.00	0.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4574E+02 OUTFLOW=0.4527E+02 BASIN STORAGE=0.1288E+00 PERCENT ERROR= 0.7

FOR PLAN = 1 RATIO= 1.06

311W	MANE	2.77	340.89	236.09	0.98	6.00	339.00	234.00	0.98

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5078E+02 OUTFLOW=0.5029E+02 BASIN STORAGE=0.1251E+00 PERCENT ERROR= 0.7

FOR PLAN = 1 RATIO= 0.95

311W	MANE	3.01	261.85	241.31	0.80	6.00	260.05	240.00	0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4162E+02 OUTFLOW=0.4113E+02 BASIN STORAGE=0.1331E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 0.85

311W	MANE	3.43	195.88	245.62	0.65	6.00	195.87	246.00	0.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3369E+02 OUTFLOW=0.3322E+02 BASIN STORAGE=0.1154E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

R311W	MANE	2.91	955.05	258.09	1.03	6.00	954.48	258.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1644E+03 EXCESS=0.0000E+00 OUTFLOW=0.1639E+03 BASIN STORAGE=0.2579E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R311W	MANE	3.12	728.68	264.41	0.84	6.00	724.85	264.00	0.84

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1350E+03 EXCESS=0.0000E+00 OUTFLOW=0.1346E+03 BASIN STORAGE=0.2586E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R311W	MANE	3.55	553.43	278.34	0.68	6.00	541.97	282.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1099E+03 EXCESS=0.0000E+00 OUTFLOW=0.1095E+03 BASIN STORAGE=0.2615E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 1.06

311E	MANE	4.99	91.19	320.57	0.44	6.00	91.11	318.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1858E+02 OUTFLOW=0.1818E+02 BASIN STORAGE=0.1378E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

311E	MANE	6.00	103.95	319.84	0.51	6.00	103.94	318.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2141E+02 OUTFLOW=0.2097E+02 BASIN STORAGE=0.1301E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.95

311E	MANE	5.32	80.98	320.06	0.39	6.00	80.72	318.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1632E+02 OUTFLOW=0.1594E+02 BASIN STORAGE=0.1372E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

311E	MANE	5.96	60.91	325.61	0.29	6.00	60.71	324.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1213E+02 OUTFLOW=0.1180E+02 BASIN STORAGE=0.1338E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

309W	MANE	6.00	70.70	330.12	0.31	6.00	70.68	330.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1394E+02 OUTFLOW=0.1353E+02 BASIN STORAGE=0.1785E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.94	83.14	323.80	0.37	6.00	83.10	324.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1641E+02 OUTFLOW=0.1597E+02 BASIN STORAGE=0.1669E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 0.95

309W	MANE	5.40	60.17	336.52	0.27	6.00	60.16	336.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1199E+02 OUTFLOW=0.1160E+02 BASIN STORAGE=0.1762E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.85

309W	MANE	6.00	38.88	352.94	0.19	6.00	38.85	354.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8447E+01 OUTFLOW=0.8109E+01 BASIN STORAGE=0.1685E+00 PERCENT ERROR= 2.0

FOR PLAN = 1 RATIO= 1.06

R309W	MANE	6.00	82.84	379.00	0.39	6.00	82.71	378.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1597E+02 EXCESS=0.0000E+00 OUTFLOW=0.1683E+02 BASIN STORAGE=0.5390E+00 PERCENT ERROR= -8.7

FOR PLAN = 1 RATIO= 0.95

R309W	MANE	5.86	59.79	396.14	0.30	6.00	59.75	402.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1159E+02 EXCESS=0.0000E+00 OUTFLOW=0.1278E+02 BASIN STORAGE=0.5612E+00 PERCENT ERROR= -15.1

FOR PLAN = 1 RATIO= 0.85

R309W	MANE	6.00	38.59	434.91	0.21	6.00	38.53	432.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8098E+01 EXCESS=0.0000E+00 OUTFLOW=0.9194E+01 BASIN STORAGE=0.5500E+00 PERCENT ERROR= -20.3

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.14	267.92	267.84	0.86	6.00	265.23	270.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5563E+02 OUTFLOW=0.5467E+02 BASIN STORAGE=0.4164E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.93	309.43	262.65	0.96	6.00	307.29	264.00	0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6177E+02 OUTFLOW=0.6076E+02 BASIN STORAGE=0.4091E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	233.47	274.01	0.78	6.00	231.00	276.00	0.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5062E+02 OUTFLOW=0.4965E+02 BASIN STORAGE=0.4195E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	176.15	287.14	0.63	6.00	175.91	288.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4098E+02 OUTFLOW=0.4013E+02 BASIN STORAGE=0.4159E+00 PERCENT ERROR= 1.1

```
          FOR PLAN = 1  RATIO= 1.06
              FCP1  MANE          0.15   1322.55    258.40      0.85      6.00    1322.48    264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2624E+03 EXCESS=0.0000E+00 OUTFLOW=0.2624E+03 BASIN STORAGE=0.4714E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP1  MANE          0.23    999.70    270.34      0.69      6.00     998.99    270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2129E+03 BASIN STORAGE=0.4677E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP1  MANE          0.18    739.64    282.30      0.55      6.00     738.74    282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.4643E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              FCP2  MANE          0.29   1322.16    264.09      0.85      6.00    1322.11    264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2625E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.8209E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP2  MANE          0.34    997.93    270.38      0.69      6.00     996.29    270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.8151E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP2  MANE          0.38    737.92    282.47      0.55      6.00     736.37    282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.8086E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             FCBC1  MANE          0.19   1321.64    264.09      0.85      6.00    1321.56    264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2625E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.1861E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             FCBC1  MANE          0.24    995.45    270.42      0.69      6.00     994.63    270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.1850E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
             FCBC1  MANE          0.16    736.11    282.41      0.55      6.00     734.90    282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1841E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               FC1  MANE          0.20   1320.99    264.12      0.85      6.00    1320.84    264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2626E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.2006E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               FC1  MANE          0.24    993.97    270.25      0.69      6.00     992.82    270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.1998E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               FC1  MANE          0.22    734.63    282.46      0.55      6.00     733.18    282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1985E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          FCBC2/FC  MANE          0.18   1320.29    264.19      0.85      6.00    1320.10    264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2626E+03 EXCESS=0.0000E+00 OUTFLOW=0.2626E+03 BASIN STORAGE=0.1922E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          FCBC2/FC  MANE          0.26    992.11    270.36      0.69      6.00     990.82    270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2131E+03 EXCESS=0.0000E+00 OUTFLOW=0.2131E+03 BASIN STORAGE=0.1909E-01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 0.85
          FCBC2/FC  MANE          0.26    732.90    282.51      0.55      6.00    731.45    282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1901E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          3.04    457.97    239.71      1.01      6.00    457.79    240.00         1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7222E+02 OUTFLOW=0.7145E+02 BASIN STORAGE=0.2303E+00 PERCENT ERROR=   0.7

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          3.03    517.89    236.78      1.11      6.00    516.12    240.00         1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7966E+02 OUTFLOW=0.7890E+02 BASIN STORAGE=0.2325E+00 PERCENT ERROR=   0.7

          FOR PLAN = 1  RATIO= 0.95
             307NW  MANE          3.20    405.72    244.61      0.92      6.00    402.50    246.00         0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6613E+02 OUTFLOW=0.6536E+02 BASIN STORAGE=0.2263E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 0.85
             307NW  MANE          3.68    314.60    249.17      0.75      6.00    311.81    246.00         0.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5431E+02 OUTFLOW=0.5355E+02 BASIN STORAGE=0.2315E+00 PERCENT ERROR=   1.0

          FOR PLAN = 1  RATIO= 1.06
            R307NW  MANE          2.09    514.86    243.57      1.11      6.00    510.12    240.00         1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7892E+02 EXCESS=0.0000E+00 OUTFLOW=0.7874E+02 BASIN STORAGE=0.7697E-01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.95
            R307NW  MANE          2.38    401.75    249.31      0.92      6.00    401.08    246.00         0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6536E+02 EXCESS=0.0000E+00 OUTFLOW=0.6516E+02 BASIN STORAGE=0.7533E-01 PERCENT ERROR=   0.2

          FOR PLAN = 1  RATIO= 0.85
            R307NW  MANE          2.55    311.62    253.09      0.75      6.00    310.61    252.00         0.75

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5356E+02 EXCESS=0.0000E+00 OUTFLOW=0.5340E+02 BASIN STORAGE=0.7540E-01 PERCENT ERROR=   0.2

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          2.59    223.76    240.85      1.04      6.00    223.01    240.00         1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3606E+02 OUTFLOW=0.3567E+02 BASIN STORAGE=0.1181E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          2.41    250.84    240.11      1.15      6.00    250.80    240.00         1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3970E+02 OUTFLOW=0.3933E+02 BASIN STORAGE=0.1221E+00 PERCENT ERROR=   0.6

          FOR PLAN = 1  RATIO= 0.95
             307NE  MANE          2.78    199.17    243.64      0.96      6.00    198.21    246.00         0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3307E+02 OUTFLOW=0.3268E+02 BASIN STORAGE=0.1183E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 0.85
             307NE  MANE          2.96    155.01    248.93      0.79      6.00    154.24    252.00         0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2726E+02 OUTFLOW=0.2689E+02 BASIN STORAGE=0.1155E+00 PERCENT ERROR=   0.9

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          5.86     40.79    366.10      0.15      6.00     40.78    366.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9422E+01 OUTFLOW=0.8998E+01 BASIN STORAGE=0.2113E+00 PERCENT ERROR=   2.3

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          5.26     55.36    353.51      0.19      6.00     55.30    354.00         0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1171E+02 OUTFLOW=0.1126E+02 BASIN STORAGE=0.2122E+00 PERCENT ERROR=   2.1
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FOR PLAN = 1 RATIO= 0.95

307SW	MANE	5.39	30.71	385.23	0.12	6.00	30.66	384.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7675E+01 OUTFLOW=0.7287E+01 BASIN STORAGE=0.1999E+00 PERCENT ERROR= 2.5

FOR PLAN = 1 RATIO= 0.85

307SW	MANE	6.00	14.46	433.75	0.07	6.00	14.44	432.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4659E+01 OUTFLOW=0.4284E+01 BASIN STORAGE=0.2067E+00 PERCENT ERROR= 3.6

FOR PLAN = 1 RATIO= 1.06

R307SW	MANE	6.00	54.95	376.96	0.19	6.00	54.74	378.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1124E+02 EXCESS=0.0000E+00 OUTFLOW=0.1110E+02 BASIN STORAGE=0.1519E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R307SW	MANE	5.80	30.60	414.46	0.12	6.00	30.58	414.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7270E+01 EXCESS=0.0000E+00 OUTFLOW=0.7142E+01 BASIN STORAGE=0.1703E+00 PERCENT ERROR= -0.6

FOR PLAN = 1 RATIO= 0.85

R307SW	MANE	5.86	14.43	472.80	0.07	6.00	14.42	474.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4279E+01 EXCESS=0.0000E+00 OUTFLOW=0.4139E+01 BASIN STORAGE=0.1766E+00 PERCENT ERROR= -0.9

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	3.26	535.80	241.85	1.00	6.00	530.41	240.00	1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8499E+02 OUTFLOW=0.8400E+02 BASIN STORAGE=0.3097E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	3.25	607.04	239.30	1.10	6.00	605.74	240.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9379E+02 OUTFLOW=0.9281E+02 BASIN STORAGE=0.3104E+00 PERCENT ERROR= 0.7

FOR PLAN = 1 RATIO= 0.95

307SE	MANE	3.51	473.93	243.32	0.91	6.00	473.60	246.00	0.91

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7779E+02 OUTFLOW=0.7680E+02 BASIN STORAGE=0.2887E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 0.85

307SE	MANE	3.88	366.81	250.60	0.75	6.00	365.46	252.00	0.75

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6382E+02 OUTFLOW=0.6286E+02 BASIN STORAGE=0.3052E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	70.16	325.24	0.31	6.00	70.12	330.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1390E+02 OUTFLOW=0.1348E+02 BASIN STORAGE=0.1756E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	82.96	324.91	0.37	6.00	82.89	324.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1637E+02 OUTFLOW=0.1593E+02 BASIN STORAGE=0.1691E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 0.95

308W	MANE	5.53	59.56	331.96	0.27	6.00	59.51	336.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1196E+02 OUTFLOW=0.1159E+02 BASIN STORAGE=0.1635E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 0.85

308W	MANE	5.57	38.47	356.58	0.19	6.00	38.43	354.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8418E+01 OUTFLOW=0.8081E+01 BASIN STORAGE=0.1680E+00 PERCENT ERROR= 2.0

FOR PLAN = 1 RATIO= 1.06

R308W	MANE	6.00	82.44	339.04	0.37	6.00	82.40	336.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1592E+02 EXCESS=0.0000E+00 OUTFLOW=0.1582E+02 BASIN STORAGE=0.9200E-01 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

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          R308W  MANE          5.65     59.32    351.13      0.27      6.00     59.04    354.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1157E+02 EXCESS=0.0000E+00 OUTFLOW=0.1145E+02 BASIN STORAGE=0.1061E+00 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.85
          R308W  MANE          6.00     38.27    376.30      0.18      6.00     38.08    378.00         0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8076E+01 EXCESS=0.0000E+00 OUTFLOW=0.7953E+01 BASIN STORAGE=0.1060E+00 PERCENT ERROR=   0.2

          FOR PLAN = 1  RATIO= 1.06
           308E  MANE          3.78    247.20    241.60      0.97      6.00    246.19    240.00         0.97

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3786E+02 OUTFLOW=0.3743E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 1.06
           308E  MANE          3.55    279.50    239.36      1.08      6.00    278.30    240.00         1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4183E+02 OUTFLOW=0.4134E+02 BASIN STORAGE=0.1336E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 0.95
           308E  MANE          4.02    220.87    242.66      0.89      6.00    218.19    246.00         0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3462E+02 OUTFLOW=0.3419E+02 BASIN STORAGE=0.1250E+00 PERCENT ERROR=   0.9

          FOR PLAN = 1  RATIO= 0.85
           308E  MANE          4.35    169.76    249.35      0.73      6.00    167.51    252.00         0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2833E+02 OUTFLOW=0.2793E+02 BASIN STORAGE=0.1176E+00 PERCENT ERROR=   1.0

          FOR PLAN = 1  RATIO= 1.06
        R307/308  MANE          1.69   2263.64    297.03      0.85      6.00   2256.45    300.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5415E+03 EXCESS=0.0000E+00 OUTFLOW=0.5408E+03 BASIN STORAGE=0.5255E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
        R307/308  MANE          1.92   1776.51    308.72      0.69      6.00   1775.34    306.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4402E+03 EXCESS=0.0000E+00 OUTFLOW=0.4395E+03 BASIN STORAGE=0.5206E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
        R307/308  MANE          1.99   1395.93    321.88      0.55      6.00   1394.06    324.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3534E+03 EXCESS=0.0000E+00 OUTFLOW=0.3528E+03 BASIN STORAGE=0.5135E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
           312W  MANE          4.38    151.05    259.56      0.68      6.00    150.27    258.00         0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2837E+02 OUTFLOW=0.2788E+02 BASIN STORAGE=0.1499E+00 PERCENT ERROR=   1.2

          FOR PLAN = 1  RATIO= 1.06
           312W  MANE          4.13    178.76    253.72      0.76      6.00    176.82    252.00         0.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3193E+02 OUTFLOW=0.3139E+02 BASIN STORAGE=0.1524E+00 PERCENT ERROR=   1.2

          FOR PLAN = 1  RATIO= 0.95
           312W  MANE          4.66    128.36    265.03      0.61      6.00    128.06    264.00         0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2550E+02 OUTFLOW=0.2503E+02 BASIN STORAGE=0.1422E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.85
           312W  MANE          5.22     92.48    315.74      0.48      6.00     92.32    312.00         0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2003E+02 OUTFLOW=0.1959E+02 BASIN STORAGE=0.1495E+00 PERCENT ERROR=   1.4

          FOR PLAN = 1  RATIO= 1.06
          R312W  MANE          1.69   2387.35    302.83      0.84      6.00   2385.94    300.00         0.84

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5721E+03 EXCESS=0.0000E+00 OUTFLOW=0.5713E+03 BASIN STORAGE=0.5634E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          R312W  MANE          1.74   1887.73    309.71      0.68      6.00   1885.78    312.00         0.68
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4645E+03 EXCESS=0.0000E+00 OUTFLOW=0.4637E+03 BASIN STORAGE=0.5695E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	2.01	1483.20	327.23	0.55	6.00	1481.73	324.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3723E+03 EXCESS=0.0000E+00 OUTFLOW=0.3716E+03 BASIN STORAGE=0.5539E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312E	MANE	4.98	105.70	258.24	0.57	6.00	105.50	258.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2150E+02 OUTFLOW=0.2112E+02 BASIN STORAGE=0.1090E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 1.06

312E	MANE	4.62	128.65	251.72	0.64	6.00	128.64	252.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2444E+02 OUTFLOW=0.2405E+02 BASIN STORAGE=0.1031E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.95

312E	MANE	5.27	91.07	311.86	0.50	6.00	91.06	312.00	0.50

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1915E+02 OUTFLOW=0.1879E+02 BASIN STORAGE=0.1079E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.85

312E	MANE	5.80	72.33	313.83	0.39	6.00	71.93	312.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1471E+02 OUTFLOW=0.1440E+02 BASIN STORAGE=0.1024E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.35	6517.77	444.72	0.83	6.00	6517.20	444.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3667E+04 EXCESS=0.0000E+00 OUTFLOW=0.3666E+04 BASIN STORAGE=0.9334E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.34	5452.75	450.71	0.69	6.00	5452.43	450.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3048E+04 EXCESS=0.0000E+00 OUTFLOW=0.3047E+04 BASIN STORAGE=0.8631E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.39	4514.23	462.64	0.57	6.00	4514.13	462.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2529E+04 EXCESS=0.0000E+00 OUTFLOW=0.2528E+04 BASIN STORAGE=0.8137E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.17	6517.16	444.31	0.83	6.00	6516.67	444.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3666E+04 EXCESS=0.0000E+00 OUTFLOW=0.3665E+04 BASIN STORAGE=0.7262E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.18	5452.38	450.31	0.69	6.00	5452.06	450.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3048E+04 EXCESS=0.0000E+00 OUTFLOW=0.3047E+04 BASIN STORAGE=0.6743E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.33	4514.03	462.42	0.57	6.00	4513.93	462.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2528E+04 EXCESS=0.0000E+00 OUTFLOW=0.2527E+04 BASIN STORAGE=0.6377E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	1.49	6516.28	446.80	0.83	6.00	6515.14	450.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3665E+04 EXCESS=0.0000E+00 OUTFLOW=0.3659E+04 BASIN STORAGE=0.5918E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	1.50	5451.92	453.12	0.69	6.00	5450.35	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3047E+04 EXCESS=0.0000E+00 OUTFLOW=0.3042E+04 BASIN STORAGE=0.5480E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	1.54	4513.71	465.52	0.57	6.00	4512.52	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2528E+04 EXCESS=0.0000E+00 OUTFLOW=0.2523E+04 BASIN STORAGE=0.5174E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	0.73	6514.79	450.94	0.83	6.00	6514.35	450.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3658E+04 EXCESS=0.0000E+00 OUTFLOW=0.3655E+04 BASIN STORAGE=0.2981E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	0.74	5450.18	457.05	0.69	6.00	5449.93	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3041E+04 EXCESS=0.0000E+00 OUTFLOW=0.3038E+04 BASIN STORAGE=0.2765E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	0.80	4512.45	468.49	0.57	6.00	4512.42	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2522E+04 EXCESS=0.0000E+00 OUTFLOW=0.2519E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC4/FC	MANE	1.05	6513.61	451.34	0.82	6.00	6512.39	450.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3655E+04 EXCESS=0.0000E+00 OUTFLOW=0.3651E+04 BASIN STORAGE=0.4077E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC4/FC	MANE	1.08	5449.59	457.93	0.69	6.00	5448.55	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3038E+04 EXCESS=0.0000E+00 OUTFLOW=0.3034E+04 BASIN STORAGE=0.3783E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC4/FC	MANE	1.13	4512.19	469.75	0.57	6.00	4511.79	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2519E+04 EXCESS=0.0000E+00 OUTFLOW=0.2516E+04 BASIN STORAGE=0.3570E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

RRCHANNL	MANE	5.97	0.16	463.63	0.87	6.00	0.16	462.00	0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95

RRCHANNL	MANE	5.97	0.12	484.09	0.71	6.00	0.12	486.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85

RRCHANNL	MANE	6.00	0.09	550.79	0.57	6.00	0.09	552.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06

AC1/AC2	MANE	0.61	11748.12	463.51	1.25	6.00	11746.81	462.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7470E+04 EXCESS=0.0000E+00 OUTFLOW=0.7464E+04 BASIN STORAGE=0.5752E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC1/AC2	MANE	0.60	9883.45	457.59	1.04	6.00	9882.08	462.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6181E+04 EXCESS=0.0000E+00 OUTFLOW=0.6177E+04 BASIN STORAGE=0.4960E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC1/AC2	MANE	0.71	8274.14	468.63	0.86	6.00	8273.80	468.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5103E+04 EXCESS=0.0000E+00 OUTFLOW=0.5100E+04 BASIN STORAGE=0.3912E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC3	MANE	0.42	11746.67	462.80	1.25	6.00	11745.41	462.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7464E+04 EXCESS=0.0000E+00 OUTFLOW=0.7460E+04 BASIN STORAGE=0.4185E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC3	MANE	0.50	9881.93	462.08	1.04	6.00	9881.92	462.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6176E+04 EXCESS=0.0000E+00 OUTFLOW=0.6173E+04 BASIN STORAGE=0.3633E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC3	MANE	0.45	8273.59	468.97	0.86	6.00	8273.07	468.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5099E+04 EXCESS=0.0000E+00 OUTFLOW=0.5097E+04 BASIN STORAGE=0.2892E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC4	MANE	0.50	11745.37	463.40	1.25	6.00	11745.05	468.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7460E+04 EXCESS=0.0000E+00 OUTFLOW=0.7454E+04 BASIN STORAGE=0.5067E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC4	MANE	0.50	9881.65	462.63	1.04	6.00	9881.47	462.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6172E+04 EXCESS=0.0000E+00 OUTFLOW=0.6168E+04 BASIN STORAGE=0.4404E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC4	MANE	0.59	8272.78	469.34	0.86	6.00	8272.02	468.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5096E+04 EXCESS=0.0000E+00 OUTFLOW=0.5093E+04 BASIN STORAGE=0.3520E+01 PERCENT ERROR= 0.0

*** NORMAL END OF HEC-1 ***

Paper Copy C
Interbasin Storm

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991           *
*           VERSION 4.0.1 (LOCAL)       *
*                                   *
*  RUN DATE  05/14/96  TIME  10:33:42   *
*                                   *
*************************************
```


```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS     *
*    HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET          *
*        DAVIS, CALIFORNIA 95616      *
*             (916) 551-1748          *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X         XXXXX X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS *DATED 28 SEP 81. THIS IS THE* FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
            1           ID          FEMA FLOOD INSURANCE STUDY, 1996
            2           ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
            3           ID          INTERBASIN  10-year  STORM
            4           ID
            5           ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
            6           ID          in 8/93 for the design of outlet modifications at the North Las Vegas
            7           ID          Detention Basin (NLVDB).  This storm centering generates the highest
            8           ID          100-year inflows to the NLVDB.
            9           ID
           10           ID          Modifications to the original B&V model were to adjust the outlet
           11           ID          rating for the NLVDB to reflect the four-foot high barrier wall in
           12           ID          front of the 3-pipe outlet.  Additional models were created to
           13           ID          represent 10, 50, and 500-year storms.
           14           ID
           15           ID          Remaining comments are from the original model dated 8/93.
           16           ID
           17           ID      This storm also known as "Gayles Storm" simulates a 54 square mile
           18           ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
           19           ID      but upstream of the North Las Vegas Detention Basin.  This model is based
           20           ID      original model developed by Black & Veatch during the predesign study for
           21           ID      Upper Las Vegas Wash Detention Basin.
           22           ID
           23           ID              Storm Area:     54.37 sq. miles
           24           ID              DARF:           0.66 (CCRFCD Drainage Manual)
           25           ID
           26           ID        10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
           27           ID        50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
           28           ID       100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
           29           ID
           30           ID       JR Card includes DARF for model
           31           ID       PB Cards are adjusted rainfall depth, NOAA Atas II amounts
           32           ID          times adjustment ratios given above.
           33           ID       PB Cards for 500-year storm based on frequency extrapolation of
           34           ID          10, 50, and 100-year data after precipitation ratio adjustments.
           35           ID
*** FREE ***
           36           IT      6       0       0     300
           37           IO      5       0       0
           38           IN      5       0       0
           39           JR   PREC    0.66

           40           KK    105
           41           KM   RUNOFF FROM SUBBASIN 105
           42           BA  6.898
           43           PB  2.23
           44           PC   .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
           45           PC   .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
           46           PC   .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
           47           PC   .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
           48           PC   .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
           49           PC   .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
           50           PC   .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
           51           PC   .997    .999   1.00
           52           LS     0      86
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1 HEC-1 INPUT PAGE 2

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          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           53           UD    .773
```

```
54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    2.23
65          LS       0      85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    1.95
71          LS       0      84
72          UD    .324

73          KK       .
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    1.71
85          LS       0      83
86          UD    .369

87          KK       .
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
1                                  HEC-1 INPUT                                    PAGE   3
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    1.58
97          LS       0      77
98          UD   1.505

99          KK       .
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    1.71
106         LS       0      84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    1.58
117         LS       0      78
118         UD   1.418

119         KK       .
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    1.71
126         LS       0      86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
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          130          RM       1   0.183    0.15

          131          KK       V
          132          RM       2   0.386    0.15
1                                        HEC-1 INPUT                                                    PAGE  4

          LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          133          KK     109
          134          KM    RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    1.58
          137          LS       0       78
          138          UD   1.281

          139          KK       .
          140          KM    COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK    109R
          143          KM    ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (PAN)
          144          RM       3   0.649    0.15

          145          KK    101R
          146          KM    ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (PAN)
          147          RM       3   0.821    0.15

          148          KK       .
          149          KM    COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK   NLVIN
          159          KO       1
          160          KM    ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM    ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM    OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

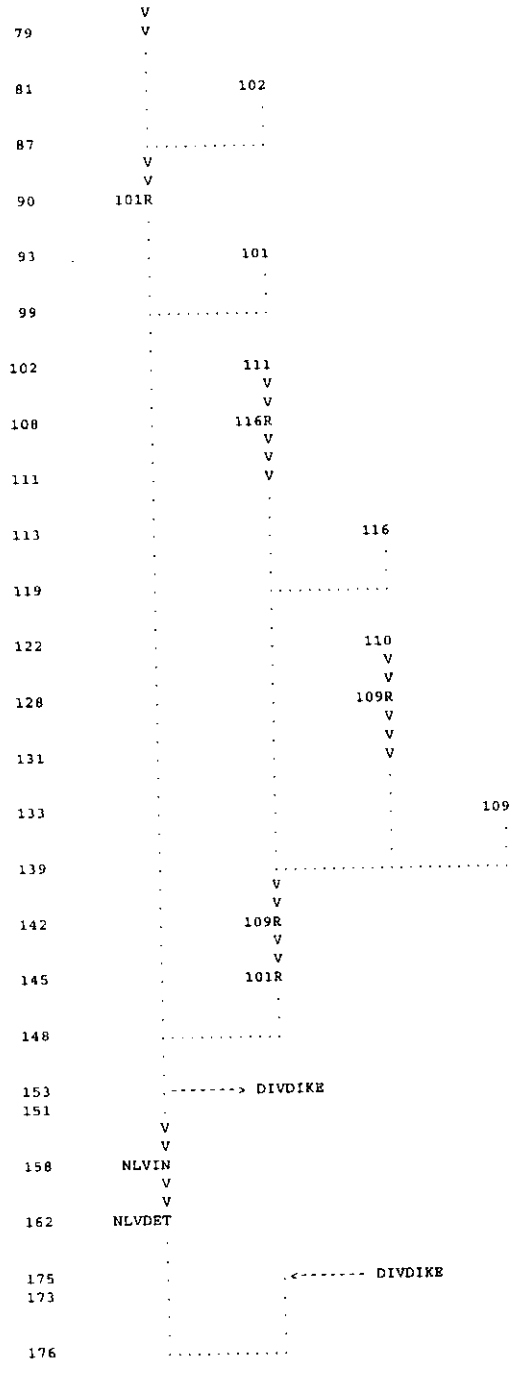
          LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          176          KK       .
          177          KM    COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
                  SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            ..........................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:33:42   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 10-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts
times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of
10, 50, and 100-year data after precipitation ratio adjustments.

```
 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME         0554  ENDING TIME
                      ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                       TOTAL TIME BASE    29.90 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.66


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
158 KK     *     NLVIN  *
           *            *
           **************

159 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

                HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                         L       2000.  CHANNEL LENGTH
                         S     0.0076  SLOPE
                         N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA       0.00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      35.00  BOTTOM WIDTH OR DIAMETER
                         Z       2.00  SIDE SLOPE
                    NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS

                                                  ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                    (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA       M         DT         DX       PEAK    TIME TO PEAK    VOLUME    MAXIMUM CELERITY
                                                     (MIN)      (FT)     (CFS)       (MIN)        (IN)        (FPS)

                   MAIN         1.01      1.55       0.45     666.67   2938.91      336.84        0.23       26.85
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6698E+03 EXCESS=0.0000E+00 OUTFLOW=0.6698E+03 BASIN STORAGE=0.3394E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	2938.17	336.00	0.23

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	877.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	783.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	696.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	617.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	544.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	479.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	420.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	368.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	321.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	280.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	243.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	211.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	183.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	159.	1		1618	164	0.	1		2348	239	0.
1		0124	15	0.	1		0854	90	138.	1		1624	165	0.	1		2354	240	0.
1		0130	16	0.	1		0900	91	119.	1		1630	166	0.	2		0000	241	0.
1		0136	17	0.	1		0906	92	104.	1		1636	167	0	2		0006	242	0.
1		0142	18	0.	1		0912	93	90.	1		1642	168	0.	2		0012	243	0.
1		0148	19	0.	1		0918	94	78.	1		1648	169	0.	2		0018	244	0.
1		0154	20	0.	1		0924	95	68.	1		1654	170	0.	2		0024	245	0.
1		0200	21	0.	1		0930	96	59.	1		1700	171	0.	2		0030	246	0.
1		0206	22	0.	1		0936	97	52.	1		1706	172	0.	2		0036	247	0.
1		0212	23	0.	1		0942	98	45.	1		1712	173	0.	2		0042	248	0.
1		0218	24	0.	1		0948	99	40.	1		1718	174	0.	2		0048	249	0.
1		0224	25	0.	1		0954	100	35.	1		1724	175	0.	2		0054	250	0.
1		0230	26	0.	1		1000	101	30.	1		1730	176	0.	2		0100	251	0.
1		0236	27	0.	1		1006	102	27.	1		1736	177	0.	2		0106	252	0.
1		0242	28	2.	1		1012	103	24.	1		1742	178	0.	2		0112	253	0.
1		0248	29	5.	1		1018	104	21.	1		1748	179	0.	2		0118	254	0.
1		0254	30	9.	1		1024	105	18.	1		1754	180	0.	2		0124	255	0.
1		0300	31	14.	1		1030	106	16.	1		1800	181	0.	2		0130	256	0.
1		0306	32	20.	1		1036	107	14.	1		1806	182	0.	2		0136	257	0.
1		0312	33	28.	1		1042	108	13.	1		1812	183	0.	2		0142	258	0.
1		0318	34	40.	1		1048	109	11.	1		1818	184	0.	2		0148	259	0.
1		0324	35	61.	1		1054	110	10.	1		1824	185	0.	2		0154	260	0.
1		0330	36	99.	1		1100	111	9.	1		1830	186	0.	2		0200	261	0.
1		0336	37	167.	1		1106	112	8.	1		1836	187	0.	2		0206	262	0.
1		0342	38	279.	1		1112	113	7.	1		1842	188	0	2		0212	263	0.
1		0348	39	444.	1		1118	114	6.	1		1848	189	0.	2		0218	264	0.
1		0354	40	660.	1		1124	115	6.	1		1854	190	0.	2		0224	265	0.
1		0400	41	906.	1		1130	116	5.	1		1900	191	0.	2		0230	266	0.
1		0406	42	1160.	1		1136	117	4.	1		1906	192	0.	2		0236	267	0.
1		0412	43	1400.	1		1142	118	4.	1		1912	193	0.	2		0242	268	0.
1		0418	44	1610.	1		1148	119	4.	1		1918	194	0.	2		0248	269	0.
1		0424	45	1785.	1		1154	120	3.	1		1924	195	0.	2		0254	270	0.
1		0430	46	1921.	1		1200	121	3.	1		1930	196	0.	2		0300	271	0.
1		0436	47	2026.	1		1206	122	2.	1		1936	197	0.	2		0306	272	0.
1		0442	48	2109.	1		1212	123	2.	1		1942	198	0.	2		0312	273	0.
1		0448	49	2186.	1		1218	124	2.	1		1948	199	0.	2		0318	274	0.
1		0454	50	2270.	1		1224	125	2.	1		1954	200	0.	2		0324	275	0.
1		0500	51	2372.	1		1230	126	1.	1		2000	201	0.	2		0330	276	0.
1		0506	52	2496.	1		1236	127	1.	1		2006	202	0.	2		0336	277	0.
1		0512	53	2631.	1		1242	128	1.	1		2012	203	0.	2		0342	278	0.
1		0518	54	2759.	1		1248	129	1.	1		2018	204	0.	2		0348	279	0.
1		0524	55	2861.	1		1254	130	1.	1		2024	205	0.	2		0354	280	0.
1		0530	56	2923.	1		1300	131	1.	1		2030	206	0.	2		0400	281	0.
1		0536	57	2938.	1		1306	132	1.	1		2036	207	0.	2		0406	282	0.
1		0542	58	2909.	1		1312	133	1.	1		2042	208	0.	2		0412	283	0.
1		0548	59	2843.	1		1318	134	0.	1		2048	209	0.	2		0418	284	0.
1		0554	60	2750.	1		1324	135	0.	1		2054	210	0.	2		0424	285	0.
1		0600	61	2641.	1		1330	136	0.	1		2100	211	0.	2		0430	286	0.
1		0606	62	2523.	1		1336	137	0.	1		2106	212	0.	2		0436	287	0.
1		0612	63	2402.	1		1342	138	0.	1		2112	213	0.	2		0442	288	0.
1		0618	64	2283.	1		1348	139	0.	1		2118	214	0.	2		0448	289	0.
1		0624	65	2166.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	2049.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	1932.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	1814.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	1692.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	1569.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	1446.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	1323.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	1203.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	1088.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	979.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			

+ 2938.	5.60		1340.	338.	271.	271.	
		(INCHES)	0.229	0.231	0.231	0.231	
		(AC-FT)	664.	670.	670.	670.	

CUMULATIVE AREA = 54.37 SQ MI

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          *            *
162 KK    *   NLVDET   *
          *            *
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163 KO OUTPUT CONTROL VARIABLES
IPRNT 1 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE
ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

HYDROGRAPH ROUTING DATA

166 RS STORAGE ROUTING
NSTPS 1 NUMBER OF SUBREACHES
ITYP STOR TYPE OF INITIAL CONDITION
RSVRIC -1.00 INITIAL CONDITION
X 0.00 WORKING R AND D COEFFICIENT

167 SV	STORAGE	0.0	25.0	100.0	190.0	430.0	665.0	1095.0	1285.0	1435.0	1540.0
		1650.0	1825.0	1920.0	2000.0	2110.0	2200.0	2310.0	2430.0		
169 SE	ELEVATION	0.00	2.00	4.00	6.00	10.00	14.00	21.00	24.00	26.00	27.00
		28.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00		
171 SQ	DISCHARGE	0.	77.	117.	597.	1310.	1660.	2110.	2260.	2360.	2690.
		3050.	4630.	5710.	7090.	8610.	10140.	11670.	13200.		

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HYDROGRAPH AT STATION NLVDET
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		1000	101	757.	243.9	6.9	1		2000	201	93.	54.4	2.8
1		0006	2	0.	0.0	0.0	1		1006	102	739.	237.9	6.8	1		2006	202	92.	53.6	2.8
1		0012	3	0.	0.0	0.0	1		1012	103	722.	232.1	6.7	1		2012	203	92.	52.8	2.7
1		0018	4	0.	0.0	0.0	1		1018	104	705.	226.4	6.6	1		2018	204	91.	52.1	2.7
1		0024	5	0.	0.0	0.0	1		1024	105	688.	220.8	6.5	1		2024	205	91.	51.3	2.7
1		0030	6	0.	0.0	0.0	1		1030	106	672.	215.3	6.4	1		2030	206	91.	50.6	2.7
1		0036	7	0.	0.0	0.0	1		1036	107	656.	209.9	6.3	1		2036	207	90.	49.8	2.7
1		0042	8	0.	0.0	0.0	1		1042	108	641.	204.7	6.2	1		2042	208	90.	49.1	2.6
1		0048	9	0.	0.0	0.0	1		1048	109	625.	199.6	6.2	1		2048	209	89.	48.3	2.6
1		0054	10	0.	0.0	0.0	1		1054	110	611.	194.5	6.1	1		2054	210	89.	47.6	2.6
1		0100	11	0.	0.0	0.0	1		1100	111	595.	189.6	6.0	1		2100	211	89.	46.9	2.6
1		0106	12	0.	0.0	0.0	1		1106	112	570.	184.9	5.9	1		2106	212	88.	46.1	2.6
1		0112	13	0.	0.0	0.0	1		1112	113	546.	180.4	5.8	1		2112	213	88.	45.4	2.5
1		0118	14	0.	0.0	0.0	1		1118	114	522.	176.0	5.7	1		2118	214	87.	44.7	2.5
1		0124	15	0.	0.0	0.0	1		1124	115	500.	171.8	5.6	1		2124	215	87.	44.0	2.5
1		0130	16	0.	0.0	0.0	1		1130	116	479.	167.8	5.5	1		2130	216	87.	43.2	2.5
1		0136	17	0.	0.0	0.0	1		1136	117	458.	164.0	5.4	1		2136	217	86.	42.5	2.5
1		0142	18	0.	0.0	0.0	1		1142	118	439.	160.3	5.3	1		2142	218	86.	41.8	2.4
1		0148	19	0.	0.0	0.0	1		1148	119	420.	156.8	5.3	1		2148	219	86.	41.1	2.4
1		0154	20	0.	0.0	0.0	1		1154	120	402.	153.4	5.2	1		2154	220	85.	40.4	2.4
1		0200	21	0.	0.0	0.0	1		1200	121	385.	150.2	5.1	1		2200	221	85.	39.7	2.4
1		0206	22	0.	0.0	0.0	1		1206	122	368.	147.1	5.0	1		2206	222	84.	39.0	2.4
1		0212	23	0.	0.0	0.0	1		1212	123	353.	144.2	5.0	1		2212	223	84.	38.3	2.4
1		0218	24	0.	0.0	0.0	1		1218	124	337.	141.3	4.9	1		2218	224	84.	37.6	2.3
1		0224	25	0.	0.0	0.0	1		1224	125	323.	138.6	4.9	1		2224	225	83.	36.9	2.3
1		0230	26	0.	0.0	0.0	1		1230	126	309.	136.0	4.8	1		2230	226	83.	36.2	2.3
1		0236	27	0.	0.0	0.0	1		1236	127	296.	133.5	4.7	1		2236	227	83.	35.5	2.3
1		0242	28	0.	0.0	0.0	1		1242	128	283.	131.1	4.7	1		2242	228	82.	34.9	2.3
1		0248	29	0.	0.0	0.0	1		1248	129	271.	128.9	4.6	1		2248	229	82.	34.2	2.2
1		0254	30	0.	0.1	0.0	1		1254	130	259.	126.7	4.6	1		2254	230	82.	33.5	2.2
1		0300	31	1.	0.2	0.0	1		1300	131	248.	124.6	4.5	1		2300	231	81.	32.8	2.2
1		0306	32	1.	0.3	0.0	1		1306	132	237.	122.6	4.5	1		2306	232	81.	32.2	2.2
1		0312	33	2.	0.5	0.0	1		1312	133	227.	120.7	4.5	1		2312	233	80.	31.5	2.2
1		0318	34	2.	0.8	0.1	1		1318	134	217.	118.8	4.4	1		2318	234	80.	30.8	2.2
1		0324	35	4.	1.2	0.1	1		1324	135	208.	117.1	4.4	1		2324	235	80.	30.2	2.1
1		0330	36	5.	1.8	0.1	1		1330	136	199.	115.4	4.3	1		2330	236	79.	29.5	2.1
1		0336	37	9.	2.8	0.2	1		1336	137	191.	113.8	4.3	1		2336	237	79.	28.9	2.1
1		0342	38	14.	4.6	0.4	1		1342	138	182.	112.3	4.3	1		2342	238	79.	28.2	2.1
1		0348	39	23.	7.4	0.6	1		1348	139	175.	110.8	4.2	1		2348	239	78.	27.6	2.1
1		0354	40	36.	11.7	0.9	1		1354	140	167.	109.4	4.2	1		2354	240	78.	26.9	2.1
1		0400	41	55.	17.8	1.4	1		1400	141	160.	108.0	4.2	2		0000	241	78.	26.3	2.0
1		0406	42	77.	25.8	2.0	1		1406	142	153.	106.7	4.1	2		0006	242	77.	25.6	2.0
1		0412	43	83.	35.7	2.3	1		1412	143	146.	105.5	4.1	2		0012	243	77.	25.0	2.0
1		0418	44	89.	47.4	2.6	1		1418	144	140.	104.3	4.1	2		0018	244	75.	24.4	1.9
1		0424	45	96.	60.7	3.0	1		1424	145	134.	103.2	4.1	2		0024	245	73.	23.8	1.9
1		0430	46	104.	75.2	3.3	1		1430	146	128.	102.1	4.0	2		0030	246	71.	23.2	1.9

1	0436	47	112.	90.6	3.7	*	1	1436	147	123.	101.1	4.0	*	2	0036	247	70.	22.6	1.8
1	0442	48	152.	106.6	4.1	*	1	1442	148	117.	100.1	4.0	*	2	0042	248	68.	22.0	1.8
1	0448	49	238.	122.7	4.5	*	1	1448	149	117.	99.1	4.0	*	2	0048	249	66.	21.5	1.7
1	0454	50	324.	138.8	4.9	*	1	1454	150	116.	98.1	4.0	*	2	0054	250	64.	20.9	1.7
1	0500	51	410.	155.0	5.2	*	1	1500	151	116.	97.2	3.9	*	2	0100	251	63.	20.4	1.6
1	0506	52	498.	171.4	5.6	*	1	1506	152	115.	96.2	3.9	*	2	0106	252	62.	19.9	1.6
1	0512	53	587.	188.1	6.0	*	1	1512	153	114.	95.3	3.9	*	2	0112	253	60.	19.4	1.6
1	0518	54	642.	205.3	6.3	*	1	1518	154	114.	94.3	3.8	*	2	0118	254	58.	18.9	1.5
1	0524	55	695.	223.0	6.5	*	1	1524	155	113.	93.4	3.8	*	2	0124	255	57.	18.4	1.5
1	0530	56	748.	240.9	6.8	*	1	1530	156	113.	92.5	3.8	*	2	0130	256	55.	18.0	1.4
1	0536	57	801.	258.7	7.1	*	1	1536	157	112.	91.5	3.8	*	2	0136	257	54.	17.5	1.4
1	0542	58	853.	276.0	7.4	*	1	1542	158	112.	90.6	3.7	*	2	0142	258	53.	17.1	1.4
1	0548	59	902.	292.6	7.7	*	1	1548	159	112.	89.7	3.7	*	2	0148	259	51.	16.6	1.3
1	0554	60	948.	308.0	8.0	*	1	1554	160	111.	88.8	3.7	*	2	0154	260	50.	16.2	1.3
1	0600	61	990.	322.3	8.2	*	1	1600	161	111.	87.9	3.7	*	2	0200	261	49.	15.8	1.3
1	0606	62	1029.	335.3	8.4	*	1	1606	162	110.	86.9	3.7	*	2	0206	262	47.	15.4	1.2
1	0612	63	1063.	347.0	8.6	*	1	1612	163	110.	86.0	3.6	*	2	0212	263	46.	15.0	1.2
1	0618	64	1094.	357.4	8.8	*	1	1618	164	109.	85.1	3.6	*	2	0218	264	45.	14.6	1.2
1	0624	65	1122.	366.7	8.9	*	1	1624	165	109.	84.2	3.6	*	2	0224	265	44.	14.3	1.1
1	0630	66	1146.	374.7	9.1	*	1	1630	166	108.	83.3	3.6	*	2	0230	266	43.	13.9	1.1
1	0636	67	1166.	381.6	9.2	*	1	1636	167	108.	82.4	3.5	*	2	0236	267	42.	13.6	1.1
1	0642	68	1183.	387.4	9.3	*	1	1642	168	107.	81.6	3.5	*	2	0242	268	41.	13.2	1.1
1	0648	69	1197.	392.0	9.4	*	1	1648	169	107.	80.7	3.5	*	2	0248	269	40.	12.9	1.0
1	0654	70	1208.	395.6	9.4	*	1	1654	170	106.	79.8	3.5	*	2	0254	270	39.	12.6	1.0
1	0700	71	1215.	398.0	9.5	*	1	1700	171	106.	78.9	3.4	*	2	0300	271	38.	12.3	1.0
1	0706	72	1219.	399.4	9.5	*	1	1706	172	105.	78.0	3.4	*	2	0306	272	37.	11.9	1.0
1	0712	73	1220.	399.8	9.5	*	1	1712	173	105.	77.2	3.4	*	2	0312	273	36.	11.6	0.9
1	0718	74	1218.	399.2	9.5	*	1	1718	174	104.	76.3	3.4	*	2	0318	274	35.	11.4	0.9
1	0724	75	1214.	397.6	9.5	*	1	1724	175	104.	75.5	3.3	*	2	0324	275	34.	11.1	0.9
1	0730	76	1207.	395.3	9.4	*	1	1730	176	103.	74.6	3.3	*	2	0330	276	33.	10.8	0.9
1	0736	77	1198.	392.2	9.4	*	1	1736	177	103.	73.7	3.3	*	2	0336	277	32.	10.5	0.8
1	0742	78	1187.	388.5	9.3	*	1	1742	178	103.	72.9	3.3	*	2	0342	278	32.	10.3	0.8
1	0748	79	1174.	384.2	9.2	*	1	1748	179	102.	72.1	3.3	*	2	0348	279	31.	10.0	0.8
1	0754	80	1159.	379.3	9.2	*	1	1754	180	102.	71.2	3.2	*	2	0354	280	30.	9.7	0.8
1	0800	81	1144.	374.0	9.1	*	1	1800	181	101.	70.4	3.2	*	2	0400	281	29.	9.5	0.8
1	0806	82	1127.	368.4	9.0	*	1	1806	182	101.	69.5	3.2	*	2	0406	282	29.	9.3	0.7
1	0812	83	1109.	362.4	8.9	*	1	1812	183	100.	68.7	3.2	*	2	0412	283	28.	9.0	0.7
1	0818	84	1091.	356.1	8.8	*	1	1818	184	100.	67.9	3.1	*	2	0418	284	27.	8.8	0.7
1	0824	85	1071.	349.7	8.7	*	1	1824	185	99.	67.1	3.1	*	2	0424	285	26.	8.6	0.7
1	0830	86	1052.	343.1	8.6	*	1	1830	186	99.	66.2	3.1	*	2	0430	286	26.	8.4	0.7
1	0836	87	1032.	336.3	8.4	*	1	1836	187	99.	65.4	3.1	*	2	0436	287	25.	8.2	0.7
1	0842	88	1012.	329.5	8.3	*	1	1842	188	98.	64.6	3.1	*	2	0442	288	24.	8.0	0.6
1	0848	89	991.	322.7	8.2	*	1	1848	189	98.	63.8	3.0	*	2	0448	289	24.	7.8	0.6
1	0854	90	971.	315.8	8.1	*	1	1854	190	97.	63.0	3.0	*	2	0454	290	23.	7.6	0.6
1	0900	91	950.	308.9	8.0	*	1	1900	191	97.	62.2	3.0	*	2	0500	291	23.	7.4	0.6
1	0906	92	930.	302.1	7.9	*	1	1906	192	96.	61.4	3.0	*	2	0506	292	22.	7.2	0.6
1	0912	93	910.	295.3	7.8	*	1	1912	193	96.	60.6	2.9	*	2	0512	293	22.	7.0	0.6
1	0918	94	890.	288.5	7.6	*	1	1918	194	96.	59.8	2.9	*	2	0518	294	21.	6.8	0.5
1	0924	95	870.	281.9	7.5	*	1	1924	195	95.	59.0	2.9	*	2	0524	295	20.	6.7	0.5
1	0930	96	850.	275.3	7.4	*	1	1930	196	95.	58.2	2.9	*	2	0530	296	20.	6.5	0.5
1	0936	97	831.	268.8	7.3	*	1	1936	197	94.	57.4	2.9	*	2	0536	297	19.	6.3	0.5
1	0942	98	812.	262.4	7.2	*	1	1942	198	94.	56.7	2.8	*	2	0542	298	19.	6.2	0.5
1	0948	99	793.	256.1	7.1	*	1	1948	199	93.	55.9	2.8	*	2	0548	299	19.	6.0	0.5
1	0954	100	775.	249.9	7.0	*	1	1954	200	93.	55.1	2.8	*	2	0554	300	18.	5.9	0.5

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)					
		(CFS)				
1220.	7.20		943.	333.	269.	269.
		(INCHES)	0.161	0.227	0.229	0.229
		(AC-FT)	467.	660.	664.	664.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
(AC-FT)	(HR)				
400.	7.20	306.	127.	102.	102.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
(FEET)	(HR)				
9.50	7.20	7.94	4.22	3.43	3.43

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					0.66
HYDROGRAPH AT					
+	105	6.90	1	FLOW	933.
				TIME	4.20
ROUTED TO					
+	104R	6.90	1	FLOW	910.
				TIME	4.40
ROUTED TO					
+	V	6.90	1	FLOW	871.
				TIME	4.70

ROUTED TO					
+	V	6.90	1	FLOW	855.
				TIME	4.90
HYDROGRAPH AT					
+	104	6.63	1	FLOW	917.
				TIME	4.10
HYDROGRAPH AT					
+	103	6.91	1	FLOW	867.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	2204.
				TIME	5.00
ROUTED TO					
+	102R	20.44	1	FLOW	2148.
				TIME	5.10
ROUTED TO					
+	V	20.44	1	FLOW	2083.
				TIME	5.30
HYDROGRAPH AT					
+	102	8.45	1	FLOW	599.
				TIME	3.80
2 COMBINED AT					
+	.	28.89	1	FLOW	2544.
				TIME	5.10
ROUTED TO					
+	101R	28.89	1	FLOW	2432.
				TIME	5.50
HYDROGRAPH AT					
+	101	9.08	1	FLOW	130.
				TIME	6.00
2 COMBINED AT					
+	.	37.97	1	FLOW	2541.
				TIME	5.50
HYDROGRAPH AT					
+	111	4.08	1	FLOW	405.
				TIME	3.70
ROUTED TO					
+	116R	4.08	1	FLOW	346.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	285.
				TIME	4.30
HYDROGRAPH AT					
+	116	5.19	1	FLOW	91.
				TIME	5.90
2 COMBINED AT					
+	.	9.27	1	FLOW	335.
				TIME	5.40
HYDROGRAPH AT					
+	110	2.94	1	FLOW	385.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	333.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	273.
				TIME	4.20
HYDROGRAPH AT					
+	109	4.18	1	FLOW	77.
				TIME	5.80
3 COMBINED AT					
+	.	16.40	1	FLOW	623.
				TIME	5.40
ROUTED TO					
+	109R	16.40	1	FLOW	560.
				TIME	5.90
ROUTED TO					
+	101R	16.40	1	FLOW	525.
				TIME	6.60
2 COMBINED AT					
+	.	54.37	1	FLOW	2939.
				TIME	5.60
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	0.
				TIME	0.10

```
 HYDROGRAPH AT
+                    .      54.37      1   FLOW         2939.
                                           TIME         5.60

 ROUTED TO
+                  NLVIN    54.37      1   FLOW         2938.
                                           TIME         5.60

 ROUTED TO
+                  NLVDET   54.37      1   FLOW         1220.
                                           TIME         7.20

                                       ** PEAK STAGES IN FEET **
                                       1   STAGE        9.50
                                           TIME         7.20

 HYDROGRAPH AT
+                    .       0.00      1   FLOW            0.
                                           TIME         0.10

  2 COMBINED AT
+                    .      54.37      1   FLOW         1220.
                                           TIME         7.20

1
                                       SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                           (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                        PEAK                                       PEAK

                                 (MIN)      (CFS)      (MIN)      (IN)      (MIN)      (CFS)      (MIN)      (IN)

        FOR PLAN = 1  RATIO= 0.66
           NLVIN  MANE          0.45    2938.91     336.84       0.23       6.00    2938.17     336.00       0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6698E+03 EXCESS=0.0000E+00 OUTFLOW=0.6698E+03 BASIN STORAGE=0.3394E-04 PERCENT ERROR=    0.0


*** NORMAL END OF HEC-1 ***
```

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)*
*          FEBRUARY 1991            *
*           VERSION 4.0.1 (LOCAL)   *
*                                   *
*  RUN DATE  05/14/96  TIME  10:33:54*
*                                   *
*************************************
```


```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 551-1748           *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                *DIAGRAM
              1 ID          FEMA FLOOD INSURANCE STUDY, 1996
              2 ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3 ID          INTERBASIN 50-year STORM
              4 ID
              5 ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
              6 ID          in 8/93 for the design of outlet modifications at the North Las Vegas
              7 ID          Detention Basin (NLVDB).  This storm centering generates the highest
              8 ID          100-year inflows to the NLVDB.
              9 ID
             10 ID          Modifications to the original B&V model were to adjust the outlet
             11 ID          rating for the NLVDB to reflect the four-foot high barrier wall in
             12 ID          front of the 3-pipe outlet.  Additional models were created to
             13 ID          represent 10, 50, and 500-year storms.
             14 ID
             15 ID          Remaining comments are from the original model dated 8/93.
             16 ID
             17 ID      This storm also known as "Qayles Storm" simulates a 54 square mile
             18 ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
             19 ID      but upstream of the North Las Vegas Detention Basin.  This model is based
             20 ID      original model developed by Black & Veatch during the predesign study for
             21 ID      Upper Las Vegas Wash Detention Basin.
             22 ID
             23 ID                Storm Area:    54.37 sq. miles
             24 ID                DARF:          0.66 (CCRFCD Drainage Manual)
             25 ID
             26 ID          10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
             27 ID          50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
             28 ID         100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
             29 ID
             30 ID       JR Card includes DARF for model
             31 ID       PB Cards are adjusted rainfall depth, NOAA Atas II amounts
             32 ID          times adjustment ratios given above.
             33 ID       PB Cards for 500-year storm based on frequency extrapolation of
             34 ID          10, 50, and 100-year data after precipitation ratio adjustments.
             35 ID
*** FREE ***
             36 IT      6       0       0     300
             37 IO      5       0       0
             38 IN      5       0       0
             39 JR    PREC    0.66

             40 KK     105
             41 KM    RUNOFF FROM SUBBASIN 105
             42 BA   6.898
             43 PB    3.33
             44 PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             45 PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             46 PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
             47 PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
             48 PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
             49 PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
             50 PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
             51 PC    .997    .999   1.00
             52 LS      0      86
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1 HEC-1 INPUT PAGE 2

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          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             53 UD    .773
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54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    3.33
65          LS       0       85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    2.87
71          LS       0       84
72          UD    .324

73          KK
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    2.60
85          LS       0       83
86          UD    .369

87          KK
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
1                                    HEC-1 INPUT                                    PAGE  3

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    2.32
97          LS       0       77
98          UD   1.505

99          KK
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    2.73
106         LS       0       84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    2.32
117         LS       0       78
118         UD   1.418

119         KK
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    2.60
126         LS       0       86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
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          130          RM       1   0.183    0.15

          131          KK       V
          132          RM       2   0.386    0.15
1                                        HEC-1 INPUT                                                    PAGE  4

          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          133          KK     109
          134          KM     RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    2.32
          137          LS       0      78
          138          UD   1.281

          139          KK       .
          140          KM     COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK     109R
          143          KM     ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM       3   0.649    0.15

          145          KK     101R
          146          KM     ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM       3   0.821    0.15

          148          KK       .
          149          KM     COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM     DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK   NLVIN
          159          KO       1
          160          KM     ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM     RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

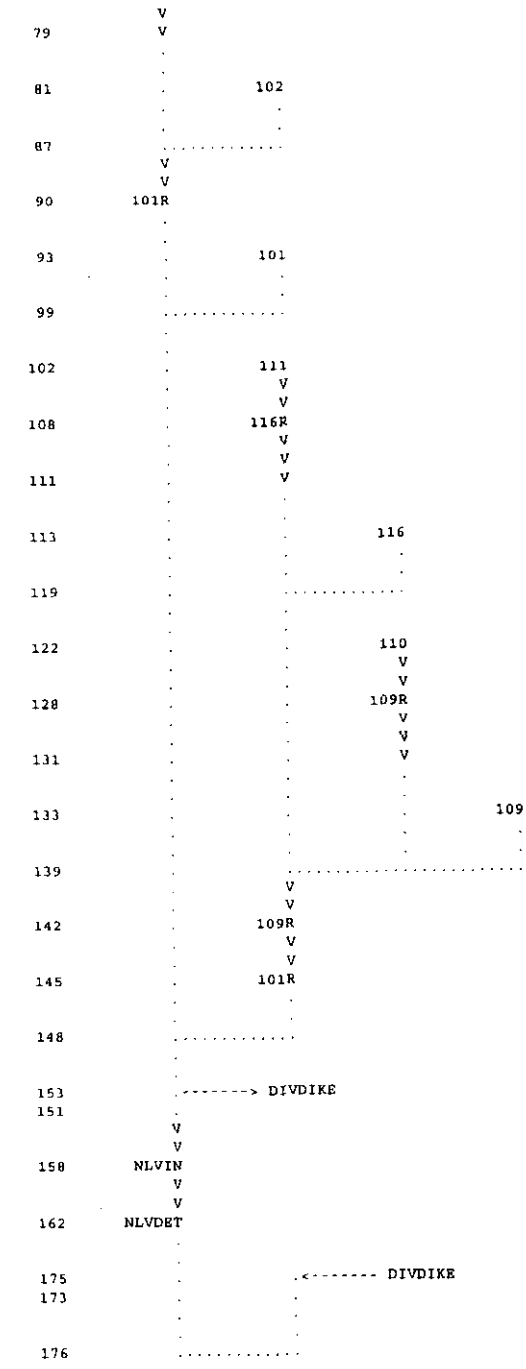
          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          176          KK       .
          177          KM     COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            ..........................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*           FEBRUARY  1991                   *
*            VERSION 4.0.1 (LOCAL)           *
*                                            *
*  RUN DATE  05/14/96  TIME  10:33:54        *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*     U.S. ARMY CORPS OF ENGINEERS           *
*     HYDROLOGIC ENGINEERING CENTER          *
*          609 SECOND STREET                 *
*        DAVIS, CALIFORNIA 95616             *
*             (916) 551-1748                 *
*                                            *
**********************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 50-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts *times adjustment ratios given above.*
PB Cards for 500-year storm based on frequency extrapolation of 10, 50, and 100-year data after precipitation ratio adjustments.

```
 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           6  MINUTES IN COMPUTATION INTERVAL
                     IDATE       1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE       2    0  ENDING DATE
                    NDTIME        0554  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                      TOTAL TIME BASE     29.90 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.66
```

*** ***

```
            *************
            *           *
158 KK      *    NLVIN  *
            *           *
            *************

159 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

              HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                        L       2000.  CHANNEL LENGTH
                        S     0.0076  SLOPE
                        N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                       CA       0.00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      35.00  BOTTOM WIDTH OR DIAMETER
                        Z       2.00  SIDE SLOPE
                   NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS
```

***

COMPUTED KINEMATIC PARAMETERS
VARIABLE TIME STEP
(DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.01	1.55	0.40	666.67	6749.70	330.78	0.57	36.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1642E+04 EXCESS=0.0000E+00 OUTFLOW=0.1642E+04 BASIN STORAGE=0.3451E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	6744.21	330.00	0.57

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	1950.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	1747.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	1560.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	1389.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	1233.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	1091.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	963.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	848.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	745.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	653.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	572.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	500.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	437.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	382.	1		1618	164	0.	1		2348	239	0.
1		0124	15	0.	1		0854	90	334.	1		1624	165	0.	1		2354	240	0.
1		0130	16	0.	1		0900	91	292.	1		1630	166	0.	2		0000	241	0.
1		0136	17	0.	1		0906	92	256.	1		1636	167	0.	2		0006	242	0.
1		0142	18	1.	1		0912	93	224.	1		1642	168	0.	2		0012	243	0.
1		0148	19	3.	1		0918	94	196.	1		1648	169	0.	2		0018	244	0.
1		0154	20	7.	1		0924	95	172.	1		1654	170	0.	2		0024	245	0.
1		0200	21	13.	1		0930	96	151.	1		1700	171	0.	2		0030	246	0.
1		0206	22	24.	1		0936	97	133.	1		1706	172	0.	2		0036	247	0.
1		0212	23	40.	1		0942	98	117.	1		1712	173	0.	2		0042	248	0.
1		0218	24	64.	1		0948	99	103.	1		1718	174	0.	2		0048	249	0.
1		0224	25	97.	1		0954	100	91.	1		1724	175	0.	2		0054	250	0.
1		0230	26	135.	1		1000	101	80.	1		1730	176	0.	2		0100	251	0.
1		0236	27	176.	1		1006	102	71.	1		1736	177	0.	2		0106	252	0.
1		0242	28	220.	1		1012	103	62.	1		1742	178	0.	2		0112	253	0.
1		0248	29	262.	1		1018	104	55.	1		1748	179	0.	2		0118	254	0.
1		0254	30	303.	1		1024	105	49.	1		1754	180	0.	2		0124	255	0.
1		0300	31	345.	1		1030	106	43.	1		1800	181	0.	2		0130	256	0.
1		0306	32	390.	1		1036	107	39.	1		1806	182	0.	2		0136	257	0.
1		0312	33	448.	1		1042	108	34.	1		1812	183	0.	2		0142	258	0.
1		0318	34	528.	1		1048	109	30.	1		1818	184	0.	2		0148	259	0.
1		0324	35	644.	1		1054	110	27.	1		1824	185	0.	2		0154	260	0.
1		0330	36	816.	1		1100	111	24.	1		1830	186	0.	2		0200	261	0.
1		0336	37	1069.	1		1106	112	21.	1		1836	187	0.	2		0206	262	0.
1		0342	38	1425.	1		1112	113	19.	1		1842	188	0.	2		0212	263	0.
1		0348	39	1895.	1		1118	114	17.	1		1848	189	0.	2		0218	264	0.
1		0354	40	2451.	1		1124	115	15.	1		1854	190	0.	2		0224	265	0.
1		0400	41	3039.	1		1130	116	13.	1		1900	191	0.	2		0230	266	0.
1		0406	42	3604.	1		1136	117	12.	1		1906	192	0.	2		0236	267	0.
1		0412	43	4103.	1		1142	118	10.	1		1912	193	0.	2		0242	268	0.
1		0418	44	4513.	1		1148	119	9.	1		1918	194	0.	2		0248	269	0.
1		0424	45	4827.	1		1154	120	8.	1		1924	195	0.	2		0254	270	0.
1		0430	46	5056.	1		1200	121	7.	1		1930	196	0.	2		0300	271	0.
1		0436	47	5217.	1		1206	122	6.	1		1936	197	0.	2		0306	272	0.
1		0442	48	5338.	1		1212	123	6.	1		1942	198	0.	2		0312	273	0.
1		0448	49	5455.	1		1218	124	5.	1		1948	199	0.	2		0318	274	0.
1		0454	50	5598.	1		1224	125	4.	1		1954	200	0.	2		0324	275	0.
1		0500	51	5787.	1		1230	126	4.	1		2000	201	0.	2		0330	276	0.
1		0506	52	6021.	1		1236	127	3.	1		2006	202	0.	2		0336	277	0.
1		0512	53	6273.	1		1242	128	3.	1		2012	203	0.	2		0342	278	0.
1		0518	54	6502.	1		1248	129	2.	1		2018	204	0.	2		0348	279	0.
1		0524	55	6669.	1		1254	130	2.	1		2024	205	0.	2		0354	280	0.
1		0530	56	6744.	1		1300	131	2.	1		2030	206	0.	2		0400	281	0.
1		0536	57	6719.	1		1306	132	1.	1		2036	207	0.	2		0406	282	0.
1		0542	58	6601.	1		1312	133	1.	1		2042	208	0.	2		0412	283	0.
1		0548	59	6409.	1		1318	134	1.	1		2048	209	0.	2		0418	284	0.
1		0554	60	6167.	1		1324	135	1.	1		2054	210	0.	2		0424	285	0.
1		0600	61	5896.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	5612.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	5329.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	5051.	1		1348	139	0.	1		2118	214	0.	2		0448	289	0.
1		0624	65	4781.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	4515.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	4250.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	3984.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	3715.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	3444.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	3174.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	2907.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	2649.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	2402.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	2168.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	29.90-HR

*	6744.	5.50		3249.	828.	665.	665.
			(INCHES)	0.556	0.566	0.566	0.566
			(AC-FT)	1611.	1642.	1642.	1642.

CUMULATIVE AREA = 54.37 SQ MI

*** ***

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          **************
          *            *
162 KK    *   NLVDET   *
          *            *
          **************
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163 KO *OUTPUT CONTROL* VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

HYDROGRAPH ROUTING DATA

166 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

167 SV	STORAGE	0.0	25.0	100.0	190.0	430.0	665.0	1095.0	1285.0	1435.0	1540.0
		1650.0	1825.0	1920.0	2000.0	2110.0	2200.0	2310.0	2430.0		
169 SE	ELEVATION	0.00	2.00	4.00	6.00	10.00	14.00	21.00	24.00	26.00	27.00
		28.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00		
171 SQ	DISCHARGE	0.	77.	117.	597.	1310.	1660.	2110.	2260.	2360.	2690.
		3050.	4630.	5710.	7090.	8610.	10140.	11670.	13200.		

***

HYDROGRAPH AT STATION NLVDET
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		1000	101	1783.	782.9	15.9	1		2000	201	115.	97.0	3.9
1		0006	2	0.	0.0	0.0	1		1006	102	1769.	768.9	15.7	1		2006	202	115.	96.1	3.9
1		0012	3	0.	0.0	0.0	1		1012	103	1754.	754.9	15.5	1		2012	203	114.	95.1	3.9
1		0018	4	0.	0.0	0.0	1		1018	104	1739.	740.9	15.2	1		2018	204	114.	94.2	3.8
1		0024	5	0.	0.0	0.0	1		1024	105	1725.	727.0	15.0	1		2024	205	113.	93.2	3.8
1		0030	6	0.	0.0	0.0	1		1030	106	1710.	713.2	14.8	1		2030	206	113.	92.3	3.8
1		0036	7	0.	0.0	0.0	1		1036	107	1696.	699.5	14.6	1		2036	207	112.	91.4	3.8
1		0042	8	0.	0.0	0.0	1		*1042*	*108*	*1682.*	*685.8*	14.3	1		2042	208	112.	90.5	3.7
1		0048	9	0.	0.0	0.0	1		1048	109	1668.	672.3	14.1	1		2048	209	111.	89.5	3.7
1		0054	10	0.	0.0	0.0	1		1054	110	1651.	658.8	13.9	1		2054	210	111.	88.6	3.7
1		0100	11	0.	0.0	0.0	1		1100	111	1631.	645.4	13.7	1		2100	211	110.	87.7	3.7
1		0106	12	0.	0.0	0.0	1		1106	112	1611.	632.2	13.4	1		2106	212	110.	86.8	3.6
1		0112	13	0.	0.0	0.0	1		1112	113	1592.	619.2	13.2	1		2112	213	109.	85.9	3.6
1		0118	14	0.	0.0	0.0	1		1118	114	1572.	606.2	13.0	1		2118	214	109.	85.0	3.6
1		0124	15	0.	0.0	0.0	1		1124	115	1553.	593.5	12.8	1		2124	215	109.	84.1	3.6
1		0130	16	0.	0.0	0.0	1		1130	116	1535.	580.8	12.6	1		2130	216	108.	83.2	3.6
1		0136	17	0.	0.0	0.0	1		1136	117	1516.	568.3	12.4	1		2136	217	108.	82.3	3.5
1		0142	18	0.	0.0	0.0	1		1142	118	1498.	555.9	12.1	1		2142	218	107.	81.4	3.5
1		0148	19	0.	0.0	0.0	1		1148	119	1479.	543.7	11.9	1		2148	219	107.	80.5	3.5
1		0154	20	0.	0.1	0.0	1		1154	120	1461.	531.6	11.7	1		2154	220	106.	79.6	3.5
1		0200	21	0.	0.1	0.0	1		1200	121	1444.	519.7	11.5	1		2200	221	106.	78.8	3.4
1		0206	22	1.	0.3	0.0	1		1206	122	1426.	507.9	11.3	1		2206	222	105.	77.9	3.4
1		0212	23	2.	0.5	0.0	1		1212	123	1409.	496.2	11.1	1		2212	223	105.	77.0	3.4
1		0218	24	3.	1.0	0.1	1		1218	124	1391.	484.7	10.9	1		2218	224	104.	76.2	3.4
1		0224	25	5.	1.6	0.1	1		1224	125	1375.	473.3	10.7	1		2224	225	104.	75.3	3.3
1		0230	26	8.	2.5	0.2	1		1230	126	1358.	462.1	10.5	1		2230	226	103.	74.4	3.3
1		0236	27	11.	3.7	0.3	1		1236	127	1341.	450.9	10.4	1		2236	227	103.	73.6	3.3
1		0242	28	16.	5.2	0.4	1		1242	128	1325.	439.9	10.2	1		2242	228	102.	72.7	3.3
1		0248	29	22.	7.1	0.6	1		1248	129	1307.	429.1	10.0	1		2248	229	102.	71.9	3.3
1		0254	30	28.	9.2	0.7	1		1254	130	1276.	418.4	9.8	1		2254	230	102.	71.1	3.2
1		0300	31	36.	11.6	0.9	1		1300	131	1245.	408.0	9.6	1		2300	231	101.	70.2	3.2
1		0306	32	44.	14.3	1.1	1		1306	132	1215.	397.9	9.5	1		2306	232	101.	69.4	3.2
1		0312	33	53.	17.4	1.4	1		1312	133	1185.	388.0	9.3	1		2312	233	100.	68.6	3.2
1		0318	34	64.	20.9	1.7	1		1318	134	1156.	378.3	9.1	1		2318	234	100.	67.7	3.1
1		0324	35	77.	25.2	2.0	1		1324	135	1128.	368.9	9.0	1		2324	235	99.	66.9	3.1
1		0330	36	80.	30.5	2.1	1		1330	136	1101.	359.7	8.8	1		*2330*	*236*	99.	66.1	3.1
1		0336	37	84.	37.7	2.3	1		1336	137	1074.	350.7	8.7	1		2336	237	98.	65.3	3.1
1		0342	38	89.	47.3	2.6	1		1342	138	1048.	341.9	8.5	1		2342	238	98.	64.5	3.1
1		0348	39	96.	60.2	2.9	1		1348	139	1023.	333.4	8.4	1		2348	239	98.	63.7	3.0
1		0354	40	105.	77.3	3.4	1		1354	140	998.	325.0	8.3	1		2354	240	97.	62.8	3.0
1		0400	41	117.	99.1	4.0	1		1400	141	974.	316.9	8.1	2		0000	241	97.	62.0	3.0
1		0406	42	251.	125.0	4.6	1		1406	142	950.	308.9	8.0	2		0006	242	96.	61.2	3.0
1		0412	43	406.	154.2	5.2	1		1412	143	927.	301.2	7.9	2		0012	243	96.	60.5	2.9
1		0418	44	574.	185.7	5.9	1		1418	144	905.	293.6	7.7	2		0018	244	95.	59.7	2.9
1		0424	45	684.	219.1	6.5	1		1424	145	883.	286.2	7.6	2		0024	245	95.	58.9	2.9
1		0430	46	787.	253.9	7.1	1		1430	146	861.	279.0	7.5	2		0030	246	95.	58.1	2.9

1	0436	47	892.	289.4	7.7	*	1	1436	147	841.	272.0	7.4	*	2	0036	247	94.	57.3	2.9
1	0442	48	999.	325.2	8.3	*	1	1442	148	820.	265.1	7.3	*	2	0042	248	94.	56.5	2.8
1	0448	49	1105.	361.1	8.9	*	1	1448	149	800.	258.4	7.1	*	2	0048	249	93.	55.8	2.8
1	0454	50	1213.	397.2	9.5	*	1	1454	150	781.	251.9	7.0	*	2	0054	250	93.	55.0	2.8
1	0500	51	1316.	433.8	10.1	*	1	1500	151	762.	245.5	6.9	*	2	0100	251	93.	54.2	2.8
1	0506	52	1372.	471.5	10.7	*	1	1506	152	743.	239.3	6.8	*	2	0106	252	92.	53.5	2.8
1	0512	53	1430.	510.7	11.4	*	1	1512	153	725.	233.2	6.7	*	2	0112	253	92.	52.7	2.7
1	0518	54	1491.	551.4	12.1	*	1	1518	154	708.	227.3	6.6	*	2	0118	254	91.	51.9	2.7
1	0524	55	1553.	593.3	12.8	*	1	1524	155	691.	221.5	6.5	*	2	0124	255	91.	51.2	2.7
1	0530	56	1616.	635.6	13.5	*	1	1530	156	674.	215.9	6.4	*	2	0130	256	91.	50.4	2.7
1	0536	57	1673.	677.7	14.2	*	1	1536	157	658.	210.4	6.3	*	2	0136	257	90.	49.7	2.7
1	0542	58	1716.	718.7	14.9	*	1	1542	158	642.	205.0	6.3	*	2	0142	258	90.	48.9	2.6
1	0548	59	1757.	758.1	15.5	*	1	1548	159	626.	199.8	6.2	*	2	0148	259	89.	48.2	2.6
1	0554	60	1796.	795.4	16.1	*	1	1554	160	611.	194.7	6.1	*	2	0154	260	89.	47.5	2.6
1	0600	61	1833.	830.2	16.7	*	1	1600	161	595.	189.7	6.0	*	2	0200	261	89.	46.7	2.6
1	0606	62	1867.	862.5	17.2	*	1	1606	162	570.	184.9	5.9	*	2	0206	262	88.	46.0	2.6
1	0612	63	1898.	892.1	17.7	*	1	1612	163	545.	180.3	5.8	*	2	0212	263	88.	45.3	2.5
1	0618	64	1926.	919.2	18.1	*	1	1618	164	522.	175.9	5.7	*	2	0218	264	87.	44.6	2.5
1	0624	65	1952.	943.8	18.5	*	1	1624	165	499.	171.6	5.6	*	2	0224	265	87.	43.8	2.5
1	0630	66	1975.	966.0	18.9	*	1	1630	166	478.	167.6	5.5	*	2	0230	266	87.	43.1	2.5
1	0636	67	1996.	985.8	19.2	*	1	1636	167	457.	163.7	5.4	*	2	0236	267	86.	42.4	2.5
1	0642	68	2014.	1003.3	19.5	*	1	1642	168	437.	160.0	5.3	*	2	0242	268	86.	41.7	2.4
1	0648	69	2030.	1018.4	19.8	*	1	1648	169	418.	156.5	5.3	*	2	0248	269	86.	41.0	2.4
1	0654	70	2043.	1031.1	20.0	*	1	1654	170	400.	153.1	5.2	*	2	0254	270	85.	40.3	2.4
1	0700	71	2054.	1041.6	20.1	*	1	1700	171	383.	149.9	5.1	*	2	0300	271	85.	39.6	2.4
1	0706	72	2063.	1049.7	20.3	*	1	1706	172	367.	146.8	5.0	*	2	0306	272	84.	38.9	2.4
1	0712	73	2069.	1055.6	20.4	*	1	1712	173	351.	143.8	5.0	*	2	0312	273	84.	38.2	2.4
1	0718	74	2073.	1059.3	20.4	*	1	1718	174	336.	141.0	4.9	*	2	0318	274	84.	37.5	2.3
1	0724	75	2074.	1061.1	20.4	*	1	1724	175	321.	138.3	4.9	*	2	0324	275	83.	36.8	2.3
1	0730	76	2074.	1060.9	20.4	*	1	1730	176	307.	135.7	4.8	*	2	0330	276	83.	36.1	2.3
1	0736	77	2072.	1059.1	20.4	*	1	1736	177	294.	133.2	4.7	*	2	0336	277	83.	35.4	2.3
1	0742	78	2069.	1055.6	20.4	*	1	1742	178	281.	130.8	4.7	*	2	0342	278	82.	34.7	2.3
1	0748	79	2064.	1050.7	20.3	*	1	1748	179	269.	128.5	4.6	*	2	0348	279	82.	34.1	2.2
1	0754	80	2057.	1044.5	20.2	*	1	1754	180	258.	126.4	4.6	*	2	0354	280	81.	33.4	2.2
1	0800	81	2049.	1037.2	20.1	*	1	1800	181	247.	124.3	4.5	*	2	0400	281	81.	32.7	2.2
1	0806	82	2041.	1028.8	19.9	*	1	1806	182	236.	122.3	4.5	*	2	0406	282	81.	32.1	2.2
1	0812	83	2031.	1019.4	19.8	*	1	1812	183	226.	120.4	4.5	*	2	0412	283	80.	31.4	2.2
1	0818	84	2020.	1009.3	19.6	*	1	1818	184	216.	118.6	4.4	*	2	0418	284	80.	30.7	2.2
1	0824	85	2009.	998.4	19.4	*	1	1824	185	207.	116.8	4.4	*	2	0424	285	80.	30.1	2.1
1	0830	86	1997.	986.9	19.2	*	1	1830	186	198.	115.1	4.3	*	2	0430	286	79.	29.4	2.1
1	0836	87	1984.	974.9	19.0	*	1	1836	187	189.	113.5	4.3	*	2	0436	287	79.	28.8	2.1
1	0842	88	1971.	962.4	18.8	*	1	1842	188	181.	112.0	4.3	*	2	0442	288	79.	28.1	2.1
1	0848	89	1958.	949.6	18.6	*	1	1848	189	173.	110.5	4.2	*	2	0448	289	78.	27.5	2.1
1	0854	90	1944.	936.4	18.4	*	1	1854	190	166.	109.1	4.2	*	2	0454	290	78.	26.8	2.0
1	0900	91	1930.	923.0	18.2	*	1	1900	191	159.	107.8	4.2	*	2	0500	291	78.	26.2	2.0
1	0906	92	1916.	909.3	18.0	*	1	1906	192	152.	106.5	4.1	*	2	0506	292	77.	25.5	2.0
1	0912	93	1901.	895.6	17.8	*	1	1912	193	145.	105.3	4.1	*	2	0512	293	77.	24.9	2.0
1	0918	94	1887.	881.6	17.5	*	1	1918	194	139.	104.1	4.1	*	2	0518	294	75.	24.3	1.9
1	0924	95	1872.	867.6	17.3	*	1	1924	195	133.	103.0	4.1	*	2	0524	295	73.	23.7	1.9
1	0930	96	1857.	853.6	17.1	*	1	1930	196	127.	101.9	4.0	*	2	0530	296	71.	23.1	1.8
1	0936	97	1843.	839.4	16.8	*	1	1936	197	122.	100.9	4.0	*	2	0536	297	69.	22.5	1.8
1	0942	98	1828.	825.3	16.6	*	1	1942	198	117.	99.9	4.0	*	2	0542	298	67.	21.9	1.8
1	0948	99	1813.	811.2	16.4	*	1	1948	199	116.	98.9	4.0	*	2	0548	299	66.	21.4	1.7
1	0954	100	1798.	797.0	16.1	*	1	1954	200	116.	98.0	3.9	*	2	0554	300	64.	20.8	1.7

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)					
		(CFS)				
2074.	7.40		1876.	808.	656.	656.
		(INCHES)	0.321	0.553	0.559	0.559
		(AC-FT)	930.	1603.	1621.	1621.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
(AC-FT)	(HR)				
1061.	7.40	873.	350.	283.	283.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
(FEET)	(HR)				
20.45	7.40	17.38	8.32	6.88	6.88

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					0.66
HYDROGRAPH AT					
	105	6.90	1	FLOW	1979.
				TIME	4.20
ROUTED TO					
	104R	6.90	1	FLOW	1921.
				TIME	4.40
ROUTED TO					
	V	6.90	1	FLOW	1840.
				TIME	4.70

ROUTED TO	V	6.90	1	FLOW	1811.
+				TIME	4.80
HYDROGRAPH AT	104	6.63	1	FLOW	1999.
+				TIME	4.00
HYDROGRAPH AT	103	6.91	1	FLOW	2062.
+				TIME	3.70
3 COMBINED AT	.	20.44	1	FLOW	4391.
+				TIME	5.00
ROUTED TO	102R	20.44	1	FLOW	4102.
+				TIME	5.10
ROUTED TO	V	20.44	1	FLOW	4183.
+				TIME	5.30
HYDROGRAPH AT	102	8.45	1	FLOW	1777.
+				TIME	3.80
2 COMBINED AT	.	28.89	1	FLOW	5308.
+				TIME	5.10
ROUTED TO	101R	28.89	1	FLOW	5100.
+				TIME	5.40
HYDROGRAPH AT	101	9.08	1	FLOW	459.
+				TIME	5.70
2 COMBINED AT	.	37.97	1	FLOW	5530.
+				TIME	5.40
HYDROGRAPH AT	111	4.08	1	FLOW	1247.
+				TIME	3.60
ROUTED TO	116R	4.08	1	FLOW	1071.
+				TIME	3.80
ROUTED TO	V	4.08	1	FLOW	874.
+				TIME	4.20
HYDROGRAPH AT	116	5.19	1	FLOW	296.
+				TIME	5.60
2 COMBINED AT	.	9.27	1	FLOW	988.
+				TIME	4.30
HYDROGRAPH AT	110	2.94	1	FLOW	955.
+				TIME	3.60
ROUTED TO	109R	2.94	1	FLOW	824.
+				TIME	3.80
ROUTED TO	V	2.94	1	FLOW	675.
+				TIME	4.20
HYDROGRAPH AT	109	4.18	1	FLOW	247.
+				TIME	5.60
3 COMBINED AT	.	16.40	1	FLOW	1775.
+				TIME	4.20
ROUTED TO	109R	16.40	1	FLOW	1521.
+				TIME	4.90
ROUTED TO	101R	16.40	1	FLOW	1436.
+				TIME	6.40
2 COMBINED AT	.	54.37	1	FLOW	6751.
+				TIME	5.50
DIVERSION TO	DIVDIKE	54.37	1	FLOW	0.
+				TIME	0.10

```
 HYDROGRAPH AT
+                    .      54.37     1   FLOW         6751.
                                          TIME         5.50

 ROUTED TO
+                  NLVIN    54.37     1   FLOW         6744.
                                          TIME         5.50

 ROUTED TO
+                  NLVDET   54.37     1   FLOW         2074.
                                          TIME         7.40

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE        20.45
                                          TIME         7.40

 HYDROGRAPH AT
+                    .       0.00     1   FLOW            0.
                                          TIME         0.10

  2 COMBINED AT
+                    .      54.37     1   FLOW         2074.
                                          TIME         7.40

1
                                     SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                         (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK     TIME TO        VOLUME      DT        PEAK     TIME TO      VOLUME
                                                     PEAK                                          PEAK

                                (MIN)      (CFS)      (MIN)       (IN)      (MIN)      (CFS)      (MIN)       (IN)

       FOR PLAN = 1  RATIO= 0.66
          NLVIN  MANE          0.40    6749.70     330.78       0.57       6.00    6744.21     330.00       0.57

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1642E+04 EXCESS=0.0000E+00 OUTFLOW=0.1642E+04 BASIN STORAGE=0.3451E-04 PERCENT ERROR=    0.0


 *** NORMAL END OF HEC-1 ***
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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:05   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID        FEMA FLOOD INSURANCE STUDY, 1996
               2    ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
               3    ID        INTERBASIN 100-YEAR STORM
               4    ID
               5    ID        Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
               6    ID        in 8/93 for the design of outlet modifications at the North Las Vegas
               7    ID        Detention Basin (NLVDB).  This storm centering generates the highest
               8    ID        100-year inflows to the NLVDB.
               9    ID
              10    ID        Modifications to the original B&V model were to adjust the outlet
              11    ID        rating for the NLVDB to reflect the four-foot high barrier wall in
              12    ID        front of the 3-pipe outlet.  Additional models were created to
              13    ID        represent 10, 50, and 500-year storms.
              14    ID
              15    ID        Remaining comments are from the original model dated 8/93.
              16    ID
              17    ID     This storm also known as "Gayles Storm" simulates a 54 square mile
              18    ID     storm centered downstream of the Upper Las Vegas Wash Detention Basin
              19    ID     but upstream of the North Las Vegas Detention Basin.  This model is based
              20    ID     original model developed by Black & Veatch during the predesign study for
              21    ID     Upper Las Vegas Wash Detention Basin.
              22    ID
              23    ID               Storm Area:    54.37 sq. miles
              24    ID               DARF:          0.66 (CCRFCD Drainage Manual)
              25    ID
              26    ID        10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
              27    ID        50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
              28    ID       100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
              29    ID
              30    ID       JR Card includes DARF for model
              31    ID       PB Cards are adjusted rainfall depth, NOAA Atas II amounts
              32    ID          times adjustment ratios given above.
              33    ID       PB Cards for 500-year storm based on frequency extrapolation of
              34    ID          10, 50, and 100-year data after precipitation ratio adjustments.
              35    ID
*** FREE ***
              36    IT      6       0       0     300
              37    IO      5       0       0
              38    IN      5       0       0
              39    JR    PREC    0.66

              40    KK     105
              41    KM    RUNOFF FROM SUBBASIN 105
              42    BA   6.898
              43    PB   3.72
              44    PC   .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
              45    PC   .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
              46    PC   .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
              47    PC   .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
              48    PC   .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
              49    PC   .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
              50    PC   .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
              51    PC   .997    .999   1.00
              52    LS     0      86
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1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              53    UD    .773
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54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    3.72
65          LS       0       85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    3.29
71          LS       0       84
72          UD    .324

73          KK       .
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    3.00
85          LS       0       83
86          UD    .369

87          KK       .
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
                                HEC-1 INPUT                                    PAGE  3
1
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    2.72
97          LS       0       77
98          UD   1.505

99          KK       .
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    3.15
106         LS       0       84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    2.52
117         LS       0       78
118         UD   1.418

119         KK       .
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    3.00
126         LS       0       86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM       1    0.183     0.15

          131          KK       V
          132          RM       2    0.386     0.15
1                                        HEC-1 INPUT                                        PAGE  4

          LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          133          KK     109
          134          KM     RUNOFF FROM SUBBASIN 109
          135          BA    4.183
          136          PB     2.72
          137          LS       0       78
          138          UD    1.281

          139          KK       .
          140          KM     COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK     109R
          143          KM     ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM       3    0.649     0.15

          145          KK     101R
          146          KM     ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM       3    0.821     0.15

          148          KK       .
          149          KM     COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM     DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK    NLVIN
          159          KO       1
          160          KM     ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM     ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM     OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM     RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                        PAGE  5

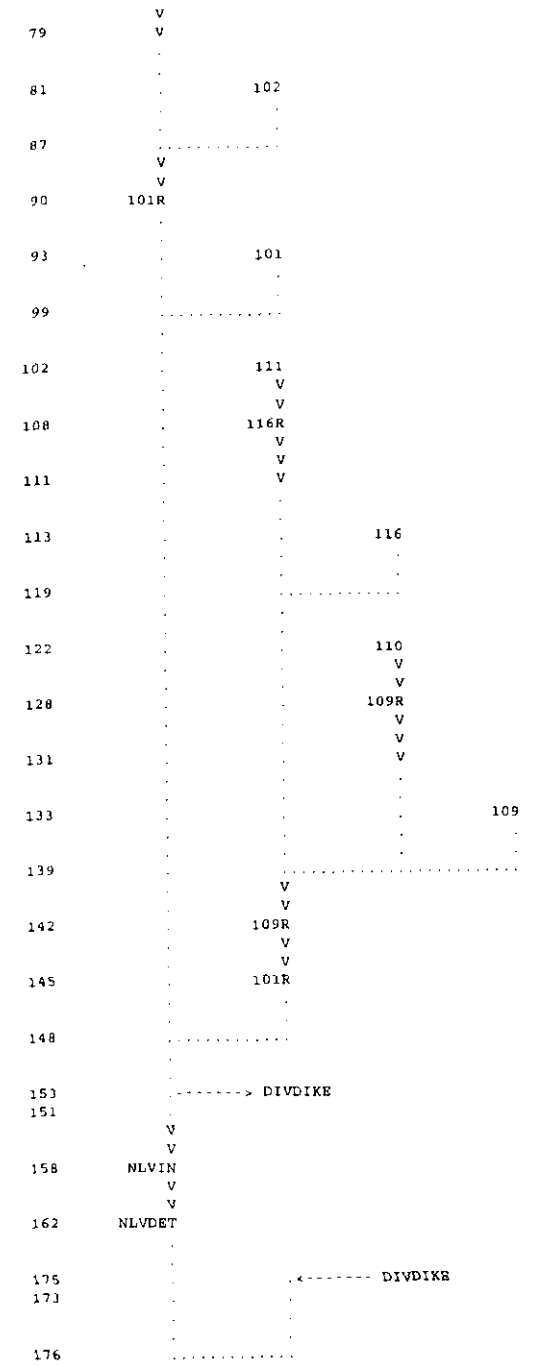
          LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          176          KK       .
          177          KM     COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            .....................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:05   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of 10, 50, and 100-year data after precipitation ratio adjustments.

```
37 IO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN           6  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1    0  STARTING DATE
                    ITIME         0000  STARTING TIME
                       NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2    0  ENDING DATE
                   NDTIME         0554  ENDING TIME
                    ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL    0.10 HOURS
                      TOTAL TIME BASE   29.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN           1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  0.66
```

*** ***

```
          **************
          *            *
158 KK    *     NLVIN  *
          *            *
          **************

159 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                         ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

             HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                       L       2000.  CHANNEL LENGTH
                       S     0.0076  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.00  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      35.00  BOTTOM WIDTH OR DIAMETER
                       Z       2.00  SIDE SLOPE
                  NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS
```

***

COMPUTED KINEMATIC PARAMETERS
VARIABLE TIME STEP
(DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.01	1.55	0.39	666.67	8341.18	330.45	0.73	38.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+04 EXCESS=0.0000E+00 OUTFLOW=0.2110E+04 BASIN STORAGE=0.3481E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	8339.62	330.00	0.73

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	2431.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	2180.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	1948.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	1736.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	1543.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	1367.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	1208.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	1065.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	937.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	822.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	721.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	632.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	554.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	485.	1		1618	164	0.	1		2348	239	0.
1		0124	15	1.	1		0854	90	424.	1		1624	165	0.	1		2354	240	0.
1		0130	16	3.	1		0900	91	372.	1		1630	166	0.	2		0000	241	0.
1		0136	17	7.	1		0906	92	326.	1		1636	167	0.	2		0006	242	0.
1		0142	18	13.	1		0912	93	285.	1		1642	168	0.	2		0012	243	0.
1		0148	19	23.	1		0918	94	250.	1		1648	169	0.	2		0018	244	0.
1		0154	20	38.	1		0924	95	220.	1		1654	170	0.	2		0024	245	0.
1		0200	21	61.	1		0930	96	193.	1		1700	171	0.	2		0030	246	0.
1		0206	22	92.	1		0936	97	170.	1		1706	172	0.	2		0036	247	0.
1		0212	23	132.	1		0942	98	150.	1		1712	173	0.	2		0042	248	0.
1		0218	24	182.	1		0948	99	132.	1		1718	174	0.	2		0048	249	0.
1		0224	25	240.	1		0954	100	117.	1		1724	175	0.	2		0054	250	0.
1		0230	26	302.	1		1000	101	103.	1		1730	176	0.	2		0100	251	0.
1		0236	27	366.	1		1006	102	91.	1		1736	177	0.	2		0106	252	0.
1		0242	28	427.	1		1012	103	81.	1		1742	178	0.	2		0112	253	0.
1		0248	29	483.	1		1018	104	71.	1		1748	179	0.	2		0118	254	0.
1		0254	30	536.	1		1024	105	63.	1		1754	180	0.	2		0124	255	0.
1		0300	31	589.	1		1030	106	56.	1		1800	181	0.	2		0130	256	0.
1		0306	32	649.	1		1036	107	50.	1		1806	182	0.	2		0136	257	0.
1		0312	33	727.	1		1042	108	44.	1		1812	183	0.	2		0142	258	0.
1		0318	34	839.	1		1048	109	39.	1		1818	184	0.	2		0148	259	0.
1		0324	35	1003.	1		1054	110	35.	1		1824	185	0.	2		0154	260	0.
1		0330	36	1244.	1		1100	111	31.	1		1830	186	0.	2		0200	261	0.
1		0336	37	1591.	1		1106	112	27.	1		1836	187	0.	2		0206	262	0.
1		0342	38	2072.	1		1112	113	24.	1		1842	188	0.	2		0212	263	0.
1		0348	39	2695.	1		1118	114	22.	1		1848	189	0.	2		0218	264	0.
1		0354	40	3419.	1		1124	115	19.	1		1854	190	0.	2		0224	265	0.
1		0400	41	4172.	1		1130	116	17.	1		1900	191	0.	2		0230	266	0.
1		0406	42	4881.	1		1136	117	15.	1		1906	192	0.	2		0236	267	0.
1		0412	43	5496.	1		1142	118	13.	1		1912	193	0.	2		0242	268	0.
1		0418	44	5988.	1		1148	119	12.	1		1918	194	0.	2		0248	269	0.
1		0424	45	6354.	1		1154	120	10.	1		1924	195	0.	2		0254	270	0.
1		0430	46	6611.	1		1200	121	9.	1		1930	196	0.	2		0300	271	0.
1		0436	47	6782.	1		1206	122	8.	1		1936	197	0.	2		0306	272	0.
1		0442	48	6908.	1		1212	123	7.	1		1942	198	0.	2		0312	273	0.
1		0448	49	7031.	1		1218	124	6.	1		1948	199	0.	2		0318	274	0.
1		0454	50	7191.	1		1224	125	5.	1		1954	200	0.	2		0324	275	0.
1		0500	51	7412.	1		1230	126	4.	1		2000	201	0.	2		0330	276	0.
1		0506	52	7691.	1		1236	127	4.	1		2006	202	0.	2		0336	277	0.
1		0512	53	7992.	1		1242	128	3.	1		2012	203	0.	2		0342	278	0.
1		0518	54	8217.	1		1248	129	3.	1		2018	204	0.	2		0348	279	0.
1		0524	55	8308.	1		1254	130	2.	1		2024	205	0.	2		0354	280	0.
1		0530	56	8340.	1		1300	131	2.	1		2030	206	0.	2		0400	281	0.
1		0536	57	8318.	1		1306	132	2.	1		2036	207	0.	2		0406	282	0.
1		0542	58	8248.	1		1312	133	2.	1		2042	208	0.	2		0412	283	0.
1		0548	59	8053.	1		1318	134	1.	1		2048	209	0.	2		0418	284	0.
1		0554	60	7741.	1		1324	135	1.	1		2054	210	0.	2		0424	285	0.
1		0600	61	7390.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	7026.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	6664.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	6311.	1		1348	139	1.	1		2118	214	0.	2		0448	289	0.
1		0624	65	5968.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	5631.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	5298.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	4963.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	4626.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	4287.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	3950.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	3618.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	3297.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	2991.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	2701.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			

```
+    8340.      5.50                4157.       1064.        854.        854.
                          (INCHES)   0.711       0.728       0.728       0.728
                          (AC-FT)    2062.       2110.       2110.       2110.

                          CUMULATIVE AREA =   54.37 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


                 **************
                 *            *
162 KK           *    NLVDET  *
                 *            *
                 **************

163 KO                OUTPUT CONTROL VARIABLES
                           IPRNT          1  PRINT CONTROL
                           IPLOT          0  PLOT CONTROL
                           QSCAL          0.  HYDROGRAPH PLOT SCALE
                               ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
                               OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

                      HYDROGRAPH ROUTING DATA

166 RS                STORAGE ROUTING
                           NSTPS          1  NUMBER OF SUBREACHES
                            ITYP       STOR  TYPE OF INITIAL CONDITION
                          RSVRIC      -1.00  INITIAL CONDITION
                               X       0.00 WORKING R AND D COEFFICIENT

167 SV                  STORAGE        0.0        25.0       100.0      190.0      430.0      665.0     1095.0     1285.0     1435.0     1540.0
                                    1650.0      1825.0      1920.0     2000.0     2110.0     2200.0     2310.0     2430.0

169 SE                ELEVATION        0.00       2.00       4.00       6.00      10.00      14.00      21.00      24.00      26.00      27.00
                                     28.00      30.00      31.00      32.00      33.00      34.00      35.00      36.00

171 SQ                DISCHARGE          0.         77.       117.       597.      1310.      1660.      2110.      2260.      2360.      2690.
                                     3050.      4630.      5710.      7090.      8610.     10140.     11670.     13200.

                                                                        ***

*****************************************************************************************************************************************

                                                HYDROGRAPH AT STATION   NLVDET
                                                     PLAN 1,   RATIO =  0.66

*****************************************************************************************************************************************

 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
                                          *                                         *
  1   0000   1       0.       0.0     0.0 *   1  1000 101    2117.    1103.6    21.1 *   1  2000 201     246.     124.2     4.5
  1   0006   2       0.       0.0     0.0 *   1  1006 102    2102.    1086.9    20.9 *   1  2006 202     235.     122.2     4.5
  1   0012   3       0.       0.0     0.0 *   1  1012 103    2084.    1070.3    20.6 *   1  2012 203     225.     120.3     4.5
  1   0018   4       0.       0.0     0.0 *   1  1018 104    2067.    1053.8    20.3 *   1  2018 204     216.     118.5     4.4
  1   0024   5       0.       0.0     0.0 *   1  1024 105    2050.    1037.4    20.1 *   1  2024 205     206.     116.7     4.4
  1   0030   6       0.       0.0     0.0 *   1  1030 106    2033.    1021.0    19.8 *   1  2030 206     197.     115.1     4.3
  1   0036   7       0.       0.0     0.0 *   1  1036 107    2015.    1004.7    19.5 *   1  2036 207     189.     113.5     4.3
  1   0042   8       0.       0.0     0.0 *   1  1042 108    1999.     988.5    19.3 *   1  2042 208     181.     111.9     4.3
  1   0048   9       0.       0.0     0.0 *   1  1048 109    1982.     972.4    19.0 *   1  2048 209     173.     110.5     4.2
  1   0054  10       0.       0.0     0.0 *   1  1054 110    1965.     956.4    18.7 *   1  2054 210     165.     109.1     4.2
  1   0100  11       0.       0.0     0.0 *   1  1100 111    1948.     940.5    18.5 *   1  2100 211     158.     107.7     4.2
  1   0106  12       0.       0.0     0.0 *   1  1106 112    1932.     924.7    18.2 *   1  2106 212     152.     106.5     4.1
  1   0112  13       0.       0.0     0.0 *   1  1112 113    1915.     909.0    18.0 *   1  2112 213     145.     105.2     4.1
  1   0118  14       0.       0.0     0.0 *   1  1118 114    1899.     893.4    17.7 *   1  2118 214     139.     104.1     4.1
  1   0124  15       0.       0.0     0.0 *   1  1124 115    1883.     878.0    17.5 *   1  2124 215     133.     103.0     4.1
  1   0130  16       0.       0.0     0.0 *   1  1130 116    1867.     862.6    17.2 *   1  2130 216     127.     101.9     4.0
  1   0136  17       0.       0.1     0.0 *   1  1136 117    1851.     847.4    17.0 *   1  2136 217     122.     100.8     4.0
  1   0142  18       0.       0.1     0.0 *   1  1142 118    1835.     832.3    16.7 *   1  2142 218     117.      99.9     4.0
  1   0148  19       1.       0.3     0.0 *   1  1148 119    1819.     817.3    16.5 *   1  2148 219     116.      98.9     4.0
  1   0154  20       2.       0.5     0.0 *   1  1154 120    1804.     802.4    16.2 *   1  2154 220     116.      97.9     3.9
  1   0200  21       3.       0.9     0.1 *   1  1200 121    1788.     787.6    16.0 *   1  2200 221     115.      97.0     3.9
  1   0206  22       5.       1.5     0.1 *   1  1206 122    1773.     773.0    15.8 *   1  2206 222     115.      96.0     3.9
  1   0212  23       7.       2.4     0.2 *   1  1212 123    1758.     758.5    15.5 *   1  2212 223     114.      95.1     3.9
  1   0218  24      11.       3.6     0.3 *   1  1218 124    1743.     744.1    15.3 *   1  2218 224     114.      94.1     3.8
  1   0224  25      16.       5.2     0.4 *   1  1224 125    1728.     729.8    15.1 *   1  2224 225     113.      93.2     3.8
  1   0230  26      23.       7.3     0.6 *   1  1230 126    1713.     715.6    14.8 *   1  2230 226     113.      92.3     3.8
  1   0236  27      30.       9.8     0.8 *   1  1236 127    1698.     701.5    14.6 *   1  2236 227     112.      91.3     3.8
  1   0242  28      40.      12.8     1.0 *   1  1242 128    1684.     687.6    14.4 *   1  2242 228     112.      90.4     3.7
  1   0248  29      50.      16.2     1.3 *   1  1248 129    1669.     673.8    14.1 *   1  2248 229     111.      89.5     3.7
  1   0254  30      62.      20.0     1.6 *   1  1254 130    1653.     660.0    13.9 *   1  2254 230     111.      88.6     3.7
  1   0300  31      74.      24.1     1.9 *   1  1300 131    1632.     646.5    13.7 *   1  2300 231     110.      87.7     3.7
  1   0306  32      79.      28.6     2.1 *   1  1306 132    1612.     633.1    13.5 *   1  2306 232     110.      86.7     3.6
  1   0312  33      82.      33.6     2.2 *   1  1312 133    1593.     619.9    13.2 *   1  2312 233     109.      85.8     3.6
  1   0318  34      85.      39.4     2.4 *   1  1318 134    1573.     606.8    13.0 *   1  2318 234     109.      84.9     3.6
  1   0324  35      88.      46.3     2.6 *   1  1324 135    1554.     593.9    12.8 *   1  2324 235     108.      84.0     3.6
  1   0330  36      93.      54.8     2.8 *   1  1330 136    1535.     581.1    12.6 *   1  2330 236     108.      83.1     3.6
  1   0336  37      99.      65.7     3.1 *   1  1336 137    1516.     568.5    12.4 *   1  2336 237     108.      82.3     3.5
  1   0342  38     106.      80.0     3.5 *   1  1342 138    1498.     556.1    12.1 *   1  2342 238     107.      81.4     3.5
  1   0348  39     116.      98.8     4.0 *   1  1348 139    1479.     543.8    11.9 *   1  2348 239     107.      80.5     3.5
  1   0354  40     237.     122.6     4.5 *   1  1354 140    1461.     531.6    11.7 *   1  2354 240     106.      79.6     3.5
  1   0400  41     391.     151.4     5.1 *   1  1400 141    1443.     519.6    11.5 *   2  0000 241     106.      78.7     3.4
  1   0406  42     569.     184.8     5.9 *   1  1406 142    1426.     507.8    11.3 *   2  0006 242     105.      77.9     3.4
  1   0412  43     693.     222.5     6.5 *   1  1412 143    1408.     496.1    11.1 *   2  0012 243     105.      77.0     3.4
  1   0418  44     816.     263.7     7.2 *   1  1418 144    1391.     484.5    10.9 *   2  0018 244     104.      76.1     3.4
  1   0424  45     946.     307.4     8.0 *   1  1424 145    1374.     473.1    10.7 *   2  0024 245     104.      75.3     3.3
  1   0430  46    1080.     352.6     8.7 *   1  1430 146    1357.     461.8    10.5 *   2  0030 246     103.      74.4     3.3
```

1	0436	47	1216.	398.5	9.5	*	1	1436	147	1341.	450.6	10.4	*	2	0036	247	103.	73.6	3.3
1	0442	48	1332.	444.5	10.2	*	1	1442	148	1324.	439.6	10.2	*	2	0042	248	102.	72.7	3.3
1	0448	49	1401.	490.8	11.0	*	1	1448	149	1306.	428.8	10.0	*	2	0048	249	102.	71.9	3.2
1	0454	50	1470.	537.7	11.8	*	1	1454	150	1275.	418.1	9.8	*	2	0054	250	102.	71.0	3.2
1	0500	51	1542.	585.6	12.6	*	1	1500	151	1244.	407.7	9.6	*	2	0100	251	101.	70.2	3.2
1	0506	52	1615.	635.0	13.5	*	1	1506	152	1214.	397.5	9.5	*	2	0106	252	101.	69.4	3.2
1	0512	53	1682.	686.2	14.3	*	1	1512	153	1184.	387.6	9.3	*	2	0112	253	100.	68.5	3.2
1	0518	54	1737.	739.0	15.2	*	1	1518	154	1155.	378.0	9.1	*	2	0118	254	100.	67.7	3.1
1	0524	55	1794.	792.7	16.1	*	1	1524	155	1127.	368.5	9.0	*	2	0124	255	99.	66.9	3.1
1	0530	56	1850.	846.4	17.0	*	1	1530	156	1100.	359.3	8.8	*	2	0130	256	99.	66.1	3.1
1	0536	57	1906.	899.8	17.8	*	1	1536	157	1073.	350.3	8.7	*	2	0136	257	98.	65.2	3.1
1	0542	58	1961.	952.2	18.7	*	1	1542	158	1047.	341.6	8.5	*	2	0142	258	98.	64.4	3.1
1	0548	59	2014.	1003.2	19.5	*	1	1548	159	1022.	333.0	8.4	*	2	0148	259	98.	63.6	3.0
1	0554	60	2065.	1051.6	20.3	*	1	1554	160	997.	324.7	8.2	*	2	0154	260	97.	62.8	3.0
1	0600	61	2111.	1096.8	21.0	*	1	1600	161	973.	316.5	8.1	*	2	0200	261	97.	62.0	3.0
1	0606	62	2145.	1138.8	21.7	*	1	1606	162	949.	308.6	8.0	*	2	0206	262	96.	61.2	3.0
1	0612	63	2175.	1177.5	22.3	*	1	1612	163	926.	300.9	7.8	*	2	0212	263	96.	60.4	2.9
1	0618	64	2203.	1213.1	22.9	*	1	1618	164	904.	293.3	7.7	*	2	0218	264	95.	59.6	2.9
1	0624	65	2229.	1245.5	23.4	*	1	1624	165	882.	285.9	7.6	*	2	0224	265	95.	58.8	2.9
1	0630	66	2252.	1274.9	23.8	*	1	1630	166	861.	278.7	7.5	*	2	0230	266	95.	58.1	2.9
1	0636	67	2271.	1301.4	24.2	*	1	1636	167	840.	271.7	7.4	*	2	0236	267	94.	57.3	2.9
1	0642	68	2287.	1324.9	24.5	*	1	1642	168	819.	264.8	7.2	*	2	0242	268	94.	56.5	2.8
1	0648	69	2300.	1345.6	24.8	*	1	1648	169	799.	258.1	7.1	*	2	0248	269	93.	55.7	2.8
1	0654	70	2312.	1363.4	25.0	*	1	1654	170	780.	251.6	7.0	*	2	0254	270	93.	55.0	2.8
1	0700	71	2322.	1378.3	25.2	*	1	1700	171	761.	245.2	6.9	*	2	0300	271	93.	54.2	2.8
1	0706	72	2330.	1390.3	25.4	*	1	1706	172	743.	239.0	6.8	*	2	0306	272	92.	53.4	2.8
1	0712	73	2336.	1399.6	25.5	*	1	1712	173	725.	233.0	6.7	*	2	0312	273	92.	52.7	2.7
1	0718	74	2341.	1406.3	25.6	*	1	1718	174	707.	227.1	6.6	*	2	0318	274	91.	51.9	2.7
1	0724	75	2344.	1410.4	25.7	*	1	1724	175	690.	221.3	6.5	*	2	0324	275	91.	51.2	2.7
1	0730	76	2345.	1412.3	25.7	*	1	1730	176	673.	215.6	6.4	*	2	0330	276	91.	50.4	2.7
1	0736	77	2345.	1411.9	25.7	*	1	1736	177	657.	210.2	6.3	*	2	0336	277	90.	49.7	2.7
1	0742	78	2343.	1409.6	25.7	*	1	1742	178	641.	204.8	6.2	*	2	0342	278	90.	48.9	2.6
1	0748	79	2340.	1405.5	25.6	*	1	1748	179	625.	199.6	6.2	*	2	0348	279	89.	48.2	2.6
1	0754	80	2336.	1399.7	25.5	*	1	1754	180	610.	194.5	6.1	*	2	0354	280	89.	47.4	2.6
1	0800	81	2332.	1392.5	25.4	*	1	1800	181	594.	189.5	6.0	*	2	0400	281	89.	46.7	2.6
1	0806	82	2326.	1383.8	25.3	*	1	1806	182	569.	184.7	5.9	*	2	0406	282	88.	46.0	2.6
1	0812	83	2319.	1374.0	25.2	*	1	1812	183	544.	180.1	5.8	*	2	0412	283	88.	45.2	2.5
1	0818	84	2312.	1363.2	25.0	*	1	1818	184	521.	175.7	5.7	*	2	0418	284	87.	44.5	2.5
1	0824	85	2304.	1351.4	24.9	*	1	1824	185	498.	171.5	5.6	*	2	0424	285	87.	43.8	2.5
1	0830	86	2296.	1338.7	24.7	*	1	1830	186	477.	167.4	5.5	*	2	0430	286	87.	43.1	2.5
1	0836	87	2287.	1325.4	24.5	*	1	1836	187	456.	163.6	5.4	*	2	0436	287	86.	42.4	2.5
1	0842	88	2278.	1311.4	24.4	*	1	1842	188	436.	159.9	5.3	*	2	0442	288	86.	41.7	2.4
1	0848	89	2268.	1296.9	24.2	*	1	1848	189	418.	156.4	5.3	*	2	0448	289	86.	41.0	2.4
1	0854	90	2258.	1282.0	24.0	*	1	1854	190	400.	153.0	5.2	*	2	0454	290	85.	40.2	2.4
1	0900	91	2246.	1266.7	23.7	*	1	1900	191	382.	149.8	5.1	*	2	0500	291	85.	39.5	2.4
1	0906	92	2233.	1251.0	23.5	*	1	1906	192	366.	146.7	5.0	*	2	0506	292	84.	38.8	2.4
1	0912	93	2221.	1235.2	23.2	*	1	1912	193	350.	143.7	5.0	*	2	0512	293	84.	38.2	2.4
1	0918	94	2208.	1219.1	23.0	*	1	1918	194	335.	140.9	4.9	*	2	0518	294	84.	37.5	2.3
1	0924	95	2195.	1202.8	22.7	*	1	1924	195	321.	138.2	4.8	*	2	0524	295	83.	36.8	2.3
1	0930	96	2182.	1186.5	22.4	*	1	1930	196	307.	135.6	4.8	*	2	0530	296	83.	36.1	2.3
1	0936	97	2169.	1170.0	22.2	*	1	1936	197	293.	133.1	4.7	*	2	0536	297	83.	35.4	2.3
1	0942	98	2156.	1153.4	21.9	*	1	1942	198	281.	130.7	4.7	*	2	0542	298	82.	34.7	2.3
1	0948	99	2143.	1136.8	21.7	*	1	1948	199	269.	128.4	4.6	*	2	0548	299	82.	34.0	2.2
1	0954	100	2130.	1120.2	21.4	*	1	1954	200	257.	126.1	4.6	*	2	0554	300	81.	33.4	2.2

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)					
		(CFS)				
2345.	7.50		2172.	1036.	840.	840.
		(INCHES)	0.371	0.708	0.716	0.716
		(AC-FT)	1077.	2054.	2077.	2077.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
(AC-FT)	(HR)				
1412.	7.50	1191.	494.	401.	401.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
(FEET)	(HR)				
25.70	7.50	22.42	10.76	8.90	8.90

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					0.66
HYDROGRAPH AT					
	105	6.90	1	FLOW	2376.
				TIME	4.20
ROUTED TO					
	104R	6.90	1	FLOW	2304.
				TIME	4.30
ROUTED TO					
	V	6.90	1	FLOW	2207.
				TIME	4.70

ROUTED TO					
+	V	6.90	1	FLOW	2174.
				TIME	4.80
HYDROGRAPH AT					
+	104	6.63	1	FLOW	2418.
				TIME	4.00
HYDROGRAPH AT					
+	103	6.91	1	FLOW	2668.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	5276.
				TIME	5.00
ROUTED TO					
+	102R	20.44	1	FLOW	5172.
				TIME	5.10
ROUTED TO					
+	V	20.44	1	FLOW	5033.
				TIME	5.20
HYDROGRAPH AT					
+	102	8.45	1	FLOW	2386.
				TIME	3.80
2 COMBINED AT					
+	.	28.89	1	FLOW	6476.
				TIME	5.10
ROUTED TO					
+	101R	28.89	1	FLOW	6236.
				TIME	5.40
HYDROGRAPH AT					
+	101	9.08	1	FLOW	694.
				TIME	5.70
2 COMBINED AT					
+	.	37.97	1	FLOW	6905.
				TIME	5.40
HYDROGRAPH AT					
+	111	4.08	1	FLOW	1644.
				TIME	3.60
ROUTED TO					
+	116R	4.08	1	FLOW	1412.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	1152.
				TIME	4.20
HYDROGRAPH AT					
+	116	5.19	1	FLOW	366.
				TIME	5.60
2 COMBINED AT					
+	.	9.27	1	FLOW	1305.
				TIME	4.20
HYDROGRAPH AT					
+	110	2.94	1	FLOW	1239.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	1068.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	875.
				TIME	4.20
HYDROGRAPH AT					
+	109	4.18	1	FLOW	364.
				TIME	5.50
3 COMBINED AT					
+	.	16.40	1	FLOW	2379.
				TIME	4.20
ROUTED TO					
+	109R	16.40	1	FLOW	2042.
				TIME	4.90
ROUTED TO					
+	101R	16.40	1	FLOW	1887.
				TIME	6.30
2 COMBINED AT					
+	.	54.37	1	FLOW	8537.
				TIME	5.50
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	194.
				TIME	5.50

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 HYDROGRAPH AT
+                    .     54.37     1   FLOW        8342.
                                         TIME         5.50

 ROUTED TO
+                  NLVIN   54.37     1   FLOW        8340.
                                         TIME         5.50

 ROUTED TO
+                  NLVDET  54.37     1   FLOW        2345.
                                         TIME         7.50

                                    ** PEAK STAGES IN FEET **
                                    1    STAGE       25.70
                                         TIME         7.50

 HYDROGRAPH AT
+                    .      0.00     1   FLOW         194.
                                         TIME         5.50

  2 COMBINED AT
+                    .     54.37     1   FLOW        2345.
                                         TIME         7.50
1
                                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
          ISTAQ    ELEMENT       DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                       PEAK                                          PEAK

                                (MIN)       (CFS)      (MIN)       (IN)     (MIN)       (CFS)      (MIN)       (IN)

       FOR PLAN = 1  RATIO= 0.66
          NLVIN  MANE          0.39     8341.18     330.45       0.73      6.00     8339.62     330.00       0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+04 EXCESS=0.0000E+00 OUTFLOW=0.2110E+04 BASIN STORAGE=0.3481E-04 PERCENT ERROR=   0.0


*** NORMAL END OF HEC-1 ***
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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:16   *
*                                       *
*****************************************
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*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
*     HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*            (916) 551-1748             *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID          FEMA FLOOD INSURANCE STUDY, 1996
               2    ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
               3    ID          INTERBASIN  500-year  STORM
               4    ID
               5    ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
               6    ID          in 8/93 for the design of outlet modifications at the North Las Vegas
               7    ID          Detention Basin (NLVDB).  This storm centering generates the highest
               8    ID          100-year inflows to the NLVDB.
               9    ID
              10    ID          Modifications to the original B&V model were to adjust the outlet
              11    ID          rating for the NLVDB to reflect the four-foot high barrier wall in
              12    ID          front of the 3-pipe outlet.  Additional models were created to
              13    ID          represent 10, 50, and 500-year storms.
              14    ID
              15    ID          Remaining comments are from the original model dated 8/93.
              16    ID
              17    ID      This storm also known as "Gayles Storm" simulates a 54 square mile
              18    ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
              19    ID      but upstream of the North Las Vegas Detention Basin.  This model is based
              20    ID      original model developed by Black & Veatch during the predesign study for
              21    ID      Upper Las Vegas Wash Detention Basin.
              22    ID
              23    ID                Storm Area:     54.37 sq. miles
              24    ID                DARF:           0.66 (CCRFCD Drainage Manual)
              25    ID
              26    ID        10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
              27    ID        50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
              28    ID       100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
              29    ID
              30    ID       JR Card includes DARF for model
              31    ID       PB Cards are adjusted rainfall depth, NOAA Atas II amounts
              32    ID          times adjustment ratios given above.
              33    ID       PB Cards for 500-year storm based on frequency extrapolation of
              34    ID          10, 50, and 100-year data after precipitation ratio adjustments.
              35    ID
*** FREE ***
              36    IT      6       0       0     300
              37    IO      5       0       0
              38    IN      5       0       0
              39    JR   PREC    0.66

              40    KK    105
              41    KM   RUNOFF FROM SUBBASIN 105
              42    BA  6.898
              43    PB   4.80
              44    PC   .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
              45    PC   .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
              46    PC   .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
              47    PC   .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
              48    PC   .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
              49    PC   .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
              50    PC   .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
              51    PC   .997    .999   1.00
              52    LS     0      86
```

1 *HEC-1 INPUT* PAGE 2

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              53    UD    .773
```

```
54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    4.80
65          LS       0       85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    4.22
71          LS       0       84
72          UD    .324

73          KK       .
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    3.89
85          LS       0       83
86          UD    .369

87          KK       .
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
1                                HEC-1 INPUT                                    PAGE   3

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    3.48
97          LS       0       77
98          UD   1.505

99          KK       .
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    4.16
106         LS       0       84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    3.23
117         LS       0       78
118         UD   1.418

119         KK       .
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    3.89
126         LS       0       86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM       1   0.183     0.15

          131          KK       V
          132          RM       2   0.386     0.15
1                                        HEC-1 INPUT                                                    PAGE  4

          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          133          KK     109
          134          KM    RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    3.48
          137          LS       0       78
          138          UD   1.281

          139          KK       .
          140          KM    COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK    109R
          143          KM    ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM       3   0.649     0.15

          145          KK    101R
          146          KM    ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM       3   0.821     0.15

          148          KK       .
          149          KM    COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK   NLVIN
          159          KO       1
          160          KM    ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

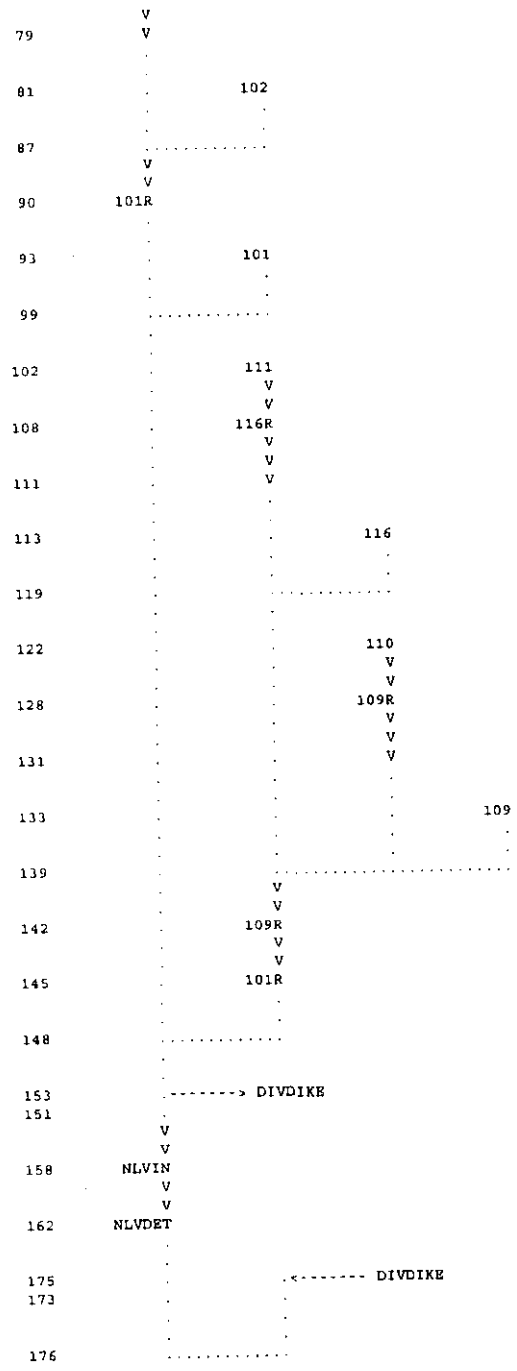
          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          176          KK       .
          177          KM    COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
                  SCHEMATIC DIAGRAM OF STREAM NETWORK

   INPUT
    LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

     NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

      40           105
                    V
                    V
      54           104R
                    V
                    V
      57            V
                    V
                    V
      59            V
                    .
                    .
      61            .          104
                    .           .
                    .           .
      67            .           .          103
                    .           .           .
                    .           .           .
      73            ..........................
                    V
                    V
      76           102R
                    V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:16   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 500-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. *This model is based* original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of 10, 50, and 100-year data after precipitation ratio adjustments.

```
37 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                    NMIN           6  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1    0  STARTING DATE
                   ITIME         0000  STARTING TIME
                      NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2    0  ENDING DATE
                  NDTIME         0554  ENDING TIME
                   ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     0.10 HOURS
                   TOTAL TIME BASE    29.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                 0.66
```

*** ***

```
          **************
          *            *
158 KK    *     NLVIN  *
          *            *
          **************

159 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                         ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

               HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                       L       2000.  CHANNEL LENGTH
                       S     0.0076  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.00  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      35.00  BOTTOM WIDTH OR DIAMETER
                       Z       2.00  SIDE SLOPE
                  NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS

                                                  ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                   (DT SHOWN IS A MINIMUM)

                ELEMENT    ALPHA      M        DT        DX        PEAK    TIME TO PEAK    VOLUME    MAXIMUM CELERITY
                                                (MIN)     (FT)      (CFS)      (MIN)         (IN)       (FPS)

                MAIN         1.01     1.55      0.43    666.67   9849.15     330.32         1.03       41.29
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2965E+04 EXCESS=0.0000E+00 OUTFLOW=0.2985E+04 BASIN STORAGE=0.3746E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	9848.60	330.00	1.03

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	3673.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	3299.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	2953.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	2636.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	2347.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	2084.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	1846.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	1631.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	1438.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	1266.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	1113.	1		1600	161	0.	1		2330	236	0.
1		0106	12	4.	1		0836	87	978.	1		1606	162	0.	1		2336	237	0.
1		0112	13	16.	1		0842	88	858.	1		1612	163	0.	1		2342	238	0.
1		0118	14	35.	1		0848	89	754.	1		1618	164	0.	1		2348	239	0.
1		0124	15	60.	1		0854	90	661.	1		1624	165	0.	1		2354	240	0.
1		0130	16	90.	1		0900	91	581.	1		1630	166	0.	2		0000	241	0.
1		0136	17	126.	1		0906	92	510.	1		1636	167	0.	2		0006	242	0.
1		0142	18	168.	1		0912	93	448.	1		1642	168	0.	2		0012	243	0.
1		0148	19	221.	1		0918	94	394.	1		1648	169	0.	2		0018	244	0.
1		0154	20	284.	1		0924	95	347.	1		1654	170	0.	2		0024	245	0.
1		0200	21	359.	1		0930	96	306.	1		1700	171	0.	2		0030	246	0.
1		0206	22	447.	1		0936	97	270.	1		1706	172	0.	2		0036	247	0.
1		0212	23	547.	1		0942	98	238.	1		1712	173	0.	2		0042	248	0.
1		0218	24	658.	1		0948	99	210.	1		1718	174	0.	2		0048	249	0.
1		0224	25	777.	1		0954	100	186.	1		1724	175	0.	2		0054	250	0.
1		0230	26	897.	1		1000	101	164.	1		1730	176	0.	2		0100	251	0.
1		0236	27	1011.	1		1006	102	146.	1		1736	177	0.	2		0106	252	0.
1		0242	28	1114.	1		1012	103	129.	1		1742	178	0.	2		0112	253	0.
1		0248	29	1204.	1		1018	104	114.	1		1748	179	0.	2		0118	254	0.
1		0254	30	1285.	1		1024	105	101.	1		1754	180	0.	2		0124	255	0.
1		0300	31	1366.	1		1030	106	90.	1		1800	181	0.	2		0130	256	0.
1		0306	32	1462.	1		1036	107	80.	1		1806	182	0.	2		0136	257	0.
1		0312	33	1594.	1		1042	108	71.	1		1812	183	0.	2		0142	258	0.
1		0318	34	1786.	1		1048	109	63.	1		1818	184	0.	2		0148	259	0.
1		0324	35	2070.	1		1054	110	56.	1		1824	185	0.	2		0154	260	0.
1		0330	36	2482.	1		1100	111	49.	1		1830	186	0.	2		0200	261	0.
1		0336	37	3061.	1		1106	112	44.	1		1836	187	0.	2		0206	262	0.
1		0342	38	3847.	1		1112	113	39.	1		1842	188	0.	2		0212	263	0.
1		0348	39	4839.	1		1118	114	34.	1		1848	189	0.	2		0218	264	0.
1		0354	40	5968.	1		1124	115	30.	1		1854	190	0.	2		0224	265	0.
1		0400	41	7115.	1		1130	116	27.	1		1900	191	0.	2		0230	266	0.
1		0406	42	8135.	1		1136	117	24.	1		1906	192	0.	2		0236	267	0.
1		0412	43	8957.	1		1142	118	21.	1		1912	193	0.	2		0242	268	0.
1		0418	44	8823.	1		1148	119	18.	1		1918	194	0.	2		0248	269	0.
1		0424	45	9007.	1		1154	120	16.	1		1924	195	0.	2		0254	270	0.
1		0430	46	9108.	1		1200	121	14.	1		1930	196	0.	2		0300	271	0.
1		0436	47	9169.	1		1206	122	12.	1		1936	197	0.	2		0306	272	0.
1		0442	48	9211.	1		1212	123	11.	1		1942	198	0.	2		0312	273	0.
1		0448	49	9255.	1		1218	124	9.	1		1948	199	0.	2		0318	274	0.
1		0454	50	9315.	1		1224	125	8.	1		1954	200	0.	2		0324	275	0.
1		0500	51	9402.	1		1230	126	7.	1		2000	201	0.	2		0330	276	0.
1		0506	52	9515.	1		1236	127	6.	1		2006	202	0.	2		0336	277	0.
1		0512	53	9641.	1		1242	128	5.	1		2012	203	0.	2		0342	278	0.
1		0518	54	9753.	1		1248	129	4.	1		2018	204	0.	2		0348	279	0.
1		0524	55	9827.	1		1254	130	4.	1		2024	205	0.	2		0354	280	0.
1		0530	56	9849.	1		1300	131	3.	1		2030	206	0.	2		0400	281	0.
1		0536	57	9813.	1		1306	132	3.	1		2036	207	0.	2		0406	282	0.
1		0542	58	9725.	1		1312	133	2.	1		2042	208	0.	2		0412	283	0.
1		0548	59	9598.	1		1318	134	2.	1		2048	209	0.	2		0418	284	0.
1		0554	60	9447.	1		1324	135	2.	1		2054	210	0.	2		0424	285	0.
1		0600	61	9286.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	9121.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	8942.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	8738.	1		1348	139	1.	1		2118	214	0.	2		0448	289	0.
1		0624	65	8538.	1		1354	140	1.	1		2124	215	0.	2		0454	290	0.
1		0630	66	8324.	1		1400	141	1.	1		2130	216	0.	2		0500	291	0.
1		0636	67	7970.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	7475.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	6964.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	6453.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	5945.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	5447.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	4967.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	4509.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	4077.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	29.90-HR

+ 9849.	5.50		5806.	1505.	1208.	1208.
		(INCHES)	0.993	1.030	1.030	1.030
		(AC-FT)	2879.	2985.	2985.	2985.

CUMULATIVE AREA = 54.37 SQ MI

*** ***

```
          **************
          *            *
162 KK    *   NLVDET   *
          *            *
          **************
```

163 KO OUTPUT CONTROL VARIABLES
IPRNT 1 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE
ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

HYDROGRAPH ROUTING DATA

166 RS STORAGE ROUTING
NSTPS 1 NUMBER OF SUBREACHES
ITYP STOR TYPE OF INITIAL CONDITION
RSVRIC -1.00 INITIAL CONDITION
X 0.00 WORKING R AND D COEFFICIENT

167 SV	STORAGE	0.0	25.0	100.0	190.0	430.0	665.0	1095.0	1285.0	1435.0	1540.0
		1650.0	1825.0	1920.0	2000.0	2110.0	2200.0	2310.0	2430.0		
169 SE	ELEVATION	0.00	2.00	4.00	6.00	10.00	14.00	21.00	24.00	26.00	27.00
		28.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00		
171 SQ	DISCHARGE	0.	77.	117.	597.	1310.	1660.	2110.	2260.	2360.	2690.
		3050.	4630.	5710.	7090.	8610.	10140.	11670.	13200.		

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HYDROGRAPH AT STATION NLVDET
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		1000	101	2342.	1408.0	25.6	1		2000	201	513.	174.3	5.7
1		0006	2	0.	0.0	0.0	1		1006	102	2330.	1389.9	25.4	1		2006	202	491.	170.2	5.6
1		0012	3	0.	0.0	0.0	1		1012	103	2318.	1371.9	25.2	1		2012	203	470.	166.2	5.5
1		0018	4	0.	0.0	0.0	1		1018	104	2306.	1353.8	24.9	1		2018	204	450.	162.4	5.4
1		0024	5	0.	0.0	0.0	1		1024	105	2294.	1335.7	24.7	1		2024	205	430.	158.7	5.3
1		0030	6	0.	0.0	0.0	1		1030	106	2282.	1317.5	24.4	1		2030	206	412.	155.3	5.2
1		0036	7	0.	0.0	0.0	1		1036	107	2270.	1299.4	24.2	1		2036	207	394.	151.9	5.2
1		0042	8	0.	0.0	0.0	1		1042	108	2257.	1281.4	23.9	1		2042	208	377.	148.7	5.1
1		0048	9	0.	0.0	0.0	1		1048	109	2243.	1263.3	23.7	1		2048	209	361.	145.7	5.0
1		0054	10	0.	0.0	0.0	1		1054	110	2229.	1245.3	23.4	1		2054	210	345.	142.8	5.0
1		0100	11	0.	0.0	0.0	1		1100	111	2215.	1227.4	23.1	1		2100	211	330.	140.0	4.9
1		0106	12	0.	0.0	0.0	1		1106	112	2200.	1209.5	22.8	1		2106	212	316.	137.3	4.8
1		0112	13	0.	0.1	0.0	1		1112	113	2186.	1191.7	22.5	1		2112	213	302.	134.8	4.8
1		0118	14	1.	0.3	0.0	1		1118	114	2172.	1174.0	22.2	1		2118	214	289.	132.3	4.7
1		0124	15	2.	0.7	0.1	1		1124	115	2158.	1156.4	22.0	1		2124	215	277.	130.0	4.7
1		0130	16	4.	1.3	0.1	1		1130	116	2145.	1138.9	21.7	1		2130	216	265.	127.7	4.6
1		0136	17	7.	2.1	0.2	1		1136	117	2131.	1121.4	21.4	1		2136	217	254.	125.6	4.6
1		0142	18	10.	3.3	0.3	1		1142	118	2117.	1104.0	21.1	1		2142	218	243.	123.5	4.5
1		0148	19	15.	4.8	0.4	1		1148	119	2101.	1086.8	20.9	1		2148	219	232.	121.6	4.5
1		0154	20	21.	6.7	0.5	1		1154	120	2083.	1069.6	20.6	1		2154	220	222.	119.7	4.4
1		0200	21	28.	9.2	0.7	1		1200	121	2066.	1052.6	20.3	1		2200	221	213.	117.9	4.4
1		0206	22	38.	12.2	1.0	1		1206	122	2048.	1035.7	20.0	1		2206	222	203.	116.2	4.4
1		0212	23	49.	16.0	1.3	1		1212	123	2030.	1019.0	19.8	1		2212	223	195.	114.6	4.3
1		0218	24	63.	20.5	1.6	1		1218	124	2013.	1002.3	19.5	1		2218	224	186.	113.0	4.3
1		0224	25	77.	25.8	2.0	1		1224	125	1996.	985.8	19.2	1		2224	225	178.	111.5	4.3
1		0230	26	81.	32.1	2.2	1		1230	126	1979.	969.5	19.0	1		2230	226	170.	110.0	4.2
1		0236	27	85.	39.3	2.4	1		1236	127	1962.	953.2	18.7	1		2236	227	163.	108.7	4.2
1		0242	28	89.	47.4	2.6	1		1242	128	1945.	937.1	18.4	1		2242	228	156.	107.3	4.2
1		0248	29	94.	56.2	2.8	1		1248	129	1928.	921.2	18.2	1		2248	229	149.	106.1	4.1
1		0254	30	99.	65.7	3.1	1		1254	130	1912.	905.3	17.9	1		2254	230	143.	104.9	4.1
1		0300	31	104.	75.8	3.4	1		1300	131	1895.	889.6	17.7	1		2300	231	137.	103.7	4.1
1		0306	32	110.	86.6	3.6	1		1306	132	1879.	874.1	17.4	1		2306	232	131.	102.6	4.1
1		0312	33	116.	98.3	4.0	1		1312	133	1863.	858.6	17.2	1		2312	233	125.	101.5	4.0
1		0318	34	176.	111.0	4.2	1		1318	134	1847.	843.3	16.9	1		2318	234	120.	100.5	4.0
1		0324	35	251.	125.2	4.6	1		1324	135	1831.	828.1	16.7	1		2324	235	117.	99.6	4.0
1		0330	36	339.	141.6	4.9	1		1330	136	1815.	813.1	16.4	1		2330	236	116.	98.6	4.0
1		0336	37	444.	161.3	5.4	1		1336	137	1799.	798.2	16.2	1		2336	237	116.	97.6	3.9
1		0342	38	574.	185.6	5.9	1		1342	138	1784.	783.4	15.9	1		2342	238	115.	96.7	3.9
1		0348	39	675.	216.3	6.4	1		1348	139	1769.	768.7	15.7	1		2348	239	115.	95.7	3.9
1		0354	40	790.	254.9	7.1	1		1354	140	1753.	754.1	15.5	1		2354	240	114.	94.8	3.9
1		0400	41	929.	301.9	7.9	1		1400	141	1738.	739.7	15.2	2		0000	241	114.	93.8	3.8
1		0406	42	1092.	356.6	8.8	1		1406	142	1723.	725.4	15.0	2		0006	242	113.	92.9	3.8
1		0412	43	1268.	415.8	9.8	1		1412	143	1708.	711.3	14.8	2		0012	243	113.	92.0	3.8
1		0418	44	1379.	476.7	10.8	1		1418	144	1694.	697.2	14.5	2		0018	244	112.	91.0	3.8
1		0424	45	1472.	538.6	11.8	1		1424	145	1679.	683.3	14.3	2		0024	245	112.	90.1	3.7
1		0430	46	1564.	600.9	12.9	1		1430	146	1665.	669.4	14.1	2		0030	246	111.	89.2	3.7

| | | |

ROUTED TO	V	6.90	1	FLOW	3213.
+				TIME	4.80
HYDROGRAPH AT	104	6.63	1	FLOW	3623.
+				TIME	4.00
HYDROGRAPH AT	103	6.91	1	FLOW	4086.
+				TIME	3.70
3 COMBINED AT	.	20.44	1	FLOW	7907.
+				TIME	3.90
ROUTED TO	102R	20.44	1	FLOW	7711.
+				TIME	4.00
ROUTED TO	V	20.44	1	FLOW	7433.
+				TIME	4.30
HYDROGRAPH AT	102	8.45	1	FLOW	3847.
+				TIME	3.70
2 COMBINED AT	.	28.89	1	FLOW	9725.
+				TIME	4.10
ROUTED TO	101R	28.89	1	FLOW	9170.
+				TIME	5.40
HYDROGRAPH AT	101	9.08	1	FLOW	1213.
+				TIME	5.60
2 COMBINED AT	.	37.97	1	FLOW	10369.
+				TIME	5.40
HYDROGRAPH AT	111	4.08	1	FLOW	2662.
+				TIME	3.60
ROUTED TO	116R	4.08	1	FLOW	2285.
+				TIME	3.80
ROUTED TO	V	4.08	1	FLOW	1868.
+				TIME	4.20
HYDROGRAPH AT	116	5.19	1	FLOW	644.
+				TIME	5.50
2 COMBINED AT	.	9.27	1	FLOW	2201.
+				TIME	4.20
HYDROGRAPH AT	110	2.94	1	FLOW	1904.
+				TIME	3.60
ROUTED TO	109R	2.94	1	FLOW	1639.
+				TIME	3.80
ROUTED TO	V	2.94	1	FLOW	1346.
+				TIME	4.10
HYDROGRAPH AT	109	4.18	1	FLOW	622.
+				TIME	5.30
3 COMBINED AT	.	16.40	1	FLOW	3947.
+				TIME	4.20
ROUTED TO	109R	16.40	1	FLOW	3402.
+				TIME	4.90
ROUTED TO	101R	16.40	1	FLOW	3084.
+				TIME	6.10
2 COMBINED AT	.	54.37	1	FLOW	13077.
+				TIME	5.50
DIVERSION TO	DIVDIKE	54.37	1	FLOW	3226.
+				TIME	5.50

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 HYDROGRAPH AT
+                    .      54.37     1   FLOW         9850.
                                          TIME         5.50

 ROUTED TO
+                  NLVIN    54.37     1   FLOW         9849.
                                          TIME         5.50

 ROUTED TO
+                  NLVDET   54.37     1   FLOW         5127.
                                          TIME         7.20

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE        30.46
                                         TIME         7.20

 HYDROGRAPH AT
+                    .       0.00     1   FLOW         3226.
                                          TIME         5.50

  2 COMBINED AT
+                    .      54.37     1   FLOW         5438.
                                          TIME         5.50

1
                                     SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                         (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                                 COMPUTATION INTERVAL
          ISTAQ    ELEMENT       DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                      PEAK                                        PEAK

                                (MIN)       (CFS)     (MIN)       (IN)     (MIN)      (CFS)     (MIN)       (IN)

      FOR PLAN = 1  RATIO= 0.66
         NLVIN  MANE          0.43     9849.15    330.32       1.03      6.00     9848.60    330.00       1.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2985E+04 EXCESS=0.0000E+00 OUTFLOW=0.2985E+04 BASIN STORAGE=0.3746E-04 PERCENT ERROR=   0.0


 *** NORMAL END OF HEC-1 ***
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Hydrologic Support Data

REGRESSION ANALYSIS OF LOWER CENTRAL VALLEY PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION

SITE ID	STORM PROBABILITY (%)	DATA FROM JMM MODELS 10-YR 10	50-YR 2	100-YR 1	REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB)) A	B	COMPUTED VALUES 10-YR 10	50-YR 2	100-YR 1	500-YR 0.2
4.01	EAST S 309	0.91	1.44	1.66	1.66256	-0.32635	0.91	1.44	1.66	2.19
4.25	SUBBASIN 117	0.98	1.61	1.66	1.72847	-0.31225	1.01	1.51	1.73	2.23
4.08	SUBBASIN 101	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.08	SUBBASIN 109	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.08	SUBBASIN 116	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.32	SUBBASIN 301	0.98	1.44	1.9	1.81898	-0.37952	0.95	1.56	1.82	2.43
4.58	SUBBASIN 118	1.06	1.69	1.83	1.87063	-0.34445	1.08	1.63	1.87	2.43
4.5	SUBBASIN 102	1.06	1.61	1.83	1.83522	-0.3357	1.06	1.60	1.84	2.38
4.5	SUBBASIN 110	1.06	1.61	1.83	1.83522	-0.3357	1.06	1.60	1.84	2.38
4.67	SUBBASIN 111	1.06	1.69	1.92	1.93279	-0.37665	1.07	1.67	1.93	2.54
5.18	SUBBASIN 119	1.14	1.95	2.09	2.15461	-0.42856	1.17	1.86	2.15	2.84
5.08	SUBBASIN 112	1.21	1.86	2.01	2.0502	-0.35738	1.23	1.80	2.05	2.63
5	SUBBASIN 103	1.21	1.78	2.01	2.01479	-0.34862	1.21	1.77	2.01	2.58

		CHECK: INITIAL DATA MINUS COMPUTED			PERCENT DIFFERENCE		
4.01	EAST S 309	-0.001	0.004	-0.003	-0.1%	0.3%	-0.2%
4.25	SUBBASIN 117	-0.029	0.098	-0.068	-3.0%	6.1%	-4.1%
4.08	SUBBASIN 101	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.08	SUBBASIN 109	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.08	SUBBASIN 116	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.32	SUBBASIN 301	0.035	-0.116	0.081	3.6%	-8.0%	4.3%
4.58	SUBBASIN 118	-0.017	0.058	-0.041	-1.7%	3.4%	-2.2%
4.5	SUBBASIN 102	-0.002	0.007	-0.005	-0.2%	0.5%	-0.3%
4.5	SUBBASIN 110	-0.002	0.007	-0.005	-0.2%	0.5%	-0.3%
4.67	SUBBASIN 111	-0.006	0.018	-0.013	-0.5%	1.1%	-0.7%
5.18	SUBBASIN 119	-0.028	0.092	-0.065	-2.4%	4.7%	-3.1%
5.08	SUBBASIN 112	-0.017	0.058	-0.040	-1.4%	3.1%	-2.0%
5	SUBBASIN 103	-0.002	0.007	-0.005	-0.2%	0.4%	-0.2%
	AVG	-0.005	0.0158	-0.011	-0.4%	0.8%	-0.6%

REGRESSION ANALYSIS OF LOWER CENTRAL VALLEY PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION
FILE HAS DATA FOR GOWAN PORTION OF BASIN

SEQ	STORM	DATA FROM JMM MODELS			REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB))		COMPUTED VALUES			
	PROBABILITY (%)	10-YR 10	50-YR 2	100-YR 1	A	B	10-YR 10	50-YR 2	100-YR 1	500-YR 0.2
1	KK AP.1	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
2	KK AP.2	1.14	1.65	2	1.95967	-0.36352	1.12	1.71	1.96	2.54
3	KK AP.3	1.15	1.67	1.9	1.89813	-0.32526	1.15	1.67	1.90	2.42
4	KK AP.4	1.13	1.63	1.8	1.81403	-0.29445	1.14	1.61	1.81	2.29
5	KK AP.5	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
6	KK AP.6	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
7	KK AP.7	1.35	1.8	1.9	1.92902	-0.24604	1.36	1.76	1.93	2.33
8	KK GD.1	1.33	1.96	2.2	2.20969	-0.38023	1.33	1.95	2.21	2.82
9	KK GD.2	1.25	1.89	2	2.05124	-0.33839	1.27	1.82	2.05	2.60
10	KK GD.3	1.19	1.79	1.9	1.94591	-0.3197	1.21	1.72	1.95	2.46
11	KK AP.8	1.14	1.65	1.9	1.88618	-0.32665	1.13	1.66	1.89	2.41
12	KK AP.9	1.14	1.65	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
13	KK GD.7	1.14	1.65	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
14	KK GD.4	1.25	1.89	2	2.05124	-0.33839	1.27	1.82	2.05	2.60
15	KK GD.5	1.2	1.73	1.9	1.91802	-0.30846	1.21	1.70	1.92	2.41
16	KK GD.6	1.14	1.59	1.8	1.79499	-0.2854	1.14	1.60	1.79	2.25
17	KK GD.8	1.08	1.57	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
18	KK GD.34	1.08	1.57	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
19	KK GD.9	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
20	KK GD.10	1.2	1.73	1.9	1.91802	-0.30846	1.21	1.70	1.92	2.41
21	KK GD.11	1.14	1.59	1.8	1.79499	-0.2854	1.14	1.60	1.79	2.25
22	KK GD.33	1.14	1.64	1.9	1.88618	-0.32665	1.13	1.66	1.89	2.41
23	KK GD.32C	1.13	1.57	1.9	1.85653	-0.32366	1.11	1.63	1.86	2.38
24	KK GD.30	1.35	1.98	2.23	2.2366	-0.38381	1.35	1.97	2.24	2.85
25	KK GD.31B	1.12	1.55	1.9	1.84901	-0.32614	1.10	1.62	1.85	2.37
26	KK GD.28	1.14	1.55	1.8	1.77728	-0.28102	1.13	1.58	1.78	2.23
27	KK GD.25	1.21	1.72	2	1.98133	-0.33848	1.20	1.75	1.98	2.53
28	KK GD.26	1.17	1.59	1.9	1.86005	-0.30716	1.15	1.65	1.86	2.35
29	KK GD.27	1.1	1.55	1.8	1.78261	-0.29971	1.09	1.57	1.78	2.26
30	KK GD.29	1.12	1.55	1.8	1.78261	-0.29971	1.09	1.57	1.78	2.26
31	KK PDGC	1.08	1.55	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
32	KK GD.21	1.28	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
33	KK GD.22	1.21	1.66	2	1.95477	-0.33191	1.19	1.72	1.95	2.49
34	KK GD.23	1.23	1.71	2	1.98133	-0.33848	1.20	1.75	1.98	2.53
35	KK GD.24	1.14	1.55	1.8	1.77728	-0.28102	1.13	1.58	1.78	2.23
36	KK GD.18	1.26	1.81	2.1	2.08356	-0.36074	1.25	1.83	2.08	2.66
37	KK GD.19	1.21	1.7	1.9	1.90341	-0.30051	1.21	1.70	1.90	2.39
38	KK GD.20	1.09	1.56	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
39	KK GD.15	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
40	KK GD.16	1.23	1.7	2.1	2.03887	-0.36272	1.20	1.79	2.04	2.62
41	KK GD.17	1.09	1.56	1.9	1.85744	-0.34125	1.07	1.62	1.86	2.41
42	KK GD.12	1.26	1.85	2.1	2.10127	-0.36512	1.26	1.85	2.10	2.69
43	KK GD.13	1.23	1.78	2	2.03887	-0.36272	1.20	1.79	2.04	2.62
44	KK GD.14A	1.15	1.63	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
45	KK GD.14B	1.12	1.59	1.7	1.72859	-0.25896	1.13	1.55	1.73	2.15
46	KK EPT.1	1.03	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
47	KK EPT.3	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
48	KK EPT.4	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
49	KK EPT.5	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
50	KK EPT.2	1	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22

REGRESSION ANALYSIS OF SPRING MOUNTAIN PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION

	DATA FROM JMM MODELS			REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB))		COMPUTED VALUES			
STORM PROBABILITY (%)	10-YR 10	50-YR 2	100-YR 1	A	B	10-YR 10	50-YR 2	100-YR 1	500-YR 0.2
DAT A SB 223	1.06	1.52	1.74	1.73323	-0.29365	1.06	1.53	1.73	2.21
DAT B SB 213	1.29	2.03	2.27	2.29435	-0.43163	1.30	2.00	2.29	2.99
DAT C SB 206	1.36	2.03	2.36	2.34718	-0.43112	1.35	2.05	2.35	3.04
DAT D SB 215	1.29	1.86	2.36	2.28126	-0.44523	1.26	1.97	2.28	3.00
DAT E SB 201	1.44	2.2	2.44	2.46701	-0.44097	1.45	2.16	2.47	3.18
DAT F SB 202	1.51	2.28	2.44	2.4931	-0.41702	1.53	2.20	2.49	3.16
DAT G SB 207 211 212	1.36	2.03	2.44	2.40243	-0.45975	1.34	2.08	2.40	3.14
DAT I SB 214	1.29	1.86	2.44	2.33651	-0.47385	1.25	2.01	2.34	3.10
DAT J SB 205	1.44	2.2	2.53	2.52917	-0.47318	1.44	2.20	2.53	3.29
DAT K SB 208	1.44	2.03	2.53	2.45392	-0.45457	1.41	2.14	2.45	3.19
DAT L SB 210	1.51	2.2	2.53	2.51984	-0.44047	1.51	2.21	2.52	3.23
DAT M SB 203 209	1.51	2.28	2.62	2.61741	-0.48143	1.51	2.28	2.62	3.39
DAT N SB 204	1.59	2.28	2.62	2.60675	-0.44405	1.58	2.30	2.61	3.32

	CHECK: INITIAL DATA MINUS COMPUTED			PERCENT DIFFERENCE		
DAT A SB 223	0.003	-0.010	0.007	0.3%	-0.6%	0.4%
DAT B SB 213	-0.010	0.035	-0.024	-0.8%	1.7%	-1.1%
DAT C SB 206	0.006	-0.018	0.013	0.4%	-0.9%	0.5%
DAT D SB 215	0.034	-0.113	0.079	2.6%	-6.1%	3.3%
DAT E SB 201	-0.012	0.039	-0.027	-0.8%	1.8%	-1.1%
DAT F SB 202	-0.023	0.076	-0.053	-1.5%	3.3%	-2.2%
DAT G SB 207 211 212	0.016	-0.054	0.038	1.2%	-2.6%	1.5%
DAT I SB 214	0.045	-0.148	0.103	3.5%	-8.0%	4.2%
DAT J SB 205	0.000	-0.001	0.001	0.0%	-0.1%	0.0%
DAT K SB 208	0.033	-0.109	0.076	2.3%	-5.4%	3.0%
DAT L SB 210	0.004	-0.015	0.010	0.3%	-0.7%	0.4%
DAT M SB 203 209	0.001	-0.004	0.003	0.1%	-0.2%	0.1%
DAT N SB 204	0.006	-0.019	0.013	0.4%	-0.8%	0.5%
AVG	0.0079	-0.026	0.0183	0.6%	-1.4%	0.7%

REGRESSION ANALYSIS OF interbasin PRECIPITATION
values are BEFORE depth area reduction

SEQ	STORM	DATA FROM JMM MODELS 10-YR	50-YR	100-YR	REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB)) A	B	COMPUTED VALUES 10-YR	50-YR	100-YR	500-YR
	PROBABILITY (%)	10	2	1			10	2	1	0.2
1	SB 105	2.23	3.33	3.72	3.74591	-0.65351	2.24	3.29	3.75	4.80
2	SB 104	2.23	3.33	3.72	3.74591	-0.65351	2.24	3.29	3.75	4.80
3	SB 103	1.95	2.87	3.29	3.28264	-0.58014	1.95	2.88	3.28	4.22
4	SB 102	1.71	2.6	3	2.99483	-0.55896	1.71	2.61	2.99	3.89
5	SB 101	1.58	2.32	2.72	2.69485	-0.48888	1.57	2.36	2.69	3.48
6	SB 111	1.71	2.73	3.15	3.15597	-0.62686	1.71	2.72	3.16	4.16
7	SB 116	1.58	2.32	2.52	2.55672	-0.41732	1.60	2.27	2.56	3.23
8	SB 110	1.71	2.6	3	2.99483	-0.55896	1.71	2.61	2.99	3.89
9	SB 109	1.58	2.32	2.72	2.69485	-0.48888	1.57	2.36	2.69	3.48

difference		
0.0112	-0.037	0.0259
0.0112	-0.037	0.0259
-0.003	0.0105	-0.007
-0.002	0.0074	-0.005
-0.011	0.036	-0.025
0.0026	-0.009	0.006
0.0158	-0.053	0.0367
-0.002	0.0074	-0.005
-0.011	0.036	-0.025
0.0013	-0.004	0.0029

REGRESSION ANALYSIS OF RANGE WASH PRECIPITATION
VALUES ARE FROM BOYLE ENGINEERING CORPORATION

SITE	DATA FROM MODEL 5-YR	10-YR	25-YR	50-YR	100-YR	500-yr	REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB)) A	B	*COMPUTED VALUES* 5-YR	10-YR	25-YR	50-YR	100-YR	500-YR
	20.00	10.00	4	2	1	0.2								
41	0.91	1.09	1.4	1.68	1.89		1.889	-0.336	0.884	1.117	1.424	1.657	1.889	2.429
302	0.87	1.04	1.34	1.61	1.81		1.8097	-0.32238	0.844	1.067	1.363	1.586	1.810	2.329
303	0.81	0.99	1.25	1.53	1.69		1.70037	-0.30251	0.794	1.004	1.281	1.491	1.700	2.187
42B	0.83	1.02	1.28	1.53	1.73		1.72602	-0.30251	0.820	1.029	1.307	1.516	1.726	2.213
42A	0.83	1.02	1.28	1.53	1.73		1.72602	-0.30251	0.820	1.029	1.307	1.516	1.726	2.213
305	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008
43	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008
309A	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008

DIFFERENTIAL: INITIAL DATA MINUS COMPUTED

SITE	5-YR	10-YR	25-YR	50-YR	100-YR
41	0.026	-0.027	-0.024	0.023	0.001
302	0.026	-0.027	-0.023	0.024	0.000
303	0.016	-0.014	-0.031	0.039	-0.010
42B	0.010	-0.009	-0.027	0.014	0.004
42A	0.010	-0.009	-0.027	0.014	0.004
305	0.014	-0.008	-0.021	0.008	0.007
43	0.014	-0.008	-0.021	0.008	0.007
309A	0.014	-0.008	-0.021	0.008	0.007

PERCENT DIFFERENCE

SITE	*5-YR*	*10-YR*	*25-YR*	50-YR	100-YR
41	2.9%	-2.4%	-1.7%	1.4%	0.0%
302	3.0%	-2.6%	-1.7%	1.5%	0.0%
303	2.0%	-1.4%	-2.5%	2.6%	-0.6%
42B	1.2%	-0.9%	-2.1%	0.9%	0.2%
42A	1.2%	-0.9%	-2.1%	0.9%	0.2%
305	1.8%	-0.8%	-1.8%	0.6%	0.4%
43	1.8%	-0.8%	-1.8%	0.6%	0.4%
309A	1.8%	-0.8%	-1.8%	0.6%	0.4%

UPPER LAS VEGAS WASH VOLUME III PART 2.

Technical Support Data Notebook

Upper Las Vegas Wash
Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 3
Engineering Analysis
with North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 3
Engineering Analyses; with North Las Vegas Detention Basin Diversion Dike

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With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

The Upper Las Vegas Wash Flood Insurance Study area extends from the upstream end of the Upper Las Vegas Wash Diversion Berm/Channel downstream through a series of flood control structures to the terminus of the King Charles channel at its confluence with the A Channel. The wash was separated into 3 subreaches:

- Subreach 1 - Upper Las Vegas Wash Interception Berm/Channel to Upper Las Vegas Detention Basin (ULVDB)
- Subreach 2 - ULVDB to the North Las Vegas Detention Basin (NLVDB)
- Subreach 3 - NLVDB to the terminus of the King Charles channel (KCC) at its confluence with the A Channel near I-15

The water surface profiles for each subreach were modeled using HEC-2. The discharges for the models were computed using HEC-1. Listed below are the HEC-2 models used by subreach.

Subreach 1

ulvdv5	ULVDB to upstream end of the Upper Las Vegas Diversion Berm (upstream study limits) subcritical model, 10-500 yr profiles

Subreach 2

nlvdbv6b	NLVDB to Upper Las Vegas Detention Basin (ULVDB) subcritical model, 10-500 yr profiles

Subreach 3

lnlvw16b	Downstream study limit at A Channel to North Las Vegas Detention Basin (NLVDB) subcritical model, 10-100 yr profiles
kgsbw2	King Charles Channel, A Channel to Craig Road Bridge, subcritical model, 500 yr profile
lnlv5015	Craig Road Bridge to NLVDB subcritical model, 500 yr profile
kgscw2	King Charles Channel , A Channel to Craig Road Bridge, supercritical model, 10-500 yr profiles

The "N" Channel Diversion diverts flow from the King Charles Channel into a lined concrete channel between the King Charles Channel and I-15. This channel was modeled as a separate subreach.

Subreach 4

nch-spw	N Channel supercritical model, 10-100 yr profiles
nch-spwb	N Channel supercritical model, 500 yr profile

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Subreach 1 - ULV Interception Berm/Channel (sta 749+97) to the ULVDB (590+59)

A subcritical/critical water surface profile was modeled from downstream to upstream from the Upper Las Vegas Detention Basin to the upstream end of the Upper Las Vegas Interception Berm (file name: ULVDV5.dat). The peak discharge for each return period was used throughout the model subreach to compute the water surface profile.

Discharges: Q_{10}=3465 cfs, Q_{50}=10312, Q_{100}=14737 cfs, Q_{500}=24938 cfs
Wash Manning's n = 0.04
Concrete, Soil Cement n = 0.025
expansion coeff=0.3
contraction coeff =0.1

The Project Officer advised us to use the upslope (northerly) floodplain boundary as the limit of study between the ULV Diversion Berm/Channel to the ULVDB. Therefore, the flood hazards on the fan surface and inflowing arroyos were not determined or mapped.

Listed below by station are comments regarding the characteristics of the wash.

Sta	Description
749+97	Upstream extent of HEC-2 model, at the upstream end of the Upper Las Vegas Wash Interceptor Berm/Channel. The interceptor berm extends from station 660+60 to 749+97 the right bank is lined with rock (d50=12"), the channel bottom is compacted native material. The left bank is lined with roller compacted concrete. A Manning's n of 0.04 was used throughout the subreach.
668+14	Upstream end of 4.5' high rock grade control structure
666+60	Downstream end of rock grade control apron
660+60	Downstream end of Interceptor berm where the interceptor channel transitions into the wash. Manning's "n" for wash reach to basin=0.04
590+59	Downstream end of the HEC-2 model. The ULVDB Pool elevations were used in the model as the starting water surface elevations.

Return period (yr)	10	50	100	500
Discharge (cfs)	3465	10312	14737	24938
ULVDB Pool Elev (ft)	2351.3	2367.0	2372.4	2375.7

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Subreach 2 - ULVDB (sta 564+87) to NLVDB (306+80)

A subcritical/critical water surface profile was modeled from downstream to upstream from the NLVDB to the ULVDB (file name: NLVDB6B.dat). The peak discharges in the wash for the 10 - 100 year events are produced by the Interbasin Storm. The peak discharge in the wash for the 500 year event is produced by the Spring Mountain Storm.

Wash Discharges: Q_{10}=2939 cfs (IB), Q_{50}=6751 (IB), Q_{100}=8537 cfs, Q_{500}=19217 cfs
Wash Manning's n = 0.04
expansion coeff=0.3
contraction coeff =0.1

The Project Officer advised us to use the upslope (northerly) floodplain boundary as the limit of study between the ULVDB to the NLVDB.

Listed below by station are comments regarding the characteristics of the wash.

Sta	Description
564+87	Upstream extent of model; The source of the cross sections downstream of Upper Las Vegas Detention Basin Spillway are from Upper Las Vegas Detention Basin Plans. The peak discharges for the Interbasin storm and Spring Mountain Storm were used in the HEC-2 modeled from 564+87 to 309+35 (Q_{10}=2939 cfs (IB), Q_{50}=6751 (IB), Q_{100}=8537 cfs, Q_{500}=19217 cfs)
564+97 -558+70	Transition from spillway to wash; cross-sections cut from Upper Las Vegas Detention Basin Plans. The lining is native material over a roller compacted concrete toe. The spillway apron toe is 26ft below the invert elevation of the transition
555+70 -320+44	The wash sections were obtained by aerial photogrammetry
315+00 -312+35	Wash sections were obtained from the 1996 Kenney Aerial Topographic Maps
309+35 -289+03	Diversion Channel sections were obtained from the Las Vegas Detention Basin Flood Control Project Plans. A Manning's n of 0.025 was used for these sections. The top of the diversion dike is 2142.0 feet. The computed 100-year water surface at the diversion dike slightly exceeds this elevation. Based on this analysis, the structural stability of the diversion dike was found to be questionable during sustained overtopping, refer to **Review of Flood Control Structures, Volume 2** of this TSDN.

However, for the purpose of this case (with NLVDB Diversion Dike) the structure was assumed to remain in place for all events.

309+35 The NLVDB Diversion Channel crosses the wash diverting the flow into the NLVDB. The wash transitions in both invert slope, approximately 1% in the wash and 0.2% in the diversion channel, and channel width, wash bottom width approximately 120 ft, diversion channel bottom width 70 ft. The channel roughness changes from 0.04 in the wash to 0.025 in the concrete lined diversion channel. The weir elevation is 2142 NGVD 29. Although sediment deposition, momentum changes at the diversion dike/wash intersection, fluctuation in water surface due to transition between subcritical and supercritical flow, and waves are likely to occur here, these effects were not considered for this case.

307+65 This section represents the upstream end of the control structure transition which serves to constrict the flow, causing wash flows over approximately 8350 cfs to begin diverting flow over the dike. The flow splits between the flow into the basin and over the dike were calculated in the HEC-1 models using a rating table developed in HEC-2, refer to the DIVDIKE node in the HEC-1 models.

306+80 The downstream end of control structure transition. The channel slope changes from 0.2% upstream in the diversion channel to 0.76% downstream in the basin inlet channel.

306+50 The downstream end of control structure is lined with soil cement. Critical depth was computed in both sub and super critical runs at this section. A stable supercritical water surface profile was computed downstream of this section to the downstream end of the inlet channel. The supercritical flow regime is drowned out by the basin stage at the time of the peak discharge. Upstream of this section in the diversion channel, approximately 200 cfs is diverted during the 100 year event and 6838 cfs during the 500 year event over the dike. The resulting flows downstream of this section are 8343 and 10989 cfs for the 100 and 500 year events, respectively.

300+67 Supercritical flow 10-500 yr, BFE's set by maximum basin stage computed in HEC-1.

294+85 Supercritical flow 10-500 yr, BFE's set by maximum basin stage computed in HEC-1.

289+03 Downstream end of inlet channel, BFE's set by maximum basin stage computed in HEC-1. The starting water surfaces for the 10-year event was determined using normal depth. The basin stages at the time of the

peak were used in the HEC-2 model as the starting water surfaces for the 50-year event (2121.5), 100-year event (2125.0), and 500-yr event (2129.0).

Return period	10	50	100	500
Wash Flow	2939	6751	8537	19217
Diverted Flow	0	0	194	6838
NLVDB Inflow	2939	6751	8343	11017
Basin Pool elev.	2117.9	2130.5	2135.4	2139.4

Subreach 3 - NLVDB (273+03) to NLVDB (1+50)

The water surface profile for Subreach 3 between NLVDB and the downstream terminus of the King Charles Channel at the A Channel was computed using several models. The reach from the Craig Road Bridge to the NLVDB was modeled as a subcritical/critical water surface profile. The water surface profile from the downstream terminus of the King Charles Channel to Craig Road Bridge was computed using both subcritical/critical and supercritical/critical flow regimes.

There are numerous locations within the wash upstream of Lone Mountain Road with substantial piles of rubble and debris, including auto bodies, concrete construction debris, tires, and urban trash. This debris was observed during each of the 3 NHC site visits. There is a high probability that much of this debris would be mobilized during large flood events and potentially reduce the capacity of the existing flood control structures. The City of North Las Vegas responded to NHC's concerns by stating in a letter dated June 21, 1996 that:

> The section of the wash between Lone Mountain Road and the North Las Vegas Detention Basin is scheduled for cleaning and debris removal on a yearly basis. Our maintenance schedule indicates that these activities should occur within the next 60 days. For your reference in preparing your hydraulic model, I will provide you with a photograph of the wash after maintenance activities are complete.

During a site visit in December of 1997, the amount of debris and rubble in the wash appeared to have increased from the previous site visit in 1996. In general, the hydraulic models assume that the debris in the wash will not affect conveyance. However, the effects of debris were taken into account at section 184+62 and at Lone Mountain Bridge. (See discussion below.)

Concrete lined channel	n = 0.014
Developed overbanks (Primarily pavement areas, smooth earth, or sparse landscaping)	n= 0.03 to 0.035

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Earth Channels (constructed) n = 0.03
Unimproved Wash n = 0.045

expansion coeff=0.3
contraction coeff =0.1

The diversion weir crosses the wash and diverts flow into the basin (refer to **Review of Flood Control Structures, Volume 2** of this TSDN). During the 100 and 500 year events overtopping flows of Q_{100}=194 cfs and Q_{500}=6838 cfs flow back into the Upper Las Vegas Wash (ULVW) and a branch of an unnamed wash to the east of the ULVW downstream of the diversion dike. Diverted flows were distributed into the two washes based on the ratio of the wash bottom widths. Manning's equation was used to compute a depth and area of inundation from the diversion weir downstream to station 269+00

	No. Las Vegas Wash	Unnamed Wash to East.
	Bottom width = 200'	Bottom width = 100'
	invert slope = 0.011 ft/ft	invert slope = 0.011 ft/ft
	side slopes = 2H:1v	side slopes = 2H:1v
	"n" = 0.045	"n" = 0.045
	Assumed channel flow	Assumed channel flow
Q_{100}:	200'/300' (194 cfs) = 129 cfs	200'/300' (194 cfs) = 65 cfs
Q_{500}:	200'/300' (6838 cfs) = 458 cfs	200'/300' (6838 cfs) = 2257 cfs
Q_{100}:	depth = 0.4 ft velocity = 1.8 fps top width = 201 ft	depth = 0.4 ft velocity = 1.8 fps top width = 101 ft
Q_{500}:	depth = 3.1 ft velocity = 7.2 fps top width = 212 ft	depth = 3.1 ft velocity = 7.0 fps top width = 112 ft

∴ The 100 yr energy depth is below 1' - the flood hazard is defined by a Zone X. The 500 yr flood hazard was mapped using a shaded Zone X flood hazard delineation, assuming an approximate depth of 3 ft

Combined Peak at xs 26383
Q_{100}=2839 cfs Q_{500}=8988 cfs

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Sta	Description
270+00	Cross sections cut from 1996 Kenney Aerial Topographic maps
273+03	The channel from the outlet structure is lined with soil cement in poor to fair condition (Manning's n of 0.03). A Manning's n of 0.045 was used for the wash downstream of this point to the Lone Mountain Bridge.
263+83	Confluence of diversion weir flows and outlet channel flows.
198+02	Sections from aerial photogrammetry.
192+15	Sections cut from CNLV Topographic maps
-186+19	Sections represent topography at a large excavation in the wash
184+72	Sections represent channel constrictions caused by tailing's piles
184+62	and concrete rubble pile in channel invert. The mounds and debris cause the flow to back up and water to break out between 18710 & 18472 during the 500 year flood event. The peak breakout flow is 518 cfs and will leave the channel at Losee and Azure. A pile of concrete construction debris (i.e. concrete junction boxes, manhole eccentric cones and bases) deposited on the upstream side of a dirt road (Azure) appears as a 2-3' mound in the wash invert on the CNLV topography maps. The cross sections used in the model reflect this pile of debris to the extent possible from available mapping.

The CNLV Topographic maps were used to delineate the 500 yr flood plain. Downslope of the intersection of Losee & Azure the ground surface slopes at 1% to the southeast. The cross section normal to the direction of flow is relatively flat with out any significant channels. The breakout flow will likely spread to sheet flow until it is confined to 1-3' deep rills in the wash surface. Based on available topo and field surveys Losee Road appears to prevent the flow from returning to the main channel. A ridge shown on the CNLV topography confines the flow on the east side. The lateral extent of the 500 yr flood plain was approximated using normal depth calculations.

Normal depth computations for the 500 yr breakout flow at the Losee & Azure intersection

Q=517 cfs, n=0.045, s=0.01
BW=150, ss=0
=> d=1.0 ft, v=3.3 fps

300' d/s of Azure
BW=700 ft
=> d=0.4 ft v=1.8 fps

1650' d/s of Azure
BW=850
=> d=0.4 ft v=1.7 fps

The inundation limits of the 500 yr breakout flow were terminated around 1650' downstream of the Losee Azure intersection. The breakout volume is approximately 48 ac-ft and is spread over an area of 29 acres.

170+58-165+46 These sections were obtained by aerial photogrammetry. The wash is composed of a partially constructed channel within the natural wash. We were provided with signed and approved rough grading plans for the Sunrise Park Inc., dated May 1996. During our December 1997 site visit, it appeared construction had been suspended. City officials informed NHC that the project had been stopped. At this time the section 165+46, obtained from aerial photogrammetry, was inserted back into the models and the Sunrise Park sections were removed. In April of 1998, followingcompletionn of the hydraulic modeling we were informed the plans for this section of channel were completed. Since incorporating these improvements would have required remodeling this subreach and would have delayed the submittal of the study, it was agreed with the Project Officer that the proposed improvements would not be included in the study.

Near section 170+58 there is significant debris scattered in the wash The debris includes a mound of tires approx 100'x50' appearing 1'-3' deep plywood on other urban debris. This debris was assumed to be removed as per the CNLV letter dated June 21, 1996.

156+67 The section was obtained from CNLV aerial topographic mapping. Upstream of this section is unfinished channel grading from the Sunrise Park Inc construction.

156+67- Drainage channel: rock side slopes and a native material bed. 143+68 Downstream of this section are channel improvements consisting of rock side slopes and a native material bed. We were unable to obtain channel plans for these improvements, however the sections 156+67 through 143+68 reflect the channel geometry as of December 1997.

143+68 The channel narrows at this location upstream of a perpendicular trench in the wash. Cross section was obtained from CNLV aerial topographic mapping.

141+67-130+94 Channel incised in wash between these stations, native earth bed and bank. These sections were obtained by aerial photogrammetry.

116+14 The main channel transitions from a 100' wide and 8-12' deep man made channel to the shallower wider wash.

The wash flows southeast across Losee between sections 116+14 and 9+29. The majority of the flow crosses at two low water crossings along Losee, refer to spot elevations on Sheet 7 of the Work Maps for low water crossings on road. The wash main channel intersects Losee Road approx 350' south of Washburn Road. The low water crossings could not be directly modeled using HEC-2 due to the two dimensional nature of the flow. The Losee Road was treated like a side weir to the channel between stations 116+14 and 109+62. A weir calculation was made to determine the depth and velocity east of Losee. This area was designated as an AO zone, depth 2ft. Listed below are the normal depth calculations:

Weir flow over Losee between 116+14 and 109+62
Road length = 500 ft — $Q=3(500)(1)^{1.5}$
Aug. depth = 1 — =1500 cfs

Normal depth and velocity
Aug. width = 200 ft - 300 ft
Invert Slope = 0.0067 ft/ft
n=0.045
side slope = 0

at BW = 200	at	BW = 300 ft
d=1.8 ft		d=1.5 ft
v=4.0 fps		v=3.4 fps
e=2.0 ft		e=1.7
$=>AO_2$		$=>AO_2$

109+62-101+55 The AO zone ties back into the AE zone between section 109+62 and 101+155. La Madre Way cuts through a ridge in the wash and is a localized low spot on the right bank. Cross section 101+55 in the HEC-2 run shows overtopping along the right bank during the 500 yr flood. The amount of flow that would break out at this location is small since the overtopping depth is approximately 0.1' and the width of the low point is approximately 40 ft. The estimated breakout using a standard weir equation is 4 cfs.

These cross sections were obtained from aerial photogrametry.

101+55-88-60 The 10-100 yr flows are conveyed to Lone Mountain Road bridge within the wash. A rainfall event upstream of the bridge occurring in the summer/fall of 1997 was estimated to have had a peak discharge of 200 to 400 cfs. This estimate was developed from the highwater marks left downstream at the Craig Road Culverts. During a site visit in December 1997 there was approximately 2-3 feet of deposition in the Lone Mountain inlet channel and bridge. Much of this deposition is a result of headcut

erosion occurring immediately upstream of the concrete bridge inlet channel in a native earth transition to the wash. The slope of the wash before the event was approximately 1%, the earth transition was approximately 9%, and the concrete inlet channel is 1%. On the December 1997 visit, the slope in the now larger transition was estimated to be 4 to 6%, with several large headcut channels at the upstream end. The material deposited in the channel and bridge ranged in size from large gravels to cobbles. The larger material is not representative of the wash surface, but is evident in the banks of the eroding channels. This material is derived from older alluvial deposits, and appears to be available in virtually unlimited supply if the headcutting process proceeds upstream to Losee Road.

The large volume of sediment deposited in the channel and bridge, during the summer/fall 1997 flood event raised the question: would the channel and bridge become blocked with sediment during the 10-100 yr flood events? To answer this question, the critical shear stress was calculated for a 5" cobble. Based on field observations, It was assumed that 90% of the inflowing sediment to the channel had a nominal diameter of less than 5 inches. The critical shear was related to flow depth to determine if the flow depths in the channel and bridge were greater than the depth required to initiate motion in 90% of the inflowing particle sizes flowing into the channel and bridge section. Assuming a dimensionless shear stress between 0.03 and 0.047 and energy slope through the bridge to be equal to the bed slope, 1%, the critical shear stress required to move a 5" particle ranges from 61.5 and 96.4 N/m. These critical shear stresses correspond to flow depths between 2 and 3.5 feet. This cursory analysis does not take into account the dynamics of the bed load matrix, hiding factors, changing transport capacities, or sediment continuity that would *be required better estimate the sediment routing through the channel and* bridge. However, it does provide a rough estimate that at flow depths greater than 3.5 feet deep, but prior to pressure flow, the culvert would likely pass the inflowing sediment through the channel and bridge.

Because the bridge remains in open channel flow conditions during the 100-year event, it was assumed that the inflowing load will be transported through the bridge under these conditions.

Using an HEC-RAS model of the reach between Lone Mountain and Craig Road produced for the **142 Acre Site at Losee Road and Craig Road LOMR**, the flow through the Lone Mountain Road Bridge was found to become pressurized at flows greater than 4000 cfs. The bridge would be pressurized during a 500 yr flood of 8470 cfs with flow overtopping the road and breaking out over the left bank. Much of the bedload carried into the inlet channel by the 8470 cfs would be deposited in the channel and

bridge, since the bridge would be capable of passing less than 50% of the flow, but 90 to 100% of the bedload mobilized by the 8470 cfs would be conveyed to the bridge inlet channel.

Based on the high supply of cobble sized material that would not be transported through the bridge under pressure flow conditions, the Lone Mountain Bridge was assumed blocked during 500 yr flood. A contributing factor in this decision was the large amount of debris expected to be mobilized in the wash upstream in the 500 yr event. Lone Mountain Road bridge is the most upstream bridge on the wash.

Lone Mountain Road slopes to the east at approximately 1 to 3%. The 500 year flow would be backed up by the road and overtop the road from the Losee/Lone Mountain Intersection to approximately 1700 feet to the east along Lone Mountain Road. There would be a significant difference in energy head between the flow overtopping the bridge at Lone Mountain Road and overtopping Lone Mountain near Berg Street. The overtopping of Lone Mountain was modeled by cutting a section starting downstream of the left bank of section 9120 to the center of the bridge and then to the intersection of Losee and Lone Mountain Road. This section does not appear in the 10-100 yr HEC-2 model (LNLVW16b).

91+20	Upstream end of concrete inlet channel to Lone Mountain Road. The transition from the wash to the inlet channel consists of an unlined 9% flared slope to the wash that has been head cut into several gullies to a slope between 4% & 6%, as described above.
88+60	Station Equation 88+60 ahead = 88+34.5 back downstream end of concrete inlet channel upstream end of Lone Mountain Road Bridge.
87+54	Downstream end of Lone Mountain Bridge begin transition to trapezoidal channel (rock side slopes & native material bottom) channel "n"=0.03 overbank n=0.03
86+73- 60+92	Trapezoidal channel rock side slopes native material bottom with rock grade control structures at 200' intervals
59+74	Upstream end of Craig Road Culverts (7-8'x8.5' RCB). The culvert has adequate capacity to convey the 10 - 100 year flood events. The 500 yr HEC-2 model, LNLV5015.DAT, ends at this station. The starting water surface elevation for the 500 yr model was determined by balancing the flow through the Craig Road culverts, the flow over Craig Road at the culvert and the flow over Craig near the intersection of Craig and Frehner Road with the total 500 yr flow of 8470 cfs for a given water surface

elevation (see Table 1). The rating curve for the culvert was computed using HY8. The low points along Craig Road occur near the intersection of Craig and Frehner roads, approximately 1923.6 feet NGVD 29 and near the center of the Craig Culvert, approximately 1924 feet NGVD 29. Road profiles and low points were obtained from the BSI Site Grading Plan and converted from NAVD 88 to NGVD 29 by subtracting 2.4'. The water over topping the road at Craig and Frehner during the 500 year event continues south over Craig Road and is contained to the East by the UPRR embankment. Flow overtopping Craig Road near the culvert is split to the west and east by the concrete walls of the King Charles Diversion Channel. Approximately 627cfs flows to the west into the industrial park between bordered on the west by Losee Road and on the east by the King Charles Diversion Channel. Approximately 1500 cfs would overtop the road east of the channel.

KING CHARLES CHANNEL

The water surface profile for the 10-500 year flood events in the King Charles Channel were modeled for both the supercritical and subcritical flow regimes. The HEC-2 model LNLVW16B was used to compute the 10-100 yr subcritical profiles, KGSBW2 was used to compute the 500 yr subcritical profile and KGSCW2 was used to compute the 10-500 yr supercritical profiles. Cross section geometry for the King Charles Channel was obtained from the King Charles Diversion Channel from the N-Channel As-built plans.

The flow in the King Charles Channel downstream of the Craig Road culvert changes regime from supercritical to subcritical, and from subcritical to supercritical. The details of the composite profiles are shown on Table 2. Froude numbers less than 1.2 were considered to be subject to a hydraulic jump. This assumption is based on COE EM1601 *Hydraulic Design of Flood Control Channels* (pg 11) which states that Froude numbers between 0.86 and 1.13 are unstable. Due to the uncertainties in the modeling of the channel, a Froude number of 1.2 was used instead of 1.13 to determine the lower limit of stable supercritical flow. The flow regime through the channel was determined to be supercritical if it met the following criteria:

1. Froude number >1.2
2. Downstream wsel < than upstream wsel

If both of the criteria listed above were not met, then the water surface was assumed to be calculated by the subcritical model. Resulting in a subcritical or critical water surface elevation.

58+51
51+05

The KCC starts at 58+52 in a 60 foot wide concrete rectangular section downstream of the Craig Road culvert and extends down to station 51+05. The rectangular section narrows from a bottom width of 60 ft at the culvert to a width of 35 ft at section 51+05. Invert slope is 0.0065 ft/ft.

51+05
50+05

Concrete transition from rectangular channel to a trapezoidal channel at section 50+05, bottom width 15 ft, side slopes 2H:1V. The invert slope changes at section 51+05 to 0.02 ft/ft.

50+05
43+60

Concrete trapezoidal channel from 50+05 to 43+60. The invert slope changes at section 50+05 from 0.02 ft/ft to 0.0082 ft/ft. This grade of 0.0082 ft/ft extends to 41+15. A maintenance access ramp between stations 49+20 and 47+81 was not included in the models. Instead a uniform trapezoidal channel was modeled.

43+60
42+47

The channel transitions from a trapezoidal channel to a rectangular channel at the upstream face of the UPRR Bridge, station 42+46. As-built plans for the bridge were not available. Field Surveys verified the invert and soffit elevations at the bridge. The bridge was modeled using the normal bridge method. The normal bridge method accounts for the losses occurring in the 10-100 yr floods due to pier obstructions and increased wetted perimeter. The 500 yr flood hydraulics at the bridge become more complicated with a portion of the water that flows over Craig Road reentering the channel upstream of the UPRR bridge. In addition to the water reentering from the left bank, water is leaving the channel along the right bank and flowing into the adjacent industrial park. Rating curves for the flow through the UPRR bridge (developed using the Special Bridge routine in HEC-2), out of the channel along the right bank (developed using a standard weir equation along the right channel bank), and out of the UPRR culvert northeast of the bridge (discussed in the **Breakout Flow East of the King Charles Channel** section and developed using a rating table from HY8) were developed. A water surface elevation was calculated by balancing the combined flow through the outlets at a common water surface elevation with the total flow upstream of the outlets (see Table 3). The water surface elevation computed from the flow balance for the 500 yr flood was 1912.9. The water surface computed at the bridge using the normal bridge routine in HEC-2 was 1912.3. This 0.6' difference in water surface elevations near the bridge opening is acceptable due to the uncertainty of the flow characteristics at a discharge far above the capacity of the channel system.

42+47
41+88

The bridge is skewed to the flow by 35° between sections 42+47 and 41+88. The length of the bridge perpendicular to the railroad tracks is 33 ft. The effective length of the bridge, taking into account the distance

between the first point along the channel centerline where the flow is directly affected by the upstream face of the bridge to the last point along the channel centerline where the flow is directly affected by the flow, is closer to 57 ft. The upstream and downstream bridge sections were spaced 57 ft apart to account for the skew of the bridge and cut perpendicular to the channel instead of using a skew factor in the HEC-2 model at the bridge.

The contraction and expansion coefficients were changed to 0.3 and 0.5, respectively, through the bridge sections. The discharge was reduced at section 42+46 from 6339 cfs to 5868 cfs to account for the breakout flows.

41+15
38+23

The flow at this section is divided between the King Charles Channel, and the N Channel. The division of flow between the King Charles Channel and the N Channel is based the ratio of the channel areas to the total channel area, resulting in 80% of the flow diverted to the King Charles Channel and 20% of the flow diverted into the N-Channel.

	Return Period			
	10	50	100	500
King Charles Channel	1025	1746	2266	4694
N Channel	256	437	567	1174

A transition along the side slope of the right bank begins at section 41+15. The vertical bank changes to a 1.5H:1V side slope at section 40+60. The left bank remains vertical. The invert slope changes from 0.0082 ft/ft upstream of section 41+16 to 0.0033 ft/ft downstream of this section. The channel curves at a centerline radius of 150' to the south. The effects of superelevation were neglected. Under extreme hydraulic conditions during the 500 yr flood, transverse waves combined with superelevation may cause minor overtopping along the left bank through the curve. It is unlikely that the volume and depth of the overtopping would be sufficient to cause significant flooding. However, the area to the left of the channel was designated a shaded X Zone due to flooding along Donovan Way.

38+23
37+24

The left bank transitions from a vertical slope to a 1.5H:1V side slope at section 37+24.

37+24
5+44

The channel between section 37+24 and 5+44 is a uniform trapezoidal channel with a bottom width of 20 ft +/- and side slopes of 1.5H:1V. A concrete trapezoidal channel drains into the KCC at station 22+50. This channel is intended to convey flow from the industrial complex to the west underneath the UPRR embankment through 2 - 3ft x 6ft culverts. Flapgates on downstream side of these culverts appeared to

be stuck in an almost closed position during NHC's December 1997 field visit. On the upstream side the culvert was half filled with sediment and had a tree with a 4" diameter trunk growing in the channel. Inflow from the culverts was neglected in the analysis.

5+44 The channel transitions from a trapezoidal channel at station 5+44 to a rectangular channel with a bottom width of 35 ft at section 4+44. The rectangular section continues to section 2+43 where a splitter wall divides the channel into two channels of equal bottom width. The HEC-2 model ends at section 1+50. Downstream of this section the uniform rectangular channel ends at station 0+88, the KCC and A Channel confluence. The stationing continues downstream to station 0+00 and the upstream face of the Interstate 15 bridge.

The starting water surface elevations used in the model at station 1+50 were calculated in HEC-2 using the slope area routine with the assumption that the bed slope approximated the energy slope at this section.

The Project Officer instructed NHC to use the Ensign and Buckley Preliminary LMMP to obtain the 100 yr backwater elevations from the A Channel (1892.9 ft). We were instructed to estimate the 10, 50, and 500 yr backwater elevations by using the discharges from the Lower Central Valley Storm in the Clark County Regional Flood Control District **Las Vegas Valley Flood Insurance Study Hydrology Report**. Normal depth was computed at station 0+00 for these discharges and added to the invert elevation at 0+00, 1885.4 ft. The Manning's N used in the calculations was calculated by applying the normal depth calculation for the known 100 yr water surface and discharge used in the Ensign and Buckley Preliminary LMMP and determining the N.

A Channel Normal Depth Calculations:
ss_L=2H:1V invert el.= 1885.4 ft
ss_R=0H:1V invert s= 0.0033 ft/ft
BW=48 ft n= 0.017

Return Period	LCVS Q	Depth	WSEL	Backwater to Station
10	2160	3.8	1889.2	1+50
50	5120	6.4	1891.8	4+50
100	6730	7.5	1892.9	5+44
500	12400	10.8	1896.2	7+00

The computed water surface elevations from the 10 - 500 yr events in the A Channel back up into the KCC and set the maximum water surface elevations for the 10-500 year recurrence intervals as listed above.

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

500 Year Breakout Flows From Station 95+00 to Craig Road

The majority of the 500 yr flood will be conveyed across Losee Road upstream of station 95+00. It is likely that a small portion of the water will continue to flow south along Losee Road and cross over Lone Mountain along the right bank. The nature of this flooding will likely be shallow sheet flow that will be bounded on the west by Losee Road. Some of the flow will return to the improved channel between Lone Mountain Road and Craig however much of this flow will spread to shallow depths between Losee and the improved channel to Craig Road.

The break out flow along the left bank downstream from Lone Mountain Road will be confined on the east by a ridge shown on the BSI **142 Acre Site at Losee Road and Craig Road As-built Plans**. Much of the breakout flow will return to the channel near station 68+00, however the backwater created by the Craig road culvert will cause the water to spill out of the channel downstream of section 63+70. Water overtopping the ridge east of the channel will spread back up Frehner 400 to 600' causing shallow flooding. The UPRR embankment will confine the flooding from continuing east.

500 Year Breakout Flows Downstream of Craig Road East of the King Charles Channel.

Approximately 1500 cfs during the 500 yr flood was calculated to overtop Craig Road east of the KCC. This water flows into a vacant triangular parcel bounded by the King Charles Channel on the west and the UPRR embankment to the southeast. This area has remnant channels of the Upper Las Vegas Wash which flow toward 2 - 5.5 ft x 12 ft culverts under the UPRR embankment. These culverts were computed to have a conveyance of 852 cfs at a water surface elevation of 1912.9 ft (see notes for 43+60 to 42+47). The remaining 650 cfs would flow to the south west back into the channel.

The water flowing through the UPRR culverts would be conveyed in a trapezoidal earth channel between Donovan Road and the UPRR embankment and has a bottom width of 30 ft +/- , side slopes 3H:1V, and an average depth of 4 to 5 feet deep. The invert slope is approximately 0.005 ft/ft. The water would breakout of this channel upstream of the Donovan N Channel crossing with much of the flow entering the N Channel. A portion of the flow is likely to be conveyed southwest in Donovan and sheetflow into a parking lot south of the N Channel.

500 Year Breakout Flows Downstream of Craig Road West of the King Charles Channel.

Approximately 627 cfs would cross Craig Road on the east side between Losee

road and the King Charles Channel. The concrete vertical banks of the KCC prevent water from returning to the KCC. The southeasterly sloping valley surface on the west side of Losee Road prevents water from flowing west. South of Craig Road conveyance area is limited to narrow alleys (approximately 35ft to 50ft in width between industrial buildings. The further terrain is complicated in this area by planter and cross sloping parking areas between parcels intended to convey local drainage. It is estimated that the entire area from Losee Road west to the KCC channel is subject to shallow flooding. This flooding would likely be less than a foot in most areas.

A block wall along the south east side of Frehner confines the flow to a corridor between Frehner and Losee. At the intersection of Losee and Frehner the block wall ends and the flow would be confined between Losee and the UPRR embankment.

Upstream of the UPRR bridge approximately 1120 cfs water breaks out along the west bank of KCC. This flow would be conveyed through the industrial complex between Frehner and the UPRR embankment. Flow through this area would become spread out by fences between lots, stored equipment and materials.

N CHANNEL

The N Channel conveys approximately 20% of the flow for the 10-100 yr floods from the King Charles channel upstream of station 41+15 on the KCC alignment to Interstate 15, the study limit. For this reach, both a subcritical/critical and supercritical/critical water surface profile was calculated using HEC-2. The subcritical/critical HEC-2 model defaulted to critical depth for the N Channel reach at a n of 0.14 the n was increased to 0.025 before the a subcritical water surface profile was computed. However, a couple of cross section were not able to converge on a subcritical solution. Those sections that did converge on a subcritical solution had unstable Froude numbers between 0.85 and 0.97. The supercritical water surface profile was stable for the entire channel reach for the 10-100 year events. The computed profile for the 500 yr floods was also stable when the combined flow from across Donovan and from the diversion was entered at the upstream end of the model. However, when the flow across Donovan was inserted between sections 5+71 and 4+46, the model calculated critical depth at sections 4+96 and 4+46. The increased discharges at these sections is likely the reason for the inability of the model to converge on a supercritical solution. The increased discharges at these sections is likely the reason for the inability of the model to converge on a supercritical solution. Therefore the supercritical/critical water surface profile with overtopping between 5+71 and 4+46, channel n=0.017 in locations with side flow entering and channel n = 0.014 for other areas, was considered the most representative model of the hydraulic conditions.

With North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

As is standard practice in computing a supercritical water surface profile using HEC-2 model the fields for the contraction and expansion coefficients were swapped. The starting water surface for the model was set using the water surface elevation in the KCC at the diversion, section 41+15.

7+08
6+38 The N Channel branches off the KCC through a 9.5 ft wide concrete lined rectangular channel and has a 10" wall running down the center of channel. The channel widens from 9.5 ft to 16 ft at the upstream side of Donovan Way, station 6+38. The channel has a constant slope of 0.0058 between station 7+08 to the downstream study limit at station 0+00

6+38 The N Channel passes under Donovan Way in 2 - 6 ft x 8 ft reinforced concrete box culverts. The soffit and invert elevations of these culverts were verified by field surveys. The culvert was modeled using the Normal Bridge Routine in HEC-2. Contraction and Expansion coefficients of 0.3 and 0.5, respectively, were used at the culvert. The contraction and expansion coefficients could have been remained 0.1 and 0.3, respectively, since the entire reach of channel from the diversion to the culvert is a gradual transition. However, a conservative approach of increasing the coefficients was modeled.

5+72
5+46 The channel transitions from the box culverts to a trapezoidal channel with a 10 ft bottom, 2H:1V side slopes, and a depth of 7 ft.

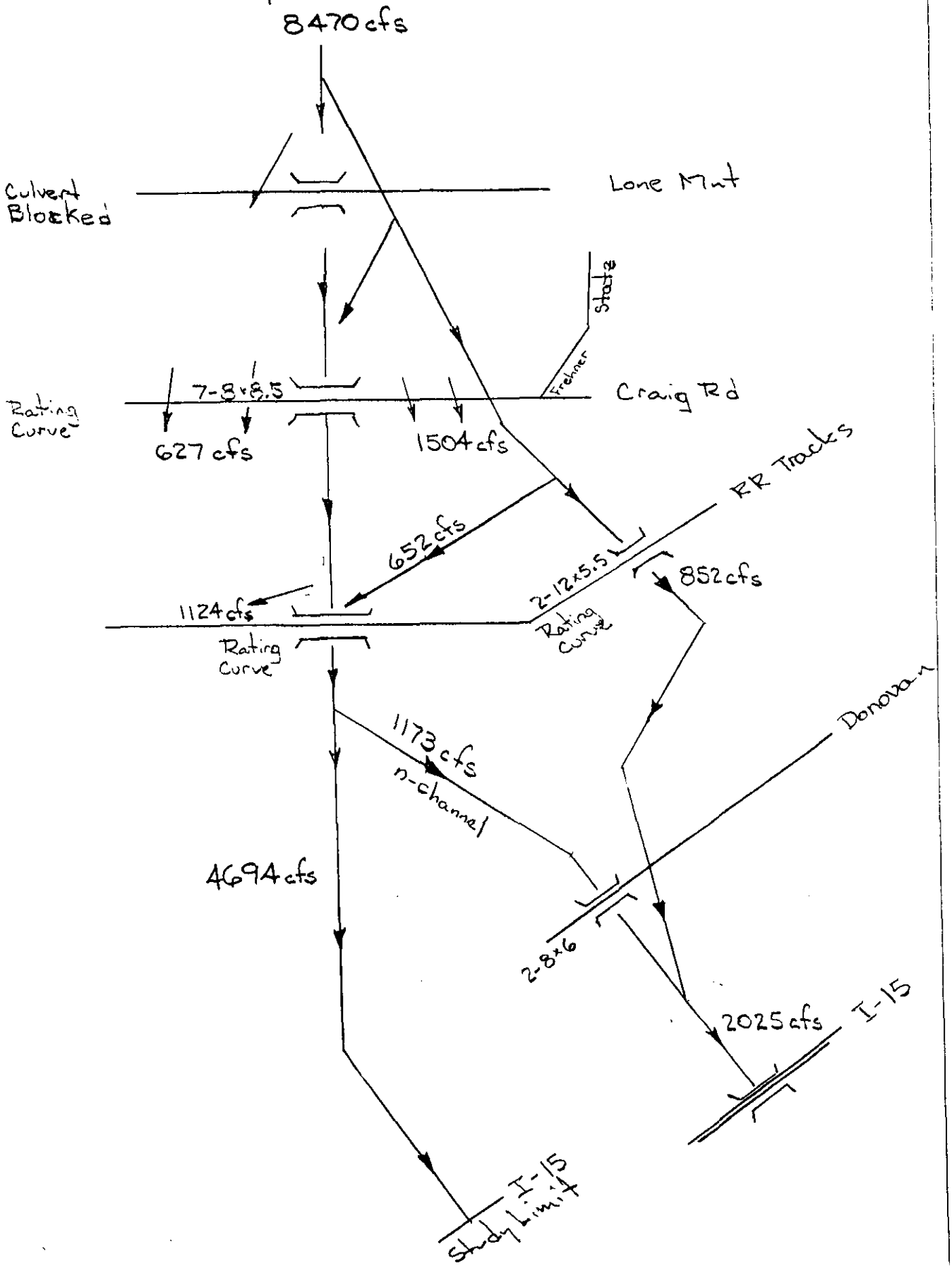
The 500 yr flow, 852 cfs, entering the N Channel from flow overtopping Donovan Way was added in 284 cfs increments to the model between sections 5+72 and 5+46, 5+46 and 4+96, and 4+96 and 4+46. The channel roughness was increased by 20% from 0.014 to 0.017 between sections 5+46 and 0+25. This increase was added to account for the turbulence created by flow entering the channel as shallow flow. No increase in the 10-100 yr floods were made since there was not any flow entering the channel at this point.

5+46
0+25 Uniform trapezoidal concrete lined channel.

0+25 Transition from trapezoidal channel to 2 - 6 ft x 12 ft concrete box culverts at station 0+00. Section 0+00, the upstream face of the Interstate 15 culvert, represents the downstream study limit.

FEMA - Clark Co.

Upper Las Vegas Wash With Diversion Dike
500 yr Flood Event



No. 5505 Engineer's Computation Pad

Table 1 **Flow Balance at Craig Road**

Craig Road 7-8x8.4 culvert
1:1 bevel , 45^ flare

Q	HW EL. NAVD88	NGVD29
5800	1924.65	1927.05
5920	1924.87	1927.27
6040	1925.01	1927.41
6160	1925.32	1927.72
6280	1925.55	1927.95
6300	1925.58	1927.98
6520	1926.01	1928.41
6640	1926.25	1928.65
6760	1926.49	1928.89
6880	1926.73	1929.13
7000	1926.98	1929.38

Flow over Craig Road

Q	WS Elev	Depth	Length
3	1924.65	0.03	150
35	1924.87	0.18	150
65	1925.01	0.27	150
503	1925.32	0.48	500
884	1925.55	0.64	580
926	1925.58	0.66	580
2755	1926.01	0.94	1000
6974	1926.25	1.11	2000
8550	1926.49	1.27	2000
10229	1926.73	1.43	2000
6041	1926.98	1.59	1000

Flow over Freiner & Craig

Q	WS Elev	Depth	Length
184	1924.65	0.55	150
304	1924.87	0.77	150
391	1925.01	0.91	150
606	1925.32	1.22	150
786	1925.55	1.45	150
810	1925.58	1.48	150
1188	1926.01	1.91	150
1419	1926.25	2.15	150
1663	1926.49	2.39	150
1919	1926.73	2.63	150
2199	1926.98	2.88	150

WSEL	craig culv	craig wr	fr/cr wr	total Q
1925.0	6031	63	384	6479
1925.2	6114	333	523	6970
1925.4	6202	635	669	7506
1925.6	6310	1011	828	8149
1925.8	6413	1861	1003	9277
1926.0	6515	2712	1179	10406
1926.2	6615	6095	1371	14081
1926.4	6715	7959	1571	16245
1926.6	6815	9319	1780	17915
1926.8	6914	9056	1998	17968

						LOB Q	craig ch	ROB Q	Total Q
500yr w	1925.7	6339	1253	878	8470	1504	6339	627	8470
~~100yr w/o~~	~~1925.6~~	~~6307~~	~~981~~	~~822~~	~~8109~~	~~1312~~	~~6307~~	~~491~~	~~8109~~
	~~1926.1~~	~~6588~~	~~5154~~	~~1319~~	~~13062~~	~~3896~~	~~6588~~	~~2577~~	~~13062~~
~~500yr w/o~~	~~1926.2~~	~~6638~~	~~6888~~	~~1414~~	~~14939~~	~~4858~~	~~6638~~	~~3444~~	~~14939~~

Table 2.

UPPER LAS VEGAS WASH - King Charles Channel with Diversion at North Las Vegas Wash

King Charles Channel Flow Regime Table

SUPERCRITICAL RUN					SUBCRITICAL RUN								
10 YR Flood Event					10 YR Flood Event					Test 1	Resulting WSEL	Test 2	Final WSEL
SECNO	Q	CWSEL	VCH	FRCH	SECNO	Q	CWSEL	VCH	FRCH				
150	1025	1889.0	9.9	1.01	150	1025	1889.0	9.9	1.02	SUB	1889.02		1889.02
243.6	1025	1888.8	11.5	1.28	243.6	1025	1889.6	8.7	0.84	SUB	1889.63	SUB	1889.63
244.6	1025	1888.6	12.0	1.36	244.6	1025	1889.8	8.1	0.76	SUB	1889.8	SUB	1889.8
450	1025	1889.2	13.8	1.65	450	1025	1890.0	9.9	1	SUPER	1889.18	SUB	1890.03
544	1025	1890.7	11.7	1.21	544	1025	1891.1	10.2	1.01	SUPER	1890.68	SUPER	1890.68
600	1025	1890.9	11.5	1.18	600	1025	1891.3	10.2	1	SUB	1891.31	SUB	1891.31
700	1025	1891.2	11.5	1.19	700	1025	1891.6	10.2	1.01	SUB	1891.6	SUB	1891.6
1200	1025	1892.7	11.9	1.24	1200	1025	1893.2	10.2	1	SUPER	1892.73	SUPER	1892.73
1700	1025	1894.5	11.8	1.22	1700	1025	1894.9	10.2	1	SUPER	1894.46	SUPER	1894.46
2000	1025	1895.5	11.7	1.21	2000	1025	1895.9	10.2	1	SUPER	1895.48	SUPER	1895.48
2200	1025	1895.8	12.8	1.38	2200	1025	1896.5	10.2	1	SUPER	1895.82	SUPER	1895.82
3724	1025	1901.5	10.2	1.01	3724	1025	1901.5	10.2	1	SUB	1901.54	SUB	1901.54
3823	1025	1901.1	10.8	1.11	3823	1025	1902.6	7.2	0.63	SUB	1902.55	SUB	1902.55
4020	1025	1901.8	10.4	1.06	4020	1025	1902.6	8.4	0.77	SUB	1902.56	SUB	1902.56
4060	1025	1902.1	10.0	1	4060	1025	1902.6	8.7	0.82	SUB	1902.55	SUB	1902.55
4115	1025	1900.6	14.6	1.94	4115	1281	1902.9	8.0	0.7	SUB	1902.86	SUB	1902.86
4188	1281	1900.9	16.5	2.39	4188	1281	1903.5	5.9	0.52	SUB	1903.5	SUB	1903.5
4189	1281	1901.0	16.3	2.35	4189	1281	1903.5	6.4	0.58	SUB	1903.45	SUB	1903.45
4246	1281	1901.3	18.7	2.89	4246	1281	1903.4	7.5	0.73	SUB	1903.39	SUB	1903.39
4247	1281	1901.2	19.0	2.96	4247	1281	1903.7	6.4	0.58	SUB	1903.68	SUB	1903.68
4360	1281	1904.4	16.9	1.84	4360	1281	1905.8	10.7	1.01	SUPER	1904.36	SUPER	1904.36
4831	1281	1908.6	14.8	1.54	4831	1281	1909.7	10.7	1.01	SUPER	1908.62	SUPER	1908.62
4920	1281	1909.5	14.1	1.45	4920	1281	1910.4	10.7	1.01	SUPER	1909.47	SUPER	1909.47
5005	1281	1910.4	13.0	1.3	5005	1281	1911.1	10.7	1.01	SUPER	1910.41	SUPER	1910.41
5105	1281	1911.2	12.1	1.22	5105	1281	1911.7	10.6	1	SUPER	1911.23	SUPER	1911.23
5200	1281	1911.6	12.2	1.29	5200	1281	1912.1	10.3	1.01	SUPER	1911.57	SUPER	1911.57
5500	1281	1913.1	11.8	1.38	5500	1281	1913.6	9.5	1	SUPER	1913.06	SUPER	1913.06
5852	1281	1915.3	9.8	1.17	5852	1281	1915.1	9.1	1.01	SUB	1915.13	SUB	1915.13
50 YR Flood Event					50 YR Flood Event								
150	1746	1890.3	11.8	1.02	150	1746	1890.3	11.8	1.02	SUB	1890.31		1890.31
243.6	1746	1889.8	14.3	1.34	243.6	1746	1891.1	10.6	0.85	SUB	1891.05	SUB	1891.05
244.6	1746	1889.6	14.8	1.42	244.6	1746	1891.3	9.7	0.76	SUB	1891.33	SUB	1891.33
450	1746	1890.2	15.8	1.56	450	1746	1891.3	11.7	1	SUPER	1890.21	SUB	1891.32
544	1746	1891.9	13.6	1.24	544	1746	1892.6	11.7	1.01	SUPER	1891.93	SUPER	1891.93
600	1746	1892.2	13.5	1.22	600	1746	1892.8	11.7	1	SUPER	1892.18	SUPER	1892.18
700	1746	1892.4	13.7	1.25	700	1746	1893.1	11.6	1.01	SUPER	1892.4	SUPER	1892.4
1200	1746	1893.9	14.0	1.28	1200	1746	1894.7	11.6	1	SUPER	1893.94	SUPER	1893.94
1700	1746	1895.7	13.9	1.28	1700	1746	1896.4	11.6	1	SUPER	1895.65	SUPER	1895.65
2000	1746	1896.6	14.0	1.28	2000	1746	1897.4	11.6	1	SUPER	1896.64	SUPER	1896.64
2200	1746	1897.0	14.9	1.4	2200	1746	1898.0	11.6	1	SUPER	1897	SUPER	1897
3724	1746	1903.0	11.7	1.01	3724	1746	1903.0	11.6	1	SUB	1903	SUB	1903
3823	1746	1902.3	13.0	1.16	3823	1746	1904.1	8.7	0.66	SUB	1904.14	SUB	1904.14
4020	1746	1902.9	13.1	1.17	4020	1746	1904.1	9.8	0.78	SUB	1904.14	SUB	1904.14
4060	1746	1903.0	13.0	1.16	4060	1746	1904.1	10.1	0.82	SUB	1904.12	SUB	1904.12
4115	1746	1901.3	18.1	2.04	4115	2183	1904.2	10.3	0.78	SUB	1904.17	SUB	1904.17
4188	2183	1901.5	19.6	2.38	4188	2183	1905.4	6.9	0.49	SUB	1905.41	SUB	1905.41
4189	2183	1901.7	19.5	2.35	4189	2183	1905.4	7.5	0.56	SUB	1905.35	SUB	1905.35
4246	2183	1902.0	21.3	2.69	4246	2183	1905.3	8.2	0.64	SUB	1905.3	SUB	1905.3
4247	2183	1901.8	21.7	2.76	4247	2183	1905.6	7.3	0.54	SUB	1905.6	SUB	1905.6
4360	2183	1905.6	18.9	1.81	4360	2183	1907.4	12.0	1	SUPER	1905.62	SUPER	1905.62
4831	2183	1910.1	16.3	1.49	4831	2183	1911.3	12.0	1.01	SUPER	1910.05	SUPER	1910.05
4920	2183	1910.9	15.5	1.4	4920	2183	1912.0	12.0	1.01	SUPER	1910.94	SUPER	1910.94
5005	2183	1912.0	14.3	1.26	5005	2183	1912.7	12.0	1.01	SUPER	1911.95	SUPER	1911.95
5105	2183	1913.2	12.6	1	5105	2183	1913.1	12.7	1	SUB	1913.13	SUB	1913.13
5200	2183	1913.0	13.7	1.18	5200	2183	1913.9	11.1	0.87	SUB	1913.94	SUB	1913.94
5500	2183	1914.2	13.4	1.28	5500	2183	1914.8	11.4	1.01	SUPER	1914.19	SUPER	1914.19
5852	2183	1916.2	12.0	1.21	5852	2183	1916.2	10.8	1.01	SUPER	1916.15	SUPER	1916.15

Table 2. cont'd

UPPER LAS VEGAS WASH - King Charles Channel with Diversion at North Las Vegas Wash
King Charles Channel Flow Regime Table

SUPERCRITICAL RUN					SUBCRITICAL RUN								
100 YR Flood Event					100 YR Flood Event					Test 1	Resulting WSEL	Test 2	Final WSEL
SECNO	Q	CWSEL	VCH	FRCH	SECNO	Q	CWSEL	VCH	FRCH				
150	2266	1891.0	13.3	1.06	150	2266	1891.1	12.9	1.02	SUB	1891.13		1891.13
243.6	2266	1890.5	15.6	1.35	243.6	2266	1892.0	11.5	0.86	SUPER	1890.45	SUB	1891.96
244.6	2266	1890.2	16.1	1.42	244.6	2266	1892.3	10.6	0.76	SUB	1892.3	SUB	1892.3
450	2266	1890.9	16.9	1.51	450	2266	1892.1	12.8	1	SUPER	1890.91	SUB	1892.14
544	2266	1892.7	14.7	1.26	544	2266	1893.4	12.4	1.01	SUPER	1892.67	SUPER	1892.67
600	2266	1892.9	14.5	1.24	600	2266	1893.6	12.4	1	SUPER	1892.93	SUPER	1892.93
700	2266	1893.2	14.7	1.26	700	2266	1893.9	12.4	1.01	SUPER	1893.16	SUPER	1893.16
1200	2266	1894.6	15.1	1.31	1200	2266	1895.5	12.4	1.01	SUPER	1894.64	SUPER	1894.64
1700	2266	1896.4	15.1	1.3	1700	2266	1897.2	12.4	1.01	SUPER	1896.36	SUPER	1896.36
2000	2266	1897.4	15.1	1.31	2000	2266	1898.2	12.4	1.01	SUPER	1897.35	SUPER	1897.35
2200	2266	1897.7	16.0	1.4	2200	2266	1898.8	12.4	1.01	SUPER	1897.72	SUPER	1897.72
3724	2266	1903.9	12.4	1.01	3724	2266	1903.9	12.4	1	SUB	1903.88	SUB	1903.88
3823	2266	1903.0	14.2	1.18	3823	2266	1905.0	9.7	0.69	SUB	1905.04	SUB	1905.04
4020	2266	1903.6	14.2	1.18	4020	2266	1905.0	10.7	0.8	SUB	1905.03	SUB	1905.03
4060	2266	1903.8	14.1	1.17	4060	2266	1905.0	11.1	0.83	SUB	1905.01	SUB	1905.01
4115	2266	1901.7	19.8	2.05	4115	2833	1905.0	11.6	0.82	SUB	1905	SUB	1905
4188	2833	1901.9	21.2	2.34	4188	2833	1906.7	7.4	0.49	SUB	1906.65	SUB	1906.65
4189	2833	1902.1	21.0	2.31	4189	2833	1906.6	8.0	0.55	SUB	1906.58	SUB	1906.58
4246	2833	1902.5	22.5	2.57	4246	2833	1906.5	8.7	0.61	SUB	1906.53	SUB	1906.53
4247	2833	1902.2	23.0	2.65	4247	2833	1906.9	7.7	0.52	SUB	1906.85	SUB	1906.85
4360	2833	1906.4	20.0	1.8	4360	2833	1908.3	12.8	1.01	SUPER	1906.36	SUB	1908.34
4831	2833	1910.8	17.5	1.51	4831	2833	1912.3	12.7	1.01	SUPER	1910.81	SUPER	1910.81
4920	2833	1911.7	16.7	1.43	4920	2833	1913.0	12.7	1.01	SUPER	1911.69	SUPER	1911.69
5005	2833	1912.7	15.7	1.31	5005	2833	1913.7	12.7	1.01	SUPER	1912.67	SUPER	1912.67
5105	2833	1914.1	13.8	1	5105	2833	1914.1	13.8	1.01	SUB	1914.06	SUB	1914.06
5200	2833	1914.0	14.3	1.11	5200	2833	1915.2	11.6	0.81	SUB	1915.19	SUB	1915.19
5500	2833	1914.9	14.3	1.24	5500	2833	1915.5	12.4	1	SUPER	1914.93	SUB	1915.54
5852	2833	1916.7	13.3	1.24	5852	2833	1916.9	11.8	1.01	SUPER	1916.66	SUPER	1916.66
500 YR Flood Event					500 YR Flood Event								
150	4694	1894.4	16.4	1.01	150	4694	1894.5	16.1	0.98	SUB	1894.52		1894.52
243.6	4694	1893.7	18.4	1.2	243.6	4694	1895.5	14.7	0.86	SUPER	1893.67	SUB	1895.51
244.6	4694	1893.1	19.5	1.31	244.6	4694	1896.1	13.6	0.77	SUB	1896.05	SUB	1896.05
450	4694	1894.0	19.4	1.31	450	4694	1895.9	15.1	0.9	SUPER	1893.98	SUB	1895.93
544	4694	1895.3	18.1	1.32	544	4694	1896.6	14.7	1.01	SUPER	1895.28	SUPER	1895.28
600	4694	1895.6	18.0	1.3	600	4694	1896.8	14.7	1	SUPER	1895.56	SUPER	1895.56
700	4694	1895.7	18.3	1.33	700	4694	1897.1	14.7	1.01	SUPER	1895.72	SUPER	1895.72
1200	4694	1897.3	18.4	1.35	1200	4694	1898.7	14.7	1	SUPER	1897.27	SUPER	1897.27
1700	4694	1899.0	18.3	1.34	1700	4694	1900.4	14.7	1	SUPER	1899	SUPER	1899
2000	4694	1900.0	18.2	1.33	2000	4694	1901.4	14.7	1	SUPER	1900.03	SUPER	1900.03
2200	4694	1900.6	18.5	1.36	2200	4694	1902.0	14.7	1	SUPER	1900.55	SUPER	1900.55
3724	4694	1906.4	16.2	1.14	3724	4694	1907.0	14.8	1.01	SUB	1907	SUB	1907
3823	4694	1905.5	18.7	1.3	3823	4694	1907.6	13.9	0.87	SUPER	1905.47	SUB	1907.58
4020	4694	1905.9	19.3	1.36	4020	4694	1907.6	15.1	0.97	SUPER	1905.85	SUPER	1905.85
4060	4694	1906.0	19.4	1.37	4060	4694	1907.5	15.6	1.01	SUPER	1905.98	SUPER	1905.98
4115	4694	1903.6	25.1	2.03	4115	5868	1907.6	16.9	1	SUPER	1903.55	SUB	1907.61
4188	5868	1903.6	26.2	2.24	4188	5868	1911.8	9.0	0.45	SUB	1911.79	SUB	1911.79
4189	5868	1904.0	25.9	2.21	4189	5868	1911.4	11.6	0.66	SUB	1911.37	SUB	1911.37
4246	5868	1904.3	27.2	2.37	4246	5868	1911.5	11.6	0.66	SUB	1911.47	SUB	1911.47
4247	5868	1903.9	27.9	2.46	4247	6339	1912.3	9.7	0.49	SUB	1912.28	SUB	1912.28
4360	6339	1909.2	24.3	1.84	4360	6339	1912.0	15.4	1.01	SUPER	1909.17	SUB	1911.97
4831	6339	1913.5	22.5	1.66	4831	6339	1915.9	15.4	1.01	SUPER	1913.5	SUPER	1913.5
4920	6339	1914.3	22.0	1.62	4920	6339	1916.6	15.4	1.01	SUPER	1914.32	SUPER	1914.32
5005	6339	1915.2	21.5	1.57	5005	6339	1917.3	15.4	1.01	SUPER	1915.15	SUPER	1915.15
5105	6339	1918.2	18.1	1.01	5105	6339	1918.2	18.1	1.01	SUB	1918.23	SUB	1918.23
5200	6339	1918.3	17.5	1	5200	6339	1920.6	14.1	0.73	SUB	1920.56	SUB	1920.56
5500	6339	1918.9	16.2	1	5500	6339	1921.9	11.9	0.63	SUB	1921.85	SUB	1921.85
5852	6339	1919.0	17.8	1.29	5852	6339	1922.3	11.5	0.66	SUB	1922.33	SUB	1922.33

Test 1: If supercritical F > 1.2, then go to Test 2 otherwise use subcritical water surface elevation

Test 2: If resulting water surface from Test 1 > downstream water surface the use supercritical watersurface otherwise use subcritical water surface elevation

Unstable Flow 0.86<F<1.13, Supercritical run assumed unstable if less than 1.2

Source: EM1601

Table 3 **Flow Balance at UPRR and King Charles intersection**

RR culvert rating table
source: hy8

Q (cfs)	HW (ft)	depth	wsel
0	100.5	0.00	1907.6
120	103.23	2.73	1910.33
240	103.55	3.05	1910.65
360	103.86	3.36	1910.96
400	103.96	3.46	1911.06
600	104.59	4.09	1911.69
720	105.16	4.66	1912.26
840	105.73	5.23	1912.83
960	106.29	5.79	1913.39
1080	106.86	6.36	1913.96
1200	107.45	6.95	1914.55

UPRR bridge rating curve
soffit el = 1910.2
source: HEC-2 SB

secno	Q (cfs)	depth	cwsel	criws	eg	vch	frch
4246	1281	3.61	1903.51	0	1904.22	6.72	0.62
4246	2183	5.51	1905.41	0	1906.28	7.52	0.56
4246	2833	6.73	1906.63	0	1907.62	7.98	0.54
4246	3125	7.25	1907.15	0	1908.19	8.17	0.53
4246	3750	8.36	1908.26	0	1909.38	8.51	0.52
4246	4375	10	1909.9	0	1910.96	8.3	0.46
4246	5000	11.42	1911.32	0	1912.39	8.3	0.43
4246	5500	12.35	1912.25	0	1913.35	8.44	0.42
4246	6500	14.08	1913.98	0	1915.16	8.75	0.41
4246	7000	14.98	1914.88	0	1916.1	8.86	0.4
4246	7500	15.32	1915.22	0	1916.56	9.28	0.42
4246	8000	15.86	1915.76	0	1917.18	9.56	0.42

Right Bank Normal Depth Calc
source: 48sx ditch prog

Q (cfs)	d	ws
100	0.9	1910.6
200	1.3	1911
300	1.6	1911.3
400	1.8	1911.5
500	2.1	1911.8
600	2.3	1912
700	2.5	1912.2
800	2.7	1912.4
900	2.8	1912.5
1000	3	1912.7
1200	3.3	1913
1500	3.6	1913.3
2000	4.2	1913.9
2500	4.6	1914.3
3000	5.1	1914.8
3500	5.4	1915.1
4000	5.8	1915.5

ws el	culv Q	brg Q	rt bank Q	Total Q
1910.5	184	4639	75	4898
1910.7	259	4727	125	5111
1910.9	337	4815	175	5327
1911.1	413	4903	233	5549
1911.3	476	4991	300	5767
1911.5	540	5097	400	6036
1911.7	602	5204	467	6273
1911.9	644	5312	550	6506
1912.1	686	5419	650	6756
1912.3	728	5529	750	7007
1912.5	771	5645	900	7315
1912.7	813	5760	1000	7573
1912.9	855	5876	1133	7864
1913.1	898	5991	1300	8189
1913.3	941	6107	1500	8548
1913.5	983	6223	1667	8872

	ws el	culv Q	brg Q	rt ban	Total Q		
	1913.7	1025	6338	1833	9197		
	1913.9	1067	6454	2000	9521		
	1914.1	1108	6567	2250	9925		
	1914.3	1149	6678	2500	10327		
	1914.5	1190	6789	2700	10679		
	1914.7	1231	6900	2900	11031		
	1914.9	1271	7029	3100	11401		
	1915.1	1312	7324	3300	11935		
	1912.5	778	5665	918	7360		
	1914.4	1167	6727	2590	10484		
~~100 w/o~~	~~1912.7~~	~~819~~	~~5779~~	~~1021~~	~~7619~~	~~8110~~	~~491 cfs flows to the left of the KC channel at Craig~~
~~500 w/o~~	~~1914.9~~	~~1278~~	~~7081~~	~~3135~~	~~11495~~	~~14939~~	~~3444 cfs flows to the left of the KC channel at Craig~~
500 w	1912.9	852	5868	1124	7843	8470	627 cfs flows to the left of the KC channel at Craig

Assumptions:

Invert El	1909.7
bw	100
SSr	55
SSl	0
Sf	0.006
n	0.1

Study Contractor: NHC

HYDRAULIC ANALYSES INDEX

City of Las Vegas, City of North Las Vegas
Clark County, NV
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

HYDRAULIC ANALYSES INDEX

FLOODING SOURCE/ STREAM NAME	HYDRAULIC METHOD/ MODEL USED	METHOD/MODEL ANALYSIS DATE	EXHIBIT NO. PAPER COPY	EXHIBIT NO. FLOPPY DISKETTES
Upper Las Vegas Wash				
Breakout Location	Hydraulic Notes	Weir Flow norm depth/4-98	A	CD
ULV Berm to ULVD Basin	ULVDV5/HEC-2	4/98	B	CD
ULVD Basin to NLVDB	NLVDBV6B/HEC-2	4/98	C	CD
NLVDB to A-Channel	LNLVW16B/HEC-2	4/98	D	CD
NLVDB to Craig	LNLVS015/HEC-2	4/98	E	CD
Craig to A-ChannelSB	KGSBW2/HEC-2	4/98	F	CD
Craig to A-ChannelSC	KGSCW2/HEC-2	4/98	G	CD
N Channel to I15 SC	NCH-SPW/HEC-2	4/98	H	CD
N Channel to I15 SC	NCH-SPWB/HEC-2	4/98	I	CD

Upper Las Vegas Wash
with North Las Vegas Detention Basin Diversion Dike

Paper Copy B

Upper Las Vegas Detention Basin to end of
Upper Las Vegas Diversion Berm

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15APR98    TIME   13:57:22 *
 *****************************************
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 ************************************
 *  U.S. ARMY CORPS OF ENGINEERS    *
 *  HYDROLOGIC ENGINEERING CENTER   *
 *  609 SECOND STREET, SUITE D      *
 *  DAVIS, CALIFORNIA 95616-4687    *
 *          (916) 756-1104          *
 ************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX  XXXXX              XXXXXXX
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                                                    THIS RUN EXECUTED 15APR98    13:57:22

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC
T1      FEMA 10-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      UPPER NO. LAS VEGAS WASH

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2                                                          2359.1

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       0                   -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150

QT        4      3465     10312     14737     24938
NC     .040      .040      .040        .1        .3

X1    59059        48      1404    2167.8
X3       10         0         0         0         0         0         0         0         0
GR   2384.7      1000    2383.8   1022.61      2379   1053.28   2381.3   1072.55    2382.8   1092.06
GR   2384.5   1110.67    2384.5   1140.38    2382.8    1157.2    2366.7   1179.45    2357.2   1201.11
GR   2357.3   1229.33    2357.5   1263.04    2357.5   1311.18    2356.8   1379.91    2382.8      1404
GR     2376   1416.23    2370.5   1436.02    2368.8   1452.13    2358.9   1479.16    2357.4   1490.49
GR     2357   1520.32    2355.5   1529.21    2357.2   1536.79    2356.9   1560.53    2356.2   1568.17
GR   2357.4   1582.07    2356.5    1621.8    2357.1   1631.88    2357.5   1678.36    2358.6   1722.03
GR   2358.6   1762.36    2358.4   1788.31    2358.7   1811.22      2359   1833.65    2359.2   1884.42
GR   2359.9    1901.3    2359.7   1929.04    2362.1   1952.43      2369   1984.65    2368.8   2040.19
GR   2371.1   2060.59    2370.4   2108.56    2365.8   2120.49    2367.7   2133.55      2381   2149.72
GR   2386.4    2167.8    2386.1   2197.93    2386.3   2238.41

X1    60826        76   1712.38   2497.85      1767      1767      1767
X3       10         0         0         0         0         0         0         0         0
GR   2392.4      1000      2394   1023.02    2392.4   1038.78    2397.9   1058.49    2395.3   1075.97
GR   2391.1    1100.2    2394.9   1117.44    2393.9   1124.66      2380   1152.28    2378.5   1168.56
GR   2377.3    1180.2    2377.6   1199.71    2380.3   1212.89    2377.3   1241.94    2377.8   1252.98
GR   2376.2   1284.24    2376.5    1299.4    2375.9   1326.12    2375.4   1337.58    2374.1   1341.99
GR   2375.8   1349.75      2375   1368.66    2375.8   1377.07    2376.2   1408.51    2386.9   1423.57
GR   2376.2   1445.88    2376.7   1471.18    2376.9   1503.45    2376.1   1537.16    2375.2   1575.28
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GR   2375.2   1594.14    2374.9   1622.95    2375.5   1634.41    2375.1   1664.71    2374.7   1682.25
GR   2372.9   1693.65    2385.7   1712.38    2382.1   1728.19    2373.8   1746.26    2374.4   1763.63
GR   2375.4   1802.46    2374.5   1814.94    2376.3   1837.01    2376.4   1860.45    2375.7   1886.94
GR   2375.3   1898.63    2373.5    1912.3    2374.3    1922.2    2371.5   1928.59    2373.6      1937
GR   2372.9    1957.4    2373.2   2000.35    2374.1   2013.36    2374.7   2038.89    2374.5   2087.87
GR   2373.9   2126.47    2373.2   2155.35    2372.6   2197.58    2372.7   2226.28    2373.4   2257.18
GR   2374.5   2274.85    2374.4    2285.1    2373.9   2291.43    2374.1   2321.86    2374.3   2364.99
GR   2374.4   2432.29    2379.2   2456.68    2389.2   2479.59    2397.8   2497.85    2394.1   2509.84
GR   2381.8   2533.33    2376.3   2552.96    2376.8   2578.91      2377   2604.09    2395.1   2630.98
GR   2396.3   2660.33

X1    62524        26      1000   1622.71      1698      1698      1698
GR   2406.4      1000    2405.4   1008.16    2398.7   1029.59    2387.5    1049.3    2388.2   1073.41
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GR	2388	1112.7	2387.9	1155.68	2387.6	1187.28	2388.1	1213.18	2388.2	1260.08
GR	2388.4	1274.19	2389	1336.34	2388.5	1346.51	2388.7	1353.78	2390.3	1368.24
GR	2390.9	1413.12	2390.5	1434.91	2390.2	1484.32	2389.8	1508.66	2390.4	1553.25
GR	2390.2	1560.63	2390.5	1577.24	2391.5	1587	2405.9	1610.57	2411	1622.71
GR	2410.9	1641.27								
X1	63598	42	1138.14	1706.37	1074	1074	1074			
X3	10	0	0	0	0	0	0	0	0	
GR	2419.8	1000	2415.8	1015.59	2415.8	1024.64	2407.5	1043.99	2409.7	1063.73
GR	2406.8	1084.98	2403.4	1100.44	2405.8	1107.23	2401.7	1119.91	2410.6	1138.14
GR	2401.9	1143.02	2399.2	1153.91	2399.1	1175.82	2398.4	1181.83	2397.7	1206.59
GR	2398.3	1214.51	2399	1238.26	2399.2	1264.33	2399.2	1295.88	2398.9	1343.44
GR	2398.3	1380.35	2398.4	1424.69	2398	1484.16	2397.7	1533.45	2397.5	1551.3
GR	2399.3	1559.64	2399.4	1605.05	2398.1	1614.34	2398.1	1650.12	2398.1	1671.78
GR	2415.9	1706.37	2413.7	1720.83	2404.1	1742.09	2405.1	1755.9	2410.6	1771.91
GR	2415.5	1789.06	2416.2	1805.67	2420.7	1839.77	2418.9	1859.3	2417.8	1879.3
GR	2417	1904.65	2415.7	1911.29						
X1	65055	62	1681.48	2222.75	1457	1457	1457			
X3	10	0	0	0	0	0	0	0	0	
GR	2428.1	1000	2428.3	1025.18	2426.1	1071.98	2414.4	1095.95	2414.6	1142.01
GR	2414.9	1157.14	2414.4	1193.39	2413.8	1199.22	2414.3	1204.34	2413.7	1232.19
GR	2413.8	1268.57	2414.1	1316.84	2413.3	1353.03	2412.6	1358.63	2413.3	1364.94
GR	2413.1	1381.78	2411.8	1391.13	2412.8	1404.23	2412.7	1434.47	2413.6	1453.46
GR	2413.5	1477.13	2413.7	1512.25	2413.1	1525.82	2413.1	1549.81	2413.4	1569.87
GR	2413	1583.44	2412.7	1618.33	2415.2	1643.74	2415.5	1681.48	2414.5	1715.41
GR	2413.4	1736.6	2411.2	1749.88	2411.5	1783.99	2410.8	1840.23	2411.5	1875.53
GR	2412.6	1897.8	2413.3	1926.96	2413.3	1949.94	2412.1	1972.09	2413	1993.04
GR	2413.7	2040.95	2413.7	2058.58	2412.6	2110.01	2412	2131.08	2412.4	2167.57
GR	2411.5	2173.16	2411.6	2180.6	2416.4	2201.08	2425.3	2222.75	2424.2	2253.46
GR	2422.9	2274.24	2426.3	2288.64	2425.7	2304.23	2418.4	2339.49	2424.2	2352.57
GR	2416.3	2378.17	2416.2	2385.25	2416.7	2390.01	2423.7	2403.42	2426.4	2420.27
GR	2424	2447.05	2425.7	2460.81						
NC	.03	.03	.03	.1	.3					
NC	.035	.035	.035	.1	.3					
X1	66061	33	1142.15	1547.04	1006	1006	1006			
X3	10	0	0	0	0	0	0	0	0	
GR	2422	1000	2420.3	1010.6	2420.5	1056.55	2420.8	1097.21	2422.1	1101.26
GR	2421.7	1116.25	2425	1126.79	2425.8	1142.15	2424.9	1158.99	2425.1	1184.71
GR	2420	1208.52	2420.1	1237.51	2419.9	1282.15	2419.9	1340.01	2420.1	1400.43

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GR	2420.1	1451.92	2420.3	1510.43	2428.2	1538.11	2428.6	1547.04	2428.5	1556.8
GR	2427.6	1561.03	2428.1	1579.96	2430.8	1590.67	2430.4	1596.92	2429.6	1601.74
GR	2431.8	1620.44	2428.8	1669.31	2429.8	1674.96	2427.6	1701.21	2427	1722.17
GR	2428	1727.46	2428.2	1745.44	2429.8	1769.16				
X1	66660	31	1255.62	1622.77	599	599	599			
X3	10	0	0	0	0	0	0	0	0	
GR	2436.0	775.00	2432.0	825.00	2427.6	1000	2427.8	1031.31	2425.8	1075.66
GR	2425.5	1117.2	2425.4	1168.93	2429.6	1180.08	2430.4	1197.88	2434.6	1217.58
GR	2434.9	1255.62	2431.5	1273	2425.1	1296.03	2425.1	1344.13	2425.5	1404.55
GR	2425.3	1470.68	2425.6	1519.85	2425.6	1588.49	2435.3	1622.77	2435	1651.58
GR	2433.1	1671.52	2434.1	1686.47	2433.6	1712.83	2432.1	1728.31	2436.3	1748.79
GR	2441.9	1771.71	2442.1	1778.67	2437.2	1797.9	2433.7	1826.05	2433.3	1844.09
GR	2433.2	1862.5								
X1	66814	36	1176.97	1618.95	154	154	154			
X3	10	0	0	0	0	0	0	0	0	
GR	2437.5	730	2431.9	840	2429.4	1000	2428.9	1036.85	2426.9	1078.1
GR	2426.4	1101.85	2427.1	1119.71	2426.7	1153.04	2434.1	1164.53	2434.1	1170.06
GR	2437	1176.97	2436.6	1195.84	2435.9	1229.11	2436.1	1250.54	2435.9	1263.1
GR	2431.5	1279.89	2431.5	1321.26	2431.4	1368.94	2431.2	1412.51	2431.1	1468.23
GR	2431.1	1526.5	2431.1	1583.41	2439.3	1608.11	2440.1	1618.95	2440	1634.31
GR	2433.4	1660.08	2433.7	1685.67	2434.6	1691.15	2434.1	1700.44	2435.9	1725.32
GR	2442.1	1752.7	2438.1	1769.25	2435.8	1785.32	2434.6	1810.56	2434.8	1826.99
GR	2433.5	1840.14								
X1	68187				1373	1373	1373		9.2	
X3	10									
X1	69560	33	1229.14	1589.47	1373	1373	1373			
X3	10	0	0	0	0	0	0	0	0	
GR	2457	600	2456	700	2456.1	1000	2455.5	1008.72	2453	1022.67
GR	2454.6	1042.07	2454.4	1072.03	2452.9	1077.13	2454.6	1083.19	2454.9	1122.82
GR	2453.4	1129.11	2453.3	1137.06	2452.3	1154.86	2452.1	1164.47	2454.8	1175.63
GR	2454.3	1197.4	2454.8	1229.14	2454.3	1242.91	2449.8	1261.07	2450.1	1304.32
GR	2449.9	1354.87	2449.6	1402.04	2449.5	1435.21	2449.9	1484.51	2450.2	1518.62
GR	2449.9	1559.63	2458.6	1589.47	2458.3	1604.36	2451.6	1627.5	2450.9	1635.87
GR	2451	1664.86	2450.8	1692.86	2454.7	1710.07				
X1	71045				1485	1485	1485		9.9	
X3	10									
X1	72532	23	1160.33	1527.5	1487	1487	1487			
X3	10	0	0	0	0	0	0	0	0	
GR	2479.4	1000	2479.4	1054.39	2478.5	1059.45	2478.6	1070.61	2478.7	1082.82
GR	2477.4	1128.55	2477.8	1160.33	2475.7	1172.96	2469.6	1193.16	2470.2	1245.75
GR	2469.7	1299.24	2469.6	1337.6	2469.7	1379.31	2469.7	1417.1	2469.9	1491.65
GR	2470.6	1499.3	2478.4	1527.5	2478.2	1538.28	2477.4	1556.39	2475.1	1569.35
GR	2474.2	1589.99	2474.3	1611.5	2475.1	1624.84				

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X1	73765				1233	1233	1233		8.3	
X3	10	0						0	0	
X1	74997	22	1273.99	1625.35	1232	1232	1232			
X3	10	0	0	0	0	0	0	0	0	
GR	2492.7	1000	2493.4	1029.61	2493	1080.21	2492.1	1117.91	2491.8	1175.23
GR	2491.2	1182.18	2491	1233.17	2492.1	1251.9	2492.9	1273.99	2486.6	1295.79
GR	2486.2	1343.52	2485.9	1401.12	2485.7	1442.79	2486	1518.89	2486.2	1559.66
GR	2486	1597.54	2494.5	1625.35	2494.6	1651.79	2491.9	1671.04	2489.6	1684.47
GR	2489.7	1701.73	2489.6	1746.66						

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1
0

CCHV= .100 CEHV= .300
*SECNO 59059.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2382.80 ELREA= 2386.40

59059.000	3.65	2359.15	2359.15	2359.10	2359.82	.67	.00	.00	2382.80
3465.0	.0	3465.0	.0	.0	526.2	.0	.0	.0	2386.40
.00	.00	6.58	.00	.000	.040	.000	.000	2355.50	1478.48
.021335	0.	0.	0.	0	4	0	.00	393.11	1871.59

*SECNO 60826.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.09

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2385.70 ELREA= 2397.80

60826.000	4.00	2375.50	.00	.00	2375.70	.19	15.82	.05	2385.70
3465.0	.0	3465.0	.0	.0	988.5	.0	30.7	20.7	2397.80
.14	.00	3.51	.00	.000	.040	.000	.000	2371.50	1742.55
.004899	1767.	1767.	1767.	10	0	0	.00	629.88	2437.89

*SECNO 62524.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .51

62524.000	2.28	2389.78	2389.75	.00	2390.53	.75	14.67	.17	2406.40
3465.0	.0	3465.0	.0	.0	499.9	.0	59.7	39.2	2411.00
.21	.00	6.93	.00	.000	.040	.000	.000	2387.50	1045.28
.019119	1698.	1698.	1698.	12	11	0	.00	318.30	1363.58

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 63598.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.88

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2410.60 ELREA= 2415.90

63598.000	2.74	2400.24	.00	.00	2400.48	.23	9.90	.05	2410.60
3465.0	.0	3465.0	.0	.0	893.0	.0	76.9	49.6	2415.90
.28	.00	3.88	.00	.000	.040	.000	.000	2397.50	1149.70
.005404	1074.	1074.	1074.	5	0	0	.00	526.24	1675.94

*SECNO 65055.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .52

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2415.50 ELREA= 2425.30

65055.000	2.77	2413.57	.00	.00	2414.17	.61	13.59	.11	2415.50
3465.0	.0	3465.0	.0	.0	554.1	.0	101.1	65.5	2425.30
.35	.00	6.25	.00	.000	.040	.000	.000	2410.80	1733.38
.019788	1457.	1457.	1457.	5	0	0	.00	422.65	2188.99

CCHV= .100 CEHV= .300
*SECNO 66061.000
3280 CROSS SECTION 66061.00 EXTENDED .32 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.06

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2425.80 ELREA= 2428.60

66061.000	2.42	2422.32	.00	.00	2422.69	.37	8.50	.02	2425.80
3465.0	.0	3465.0	.0	.0	706.1	.0	115.7	74.1	2428.60
.41	.00	4.91	.00	.000	.035	.000	.000	2419.90	1197.71
.004656	1006.	1006.	1006.	5	0	0	.00	319.78	1517.49

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 66660.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2434.90 ELREA= 2435.30

66660.000	1.90	2427.00	2427.00	.00	2427.80	.80	4.66	.13	2434.90
3465.0	.0	3465.0	.0	.0	481.6	.0	123.8	78.4	2435.30
.43	.00	7.19	.00	.000	.035	.000	.000	2425.10	1289.20
.015592	599.	599.	599.	4	15	0	.00	304.23	1593.43

*SECNO 66814.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2437.00 ELREA= 2440.10

66814.000	1.72	2432.82	2432.82	.00	2433.61	.79	2.41	.00	2437.00
3465.0	.0	3465.0	.0	.0	486.4	.0	125.5	78.5	2440.10
.44	.00	7.12	.00	.000	.035	.000	.000	2431.10	1274.84
.015720	154.	154.	154.	20	11	0	.00	313.77	1588.60

*SECNO 68187.000
3280 CROSS SECTION 68187.00 EXTENDED .14 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.01

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2446.20 ELREA= 2449.30

68187.000	2.54	2442.84	.00	.00	2443.18	.34	9.52	.05	2446.20
3465.0	.0	3465.0	.0	.0	745.2	.0	144.9	89.4	2449.30
.52	.00	4.65	.00	.000	.035	.000	.000	2440.30	1271.72
.003885	1373.	1373.	1373.	9	0	0	.00	319.35	1591.07

*SECNO 69560.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .54

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2454.80 ELREA= 2458.60

69560.000	2.04	2451.54	.00	.00	2452.26	.71	8.97	.11	2454.80
3465.0	.0	3465.0	.0	.0	511.0	.0	164.7	99.4	2458.60

```
      .57       .00      6.78       .00      .000      .035      .000      .000   2449.50   1254.04
   .013196     1373.     1373.     1373.         5         0         0       .00    311.22   1565.26


*SECNO 71045.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.77


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2464.70 ELREA=      2468.50

 71045.000      2.73   2462.13       .00       .00   2462.48       .35     10.19       .04   2464.70
    3465.0        .0    3465.0        .0        .0     725.6        .0     185.8     110.1   2468.50
       .66       .00      4.78       .00      .000      .035      .000      .000   2459.40   1251.28
   .004192     1485.     1485.     1485.         5         0         0       .00    316.33   1567.61


*SECNO 72532.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .61


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2477.80 ELREA=      2478.40

 72532.000      1.94   2471.54       .00       .00   2472.18       .64      9.62       .09   2477.80
    3465.0        .0    3465.0        .0        .0     539.1        .0     207.4     120.9   2478.40
       .72       .00      6.43       .00      .000      .035      .000      .000   2469.60   1186.74
   .011259     1487.     1487.     1487.         5         0         0       .00    315.95   1502.69


*SECNO 73765.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.55

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    15APR98       13:57:22                                                                    PAGE    9

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2486.10 ELREA=      2486.70

 73765.000      2.46   2480.36       .00       .00   2480.74       .37      8.53       .03   2486.10
    3465.0        .0    3465.0        .0        .0     705.2        .0     225.0     129.9   2486.70
       .79       .00      4.91       .00      .000      .035      .000      .000   2477.90   1185.01
   .004674     1233.     1233.     1233.         5         0         0       .00    319.57   1504.58


*SECNO 74997.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2492.90 ELREA=      2494.50

 74997.000      2.22   2487.92       .00       .00   2488.48       .56      7.69       .05   2492.90
    3465.0        .0    3465.0        .0        .0     579.1        .0     243.2     138.8   2494.50
       .85       .00      5.98       .00      .000      .035      .000      .000   2485.70   1291.21
   .008749     1232.     1232.     1232.         3         0         0       .00    312.62   1603.83


T1       FEMA 50-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       UPPER NO. LAS VEGAS WASH

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                                                                            2367.0

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2                    -1

1
    15APR98       13:57:22                                                                    PAGE   10

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 2
0

 CCHV=     .100 CEHV=     .300
 *SECNO 59059.000

 3265 DIVIDED FLOW


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2382.80 ELREA=      2386.40

  59059.000     11.50   2367.00       .00   2367.00   2367.09       .09       .00       .00   2382.80
    10312.0        .0    10312.0        .0        .0    4328.0        .0        .0        .0   2386.40
        .00       .00      2.38       .00      .000      .040      .000      .000   2355.50   1457.04
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   .000252        0.        0.        0.        0         0         0       .00    529.63   2128.74


*SECNO 60826.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2385.70 ELREA=      2397.80

 60826.000      4.55   2376.05   2376.05       .00   2376.97       .92      1.41       .25   2385.70
   10312.0        .0   10312.0        .0        .0    1339.5        .0     115.0      24.1   2397.80
       .06       .00      7.70       .00      .000      .040      .000      .000   2371.50   1741.37
   .016755      1767.     1767.     1767.        20        17         0       .00    659.44   2440.66


*SECNO 62524.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.68

 62524.000      4.73   2392.23       .00       .00   2392.80       .57     15.80       .03   2406.40
   10312.0        .0   10312.0        .0        .0    1699.7        .0     174.2      47.6   2411.00
       .14       .00      6.07       .00      .000      .040      .000      .000   2387.50   1040.98
   .005908      1698.     1698.     1698.         7         0         0       .00    547.21   1588.19


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   15APR98       13:57:22                                                                        PAGE   11

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 63598.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  .67


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2410.60 ELREA=      2415.90

 63598.000      3.55   2401.05       .00       .00   2401.99       .94      9.08       .11   2410.60
   10312.0        .0   10312.0        .0        .0    1322.8        .0     211.4      60.9   2415.90
       .18       .00      7.80       .00      .000      .040      .000      .000   2397.50   1146.42
   .013086      1074.     1074.     1074.         3         0         0       .00    531.10   1677.52


*SECNO 65055.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

 65055.000      4.70   2415.50   2414.89       .00   2416.25       .75     15.31      6.68   2415.50
   10312.0        .0   10312.0        .0        .0    1481.2        .0     258.3      78.4   2425.30
       .24       .00      6.96       .00      .000      .040      .000      .000   2410.80   1681.58
   .008619      1457.     1457.     1457.        20         8         0       .00    515.65   2197.23


CCHV=      .100 CEHV=      .300
*SECNO 66061.000
3280 CROSS SECTION  66061.00 EXTENDED       1.70 FEET


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

 66061.000      1.80   2423.70       .00       .00   2424.93      1.24      8.54       .14   2425.80
   10312.0        .0   10312.0        .0        .0    1156.1        .0     288.8      88.2   2428.60
       .27       .00      8.92       .00      .000      .035      .000      .000   2419.90   1191.26
   .008360      1006.     1006.     1006.         4         0         0       .00    331.08   1522.34


*SECNO 66660.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2434.90 ELREA=      2435.30

 66660.000      3.85   2428.95       .00       .00   2430.34      1.39      5.36       .04   2434.90
   10312.0        .0   10312.0        .0        .0    1091.8        .0     304.3      92.7   2435.30
       .29       .00      9.45       .00      .000      .035      .000      .000   2425.10   1282.14
   .009603       599.      599.      599.         2         0         0       .00    318.21   1600.36


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   15APR98       13:57:22                                                                        PAGE   12

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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*SECNO 66814.000
3280 CROSS SECTION  66814.00 EXTENDED       1.00 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2437.00 ELREA=      2440.10

 66814.000      3.40   2434.50   2434.50       .00   2436.08      1.58      1.67       .06   2437.00
   10312.0        .0   10312.0        .0        .0   1020.8         .0     308.0      93.8   2440.10
       .29       .00     10.10       .00      .000      .035      .000      .000   2431.10   1268.45
   .012364       154.      154.      154.        20        11         0       .00    325.19   1593.64


*SECNO 68187.000
3280 CROSS SECTION  68187.00 EXTENDED       2.15 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.67


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2446.20 ELREA=      2449.30

 68187.000      4.55   2444.85       .00       .00   2445.69       .84      9.54       .07   2446.20
   10312.0        .0   10312.0        .0        .0   1401.6         .0     346.2      104.2   2449.30
       .34       .00      7.36       .00      .000      .035      .000      .000   2440.30   1264.04
   .004443      1373.     1373.     1373.         6         0         0       .00    333.09   1597.13


*SECNO 69560.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2454.80 ELREA=      2458.60

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   15APR98       13:57:22                                                                  PAGE   13

    SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 69560.000      3.83   2453.33       .00       .00   2454.75      1.42      8.88       .17   2454.80
   10312.0        .0   10312.0        .0        .0   1078.3         .0     385.2      114.6   2458.60
       .38       .00      9.56       .00      .000      .035      .000      .000   2449.50   1246.84
   .010272      1373.     1373.     1373.         4         0         0       .00    324.54   1571.38


*SECNO 71045.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2464.70 ELREA=      2468.50

 71045.000      4.68   2464.08       .00       .00   2464.97       .90     10.17       .05   2464.70
   10312.0        .0   10312.0        .0        .0   1357.9         .0     426.8      125.7   2468.50
       .44       .00      7.59       .00      .000      .035      .000      .000   2459.40   1243.40
   .004892      1485.     1485.     1485.         3         0         0       .00    330.91   1574.31


*SECNO 72532.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2477.80 ELREA=      2478.40

 72532.000      3.78   2473.38       .00       .00   2474.67      1.29      9.58       .12   2477.80
   10312.0        .0   10312.0        .0        .0   1132.6         .0     469.3      137.0   2478.40
       .48       .00      9.10       .00      .000      .035      .000      .000   2469.60   1180.64
   .008870      1487.     1487.     1487.         4         0         0       .00    328.71   1509.35


*SECNO 73765.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2486.10 ELREA=      2486.70

 73765.000      4.33   2482.23       .00       .00   2483.19       .96      8.48       .03   2486.10
   10312.0        .0   10312.0        .0        .0   1314.2         .0     503.9      146.3   2486.70
       .53       .00      7.85       .00      .000      .035      .000      .000   2477.90   1178.82
   .005490      1233.     1233.     1233.         4         0         0       .00    332.51   1511.34


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   15APR98       13:57:22                                                                  PAGE   14
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 74997.000
3280 CROSS SECTION 74997.00 EXTENDED .25 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2492.90 ELREA= 2494.50

74997.000	4.16	2489.86	.00	.00	2491.01	1.15	7.77	.06	2492.90
10312.0	.0	10312.0	.0	.0	1195.8	.0	539.4	155.6	2494.50
.57	.00	8.62	.00	.000	.035	.000	.000	2485.70	1284.53
.007312	1232.	1232.	1232.	4	0	0	.00	325.63	2610.35

T1 FEMA 100-YEAR HEC-2 ANALYSIS
T2 BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3 UPPER NO. LAS VEGAS WASH

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		4							2372.4	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3		-1							

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 3
0

CCHV= .100 CEHV= .300
*SECNO 59059.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2382.80 ELREA= 2386.40

59059.000	16.90	2372.40	.00	2372.40	2372.46	.06	.00	.00	2382.80
14737.0	.0	14737.0	.0	.0	7695.8	.0	.0	.0	2386.40
.00	.00	2.91	.00	.000	.040	.000	.000	2355.50	1429.18
.000112	0.	0.	0.	0	0	0	.00	710.08	2139.26

*SECNO 60826.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2385.70 ELREA= 2397.80

60826.000	5.00	2376.50	2376.50	.00	2377.74	1.24	.68	.35	2385.70
14737.0	.0	14737.0	.0	.0	1650.1	.0	189.6	28.7	2397.80
.05	.00	8.93	.00	.000	.040	.000	.000	2371.50	1740.37
.018586	1767.	1767.	1767.	20	17	0	.00	702.61	2442.99

*SECNO 62524.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.81

62524.000	5.53	2393.03	.00	.00	2393.76	.74	15.97	.05	2406.40
14737.0	.0	14737.0	.0	.0	2137.5	.0	263.4	53.1	2411.00
.12	.00	6.89	.00	.000	.040	.000	.000	2387.50	1039.57
.005664	1698.	1698.	1698.	6	0	0	.00	549.92	1589.50

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 63598.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2410.60 ELREA= 2415.90

63598.000	4.12	2401.62	.00	.00	2402.89	1.27	8.97	.16	2410.60
14737.0	.0	14737.0	.0	.0	1627.0	.0	309.8	66.4	2415.90
.16	.00	9.06	.00	.000	.040	.000	.000	2397.50	1144.12
.013525	1074.	1074.	1074.	3	0	0	.00	534.51	1678.63

*SECNO 65055.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2415.50 ELREA= 2425.30

65055.000	4.79	2415.59	.00	.00	2416.10	.51	13.13	.08	2415.50
14737.0	5320.6	9416.4	.0	1086.4	1531.7	.0	380.8	93.8	2425.30
.23	4.90	6.15	.00	.040	.040	.000	.000	2410.80	1093.50
.006435	1457.	1457.	1457.	2	0	0	.00	1104.14	2197.65

CCHV= .100 CEHV= .300
*SECNO 66061.000
3280 CROSS SECTION 66061.00 EXTENDED 2.16 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2425.80 ELREA= 2428.60

66061.000	4.26	2424.16	2424.16	.00	2426.13	1.96	8.45	.44	2425.80
14737.0	.0	14737.0	.0	.0	1310.5	.0	426.1	110.5	2428.60
.25	.00	11.24	.00	.000	.035	.000	.000	2419.90	1189.09
.011417	1006.	1006.	1006.	4	12	0	.00	334.87	1523.96

*SECNO 66660.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2434.90 ELREA= 2435.30

66660.000	5.02	2430.12	.00	.00	2431.69	1.57	5.52	.04	2434.90
14737.0	.0	14737.0	.0	.0	1466.2	.0	445.2	115.0	2435.30
.27	.00	10.05	.00	.000	.035	.000	.000	2425.10	1277.96
.007604	599.	599.	599.	3	0	0	.00	326.50	1604.46

*SECNO 66814.000
3280 CROSS SECTION 66814.00 EXTENDED 1.85 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2437.00 ELREA= 2440.10

66814.000	4.25	2435.35	2435.35	.00	2437.34	1.99	1.43	.13	2437.00
14737.0	.0	14737.0	.0	.0	1301.9	.0	450.1	116.2	2440.10
.27	.00	11.32	.00	.000	.035	.000	.000	2431.10	1265.18
.011505	154.	154.	154.	20	11	0	.00	331.04	1596.22

*SECNO 68187.000
3280 CROSS SECTION 68187.00 EXTENDED 3.39 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.56

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2446.20 ELREA= 2449.30

68187.000	5.79	2446.09	.00	.00	2447.06	.96	9.61	.10	2446.20
14737.0	.0	14737.0	.0	.0	1870.5	.0	500.1	128.0	2449.30
.32	.00	7.88	.00	.000	.035	.000	.000	2440.30	1182.13
.004703	1373.	1373.	1373.	6	0	0	.00	418.72	1600.85

*SECNO 69560.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2454.80 ELREA= 2458.60

69560.000	4.80	2454.30	.00	.00	2456.03	1.73	8.74	.23	2454.80
14737.0	.0	14737.0	.0	.0	1398.1	.0	551.6	139.8	2458.60
.36	.00	10.54	.00	.000	.035	.000	.000	2449.50	1242.88
.009100	1373.	1373.	1373.	4	0	0	.00	331.84	1574.72

*SECNO 71045.000
3280 CROSS SECTION 71045.00 EXTENDED .32 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2464.70 ELREA= 2468.50

71045.000	5.52	2464.92	.00	.00	2465.99	1.08	9.90	.06	2464.70
14737.0	763.8	13973.2	.0	203.2	1642.7	.0	606.9	155.1	2468.50
.41	3.76	8.51	.00	.035	.035	.000	.000	2459.40	1011.42
.005095	1485.	1485.	1485.	4	0	0	.00	565.76	1577.18

*SECNO 72532.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2477.80 ELREA= 2478.40

72532.000	4.65	2474.25	.00	.00	2475.92	1.67	9.75	.18	2477.80
14737.0	.0	14737.0	.0	.0	1419.7	.0	662.7	170.5	2478.40
.45	.00	10.38	.00	.000	.035	.000	.000	2469.60	1177.78
.008747	1487.	1487.	1487.	4	0	0	.00	334.70	1512.48

*SECNO 73765.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2486.10 ELREA= 2486.70

73765.000	5.29	2483.19	.00	.00	2484.45	1.26	8.49	.04	2486.10
14737.0	.0	14737.0	.0	.0	1635.2	.0	705.9	180.0	2486.70
.48	.00	9.01	.00	.000	.035	.000	.000	2477.90	1175.66
.005561	1233.	1233.	1233.	3	0	0	.00	339.13	1514.79

*SECNO 74997.000
3280 CROSS SECTION 74997.00 EXTENDED 1.18 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2492.90 ELREA= 2494.50

74997.000	5.08	2490.78	.00	.00	2492.27	1.50	7.75	.07	2492.90
14737.0	.0	14737.0	.0	.0	1501.4	.0	750.3	189.5	2494.50
.52	.00	9.82	.00	.000	.035	.000	.000	2485.70	1281.31
.007180	1232.	1232.	1232.	3	0	0	.00	331.88	1613.19

T1 FEMA 500-YEAR HEC-2 ANALYSIS
T2 BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3 UPPER NO. LAS VEGAS WASH

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		5							2375.7	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	4		-1							

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*PROF 4
0

 CCHV=      .100 CEHV=      .300
 *SECNO 59059.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2382.80 ELREA=      2386.40

  59059.000      20.20    2375.70       .00    2375.70    2375.80       .10       .00       .00    2382.80
    24938.0         .0    24938.0         .0         .0   10065.3         .0         .0         .0    2386.40
        .00        .00       2.48        .00       .000       .040       .000       .000    2355.50    1417.31
    .000135         0.         0.         0.          0          0          0        .00     725.97    2143.28


 *SECNO 60826.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2385.70 ELREA=      2397.80

  60826.000       6.01    2377.51    2377.51       .00    2379.24       1.73       .80       .49    2385.70
    24938.0         .0    24938.0         .0         .0    2362.0         .0      252.1      29.1    2397.80
        .05        .00      10.56        .00       .000       .040       .000       .000    2371.50    1738.18
    .016332      1767.      1767.      1767.         20         17          0        .00     709.93    2448.11


 *SECNO 62524.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62

  62524.000       6.83    2394.33       .00       .00    2395.51       1.18      16.21       .05    2406.40
    24938.0         .0    24938.0         .0         .0    2855.1         .0      353.7      53.8    2411.00
        .10        .00       8.73        .00       .000       .040       .000       .000    2387.50    1037.29
    .006256      1698.      1698.      1698.          6          0          0        .00     554.34    1591.63


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 63598.000

 3301 HV CHANGED MORE THAN HVINS

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2410.60 ELREA=      2415.90

  63598.000       5.43    2402.93       .00       .00    2404.72       1.78       9.02       .18    2410.60
    24938.0         .0    24938.0         .0         .0    2328.4         .0      417.6      67.2    2415.90
        .13        .00      10.71        .00       .000       .040       .000       .000    2397.50    1142.44
    .011677      1074.      1074.      1074.          4          0          0        .00     538.73    1681.17


 *SECNO 65055.000

 3301 HV CHANGED MORE THAN HVINS

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

  65055.000       5.74    2416.54       .00       .00    2417.28        .74      12.46       .10    2415.50
    24938.0    10070.4    14867.6         .0    1641.0    2019.7         .0      517.8      94.8    2425.30
        .19       6.14       7.36        .00       .040       .040       .000       .000    2410.80    1091.57
    .006446      1457.      1457.      1457.          5          0          0        .00    1109.84    2201.41


 CCHV=      .100 CEHV=      .300
 *SECNO 66061.000
 3280 CROSS SECTION  66061.00 EXTENDED      3.85 FEET


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

  66061.000       5.95    2425.85    2425.85       .00    2427.35       1.50       6.49       .23    2425.80
    24938.0    6027.6    18910.4         .0      621.9    1916.2         .0      589.4      113.7    2428.60
        .22       9.69       9.87        .00       .035       .035       .000       .000    2419.90    1000.00
    .006447      1006.      1006.      1006.          2         16          0        .00     529.87    1529.87


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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 66660.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2434.90 ELREA= 2435.30

66660.000	6.20	2431.30	2431.30	.00	2434.10	2.81	4.81	.39	2434.90
24938.0	.0	24938.0	.0	.0	1855.1	.0	619.6	119.7	2435.30
.23	.00	13.44	.00	.000	.035	.000	.000	2425.10	1273.73
.010294	599.	599.	599.	3	8	0	.00	334.89	1608.62

*SECNO 66814.000
3280 CROSS SECTION 66814.00 EXTENDED 3.51 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2437.00 ELREA= 2440.10

66814.000	5.91	2437.01	2437.01	.00	2437.47	.46	.45	.23	2437.00
24938.0	16708.3	8229.7	.0	2808.0	1920.9	.0	631.2	121.8	2440.10
.24	5.95	4.28	.00	.035	.035	.000	.000	2431.10	739.62
.001366	154.	154.	154.	20	15	0	.00	861.59	1601.21

*SECNO 68187.000
3280 CROSS SECTION 68187.00 EXTENDED 3.50 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2446.20 ELREA= 2449.30

68187.000	5.90	2446.20	2446.20	.00	2446.67	.46	1.88	.00	2446.20
24938.0	16713.8	8224.2	.0	2804.9	1917.9	.0	780.2	149.0	2449.30
.31	5.96	4.29	.00	.035	.035	.000	.000	2440.30	739.76
.001371	1373.	1373.	1373.	20	10	0	.00	861.43	1601.19

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 69560.000
3280 CROSS SECTION 69560.00 EXTENDED 1.08 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2454.80 ELREA= 2458.60

69560.000	6.28	2455.78	2455.78	.00	2457.83	2.05	3.80	.48	2454.80
24938.0	2207.4	22730.6	.0	372.0	1910.4	.0	890.6	171.6	2458.60
.34	5.93	11.90	.00	.035	.035	.000	.000	2449.50	1004.62
.008235	1373.	1373.	1373.	20	9	0	.00	575.19	1579.81

*SECNO 71045.000
3280 CROSS SECTION 71045.00 EXTENDED 1.67 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2464.70 ELREA= 2468.50

71045.000	6.87	2466.27	2465.64	.00	2467.78	1.51	9.89	.05	2464.70
24938.0	3004.8	21933.2	.0	606.8	2115.8	.0	975.9	197.1	2468.50
.38	4.95	10.37	.00	.035	.035	.000	.000	2459.40	663.35
.005499	1485.	1485.	1485.	8	6	0	.00	918.45	1581.81

*SECNO 72532.000
3280 CROSS SECTION 72532.00 EXTENDED .74 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2477.80 ELREA= 2478.40

72532.000	6.24	2475.84	.00	.00	2478.35	2.51	10.27	.30	2477.80
24938.0	.0	24938.0	.0	.0	1961.6	.0	1055.8	218.6	2478.40
.42	.00	12.71	.00	.000	.035	.000	.000	2469.60	1172.13
.008929	1487.	1487.	1487.	3	0	0	.00	346.11	1518.24

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 73765.000
3280 CROSS SECTION 73765.00 EXTENDED 1.69 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2486.10 ELREA= 2486.70

73765.000	7.18	2485.08	.00	.00	2486.91	1.83	8.50	.07	2486.10
24938.0	.0	24938.0	.0	.0	2295.2	.0	1116.1	228.6	2486.70
.45	.00	10.87	.00	.000	.035	.000	.000	2477.90	1166.41
.005480	1233.	1233.	1233.	2	0	0	.00	355.27	1521.68

*SECNO 74997.000
3280 CROSS SECTION 74997.00 EXTENDED 2.92 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2492.90 ELREA= 2494.50

74997.000	6.82	2492.52	.00	.00	2494.73	2.22	7.71	.12	2492.90
24938.0	.0	24938.0	.0	.0	2086.1	.0	1178.1	238.5	2494.50
.48	.00	11.95	.00	.000	.035	.000	.000	2485.70	1275.32
.007206	1232.	1232.	1232.	3	0	0	.00	343.54	1618.86

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THIS RUN EXECUTED 15APR98 13:57:23

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERRISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

UPPER NO. LAS VEGAS WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	59059.000	.00	.00	.00	2355.50	3465.00	2359.15	2359.15	2359.82	213.35	6.58	526.24	237.22
	59059.000	.00	.00	.00	2355.50	10312.00	2367.00	.00	2367.09	2.52	2.38	4327.97	6499.39
	59059.000	.00	.00	.00	2355.50	14737.00	2372.40	.00	2372.46	1.12	1.91	7695.76	13919.88
	59059.000	.00	.00	.00	2355.50	24938.00	2375.70	.00	2375.80	1.35	2.48	10065.27	21425.65
*	60826.000	1767.00	.00	.00	2371.50	3465.00	2375.50	.00	2375.70	48.99	3.51	988.53	495.06
*	60826.000	1767.00	.00	.00	2371.50	10312.00	2376.05	2376.05	2376.97	167.55	7.70	1339.53	796.65
*	60826.000	1767.00	.00	.00	2371.50	14737.00	2376.50	2376.50	2377.74	185.86	8.93	1650.07	1080.97
*	60826.000	1767.00	.00	.00	2371.50	24938.00	2377.51	2377.51	2379.24	163.32	10.56	2362.03	1951.35
*	62524.000	1698.00	.00	.00	2387.50	3465.00	2389.78	2389.75	2390.53	191.19	6.93	499.94	250.59
*	62524.000	1698.00	.00	.00	2387.50	10312.00	2392.23	.00	2392.80	59.08	6.07	1699.72	1341.61
*	62524.000	1698.00	.00	.00	2387.50	14737.00	2393.03	.00	2393.76	56.64	6.89	2137.53	1958.24
*	62524.000	1698.00	.00	.00	2387.50	24938.00	2394.33	.00	2395.51	62.56	8.73	2855.06	3152.83
*	63598.000	1074.00	.00	.00	2397.50	3465.00	2400.24	.00	2400.48	54.04	3.88	892.97	471.35
*	63598.000	1074.00	.00	.00	2397.50	10312.00	2401.05	.00	2401.99	130.86	7.80	1322.78	901.46
*	63598.000	1074.00	.00	.00	2397.50	14737.00	2401.62	.00	2402.89	135.25	9.06	1627.03	1267.18
	63598.000	1074.00	.00	.00	2397.50	24938.00	2402.93	.00	2404.72	118.77	10.71	2328.43	2288.27
*	65055.000	1457.00	.00	.00	2410.80	3465.00	2413.57	.00	2414.17	197.88	6.25	554.08	246.32
*	65055.000	1457.00	.00	.00	2410.80	10312.00	2415.50	2414.89	2416.25	86.19	6.96	1481.24	1110.76
*	65055.000	1457.00	.00	.00	2410.80	14737.00	2415.59	.00	2416.10	64.35	6.15	2618.15	1837.06

	65055.000	1457.00	.00	.00	2410.80	24938.00	2416.54	.00	2417.28	64.46	7.36	3660.66	3106.05
*	66061.000	1006.00	.00	.00	2419.90	3465.00	2422.32	.00	2422.69	46.56	4.91	706.08	507.78
	66061.000	1006.00	.00	.00	2419.90	10312.00	2423.70	.00	2424.93	83.60	8.92	1156.09	1127.83
*	66061.000	1006.00	.00	.00	2419.90	14737.00	2424.16	2424.16	2426.13	114.17	11.24	1310.55	1379.20
*	66061.000	1006.00	.00	.00	2419.90	24938.00	2425.85	2425.85	2427.35	64.47	9.87	2538.10	3105.96
*	66660.000	599.00	.00	.00	2425.10	3465.00	2427.00	2427.00	2427.80	155.92	7.19	481.64	277.50
	66660.000	599.00	.00	.00	2425.10	10312.00	2428.95	.00	2430.34	96.03	9.45	1091.78	1052.30
	66660.000	599.00	.00	.00	2425.10	14737.00	2430.12	.00	2431.69	76.04	10.05	1466.23	1690.02
*	66660.000	599.00	.00	.00	2425.10	24938.00	2431.30	2431.30	2434.10	102.94	13.44	1855.06	2457.88

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	66814.000	154.00	.00	.00	2431.10	3465.00	2432.82	2432.82	2433.61	157.20	7.12	486.41	276.36
*	66814.000	154.00	.00	.00	2431.10	10312.00	2434.50	2434.50	2436.08	123.64	10.10	1020.77	927.39
*	66814.000	154.00	.00	.00	2431.10	14737.00	2435.35	2435.35	2437.34	115.05	11.32	1301.86	1373.92
*	66814.000	154.00	.00	.00	2431.10	24938.00	2437.01	2437.01	2437.47	13.66	4.28	4728.94	6748.06
*	68187.000	1373.00	.00	.00	2440.30	3465.00	2442.84	.00	2443.18	38.85	4.65	745.24	555.89
*	68187.000	1373.00	.00	.00	2440.30	10312.00	2444.85	.00	2445.69	44.43	7.36	1401.58	1547.13
*	68187.000	1373.00	.00	.00	2440.30	14737.00	2446.09	.00	2447.06	47.03	7.88	1870.48	2148.96
*	68187.000	1373.00	.00	.00	2440.30	24938.00	2446.20	2446.20	2446.67	13.71	4.29	4722.84	6735.16
*	69560.000	1373.00	.00	.00	2449.50	3465.00	2451.54	.00	2452.26	131.96	6.78	510.97	301.63
*	69560.000	1373.00	.00	.00	2449.50	10312.00	2453.33	.00	2454.75	102.72	9.56	1078.28	1017.45
	69560.000	1373.00	.00	.00	2449.50	14737.00	2454.30	.00	2456.03	91.00	10.54	1398.13	1544.89
*	69560.000	1373.00	.00	.00	2449.50	24938.00	2455.78	2455.78	2457.83	82.35	11.90	2282.47	2748.05
*	71045.000	1485.00	.00	.00	2459.40	3465.00	2462.13	.00	2462.48	41.92	4.78	725.61	535.14
*	71045.000	1485.00	.00	.00	2459.40	10312.00	2464.08	.00	2464.97	48.92	7.59	1357.92	1474.39
	71045.000	1485.00	.00	.00	2459.40	14737.00	2464.92	.00	2465.99	50.95	8.51	1845.90	2064.70
	71045.000	1485.00	.00	.00	2459.40	24938.00	2466.27	2465.64	2467.78	54.99	10.37	2722.56	3363.01
*	72532.000	1487.00	.00	.00	2469.60	3465.00	2471.54	.00	2472.18	112.59	6.43	539.13	326.55
	72532.000	1487.00	.00	.00	2469.60	10312.00	2473.38	.00	2474.67	88.70	9.10	1132.64	1094.95
	72532.000	1487.00	.00	.00	2469.60	14737.00	2474.25	.00	2475.92	87.47	10.38	1419.72	1575.75
	72532.000	1487.00	.00	.00	2469.60	24938.00	2475.84	.00	2478.35	89.29	12.71	1961.56	2639.07
*	73765.000	1233.00	.00	.00	2477.90	3465.00	2480.36	.00	2480.74	46.74	4.91	705.15	506.81
	73765.000	1233.00	.00	.00	2477.90	10312.00	2482.23	.00	2483.19	54.90	7.85	1314.17	1391.67
	73765.000	1233.00	.00	.00	2477.90	14737.00	2483.19	.00	2484.45	55.61	9.01	1635.23	1976.21
	73765.000	1233.00	.00	.00	2477.90	24938.00	2485.08	.00	2486.91	54.80	10.87	2295.21	3368.66
	74997.000	1232.00	.00	.00	2485.70	3465.00	2487.92	.00	2488.48	87.49	5.98	579.07	370.44
	74997.000	1232.00	.00	.00	2485.70	10312.00	2489.86	.00	2491.01	73.12	8.62	1195.80	1205.96
	74997.000	1232.00	.00	.00	2485.70	14737.00	2490.78	.00	2492.27	71.80	9.82	1501.44	1739.22
	74997.000	1232.00	.00	.00	2485.70	24938.00	2492.52	.00	2494.73	72.06	11.95	2086.09	2937.79

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UPPER NO. LAS VEGAS WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	59059.000	3465.00	2359.15	.00	.00	.05	393.11	.00
	59059.000	10312.00	2367.00	7.85	.00	.00	529.63	.00
	59059.000	14737.00	2372.40	5.40	.00	.00	710.08	.00
	59059.000	24938.00	2375.70	3.30	.00	.00	725.97	.00
*	60826.000	3465.00	2375.50	.00	16.36	.00	629.88	1767.00
*	60826.000	10312.00	2376.05	.54	9.05	.00	659.44	1767.00
*	60826.000	14737.00	2376.50	.46	4.10	.00	702.61	1767.00
*	60826.000	24938.00	2377.51	1.01	1.81	.00	709.93	1767.00
*	62524.000	3465.00	2389.78	.00	14.28	.00	318.30	1698.00
*	62524.000	10312.00	2392.23	2.45	16.18	.00	547.21	1698.00
*	62524.000	14737.00	2393.03	.80	16.52	.00	549.92	1698.00
*	62524.000	24938.00	2394.33	1.30	16.81	.00	554.34	1698.00
*	63598.000	3465.00	2400.24	.00	10.46	.00	526.24	1074.00
*	63598.000	10312.00	2401.05	.81	8.82	.00	531.10	1074.00
*	63598.000	14737.00	2401.62	.57	8.59	.00	534.51	1074.00
	63598.000	24938.00	2402.93	1.32	8.61	.00	538.73	1074.00
*	65055.000	3465.00	2413.57	.00	13.32	.00	422.65	1457.00
*	65055.000	10312.00	2415.50	1.93	14.45	.00	515.65	1457.00
*	65055.000	14737.00	2415.59	.10	13.98	.00	1104.14	1457.00
	65055.000	24938.00	2416.54	.94	13.60	.00	1109.84	1457.00
*	66061.000	3465.00	2422.32	.00	8.75	.00	319.78	1006.00
	66061.000	10312.00	2423.70	1.38	8.20	.00	331.08	1006.00
*	66061.000	14737.00	2424.16	.46	8.57	.00	334.87	1006.00
*	66061.000	24938.00	2425.85	1.69	9.31	.00	529.87	1006.00
*	66660.000	3465.00	2427.00	.00	4.68	.00	304.23	599.00
	66660.000	10312.00	2428.95	1.96	5.26	.00	318.21	599.00
	66660.000	14737.00	2430.12	1.17	5.96	.00	326.50	599.00
*	66660.000	24938.00	2431.30	1.18	5.45	.00	334.89	599.00

*	66814.000	3465.00	2432.82	.00	5.83	.00	313.77	154.00
*	66814.000	10312.00	2434.50	1.67	5.54	.00	325.19	154.00
*	66814.000	14737.00	2435.35	.86	5.23	.00	331.04	154.00
*	66814.000	24938.00	2437.01	1.66	5.71	.00	861.59	154.00
*	68187.000	3465.00	2442.84	.00	10.02	.00	319.35	1373.00
*	68187.000	10312.00	2444.85	2.01	10.36	.00	333.09	1373.00
*	68187.000	14737.00	2446.09	1.24	10.74	.00	418.72	1373.00
*	68187.000	24938.00	2446.20	.11	9.19	.00	861.43	1373.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	69560.000	3465.00	2451.54	.00	8.70	.00	311.22	1373.00
*	69560.000	10312.00	2453.33	1.78	8.47	.00	324.54	1373.00
	69560.000	14737.00	2454.30	.97	8.21	.00	331.84	1373.00
*	69560.000	24938.00	2455.78	1.48	9.58	.00	575.19	1373.00
*	71045.000	3465.00	2462.13	.00	10.58	.00	316.33	1485.00
*	71045.000	10312.00	2464.08	1.95	10.75	.00	330.91	1485.00
	71045.000	14737.00	2464.92	.84	10.61	.00	565.76	1485.00
	71045.000	24938.00	2466.27	1.35	10.48	.00	918.45	1485.00
*	72532.000	3465.00	2471.54	.00	9.42	.00	315.95	1487.00
	72532.000	10312.00	2473.38	1.84	9.31	.00	328.71	1487.00
	72532.000	14737.00	2474.25	.86	9.33	.00	334.70	1487.00
	72532.000	24938.00	2475.84	1.59	9.57	.00	346.11	1487.00
*	73765.000	3465.00	2480.36	.00	8.82	.00	319.57	1233.00
	73765.000	10312.00	2482.23	1.87	8.85	.00	332.51	1233.00
	73765.000	14737.00	2483.19	.96	8.94	.00	339.13	1233.00
	73765.000	24938.00	2485.08	1.89	9.24	.00	355.27	1233.00
	74997.000	3465.00	2487.92	.00	7.56	.00	312.62	1232.00
	74997.000	10312.00	2489.86	1.93	7.63	.00	325.63	1232.00
	74997.000	14737.00	2490.78	.92	7.59	.00	331.88	1232.00
	74997.000	24938.00	2492.52	1.74	7.44	.00	343.54	1232.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 59059.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 60826.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 60826.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 60826.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 60826.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 62524.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 63598.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 63598.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 63598.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 65055.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 65055.000 PROFILE= 2 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 65055.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 65055.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 66061.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 66061.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66061.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66061.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66061.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66660.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66660.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66660.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66660.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66814.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=  66814.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
1
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 WARNING SECNO=  68187.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  68187.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  68187.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  68187.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  68187.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  68187.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  69560.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  69560.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  69560.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  69560.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  69560.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  71045.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  71045.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  72532.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  73765.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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Paper Copy C

North Las Vegas Detention Basin
to Upper Las Vegas Detention Basin

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    15APR98    TIME   13:31:06  *
*****************************************
```

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*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*           (916) 756-1104          *
*************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX    XXXXX
X     X  X        X                    X
X     X  X        X     X              X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

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1
    15APR98      13:31:06                                                    PAGE    1


                                                    THIS RUN EXECUTED 15APR98    13:31:06

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC


 T1      FEMA 10-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      MIDDLE NO. LAS VEGAS WASH

 J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2                             .0076                                 2115.1

 J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       0                   -1


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150

   ***************************************************************************
   THE 500 YEAR DISCHARGE IS FROM SPRING MOUNTAIN STORM.  THE 10, 50, AND 100
   YEAR DISCHARGES ARE FROM THE INTERBASIN STORM
   ***************************************************************************


 QT        4       2939       6751       8343      11017
 NC     .025       .025       .025         .1         .3


     LINE "A" STA 27+61.6
 X1    28903          8       1000     1117.1
 GR     2145       1000     2128.6       1030     2114.6       1058     2114.4     1075.5     2114.6       1093
 GR   2126.6       1117     2126.6     1117.1       2144     1186.7


 X1    29486                                     582.2      582.2      582.2                4.42


1
    15APR98      13:31:06                                                                                PAGE    2


 X1    30067                                     582.2      582.2      582.2                4.42
     LINE "A" STA 10+15
     D/S FACE OF CONTROL STRUCTURE

 X1    30650         15       1015     1114.4     582.2      582.2      582.2
 X3       10                                                                        2144
 GR   2147.5        500       2144        621      2140        812       2136        823       2133        832
 GR     2133        874       2136        884      2142        897       2142        952       2145       1000
 GR     2145       1015     2127.7     1047.2    2127.5     1064.7     2127.7     1082.2       2145     1114.4


 NC                                             .3         .5
     LINE "A" STA 9+85
     U/S FACE OF CONTROL STRUCTURE
     D/S FACE OF TRANSITION
 X1    30680                                       30         30         30                 .23
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X3       10                                                          2144
    LINE "A" STA 9+00
    U/S FACE OF TRANSITION
    D/S END OF DIVERSION DIKE

QT        4       2939       6751       8537      19217

X1    30765         13       1015     1192.8         85         85         85
X3       10                                                    2142.9
GR     2148        525       2144        691       2140        757       2136        790       2136        800
GR     2142        824     2142.9        945       2142       1000       2142       1015     2128.5     1068.9
GR   2127.9     1103.9     2128.5     1138.9       2142     1192.8


X1    30935                                  170        170        170                  .34
X3       10

NC      .040       .040       .040         .1         .3
   SECTION CUT FROM KENNY TOPO
X1    31235         18       1192       1377        300        300        300
GR     2148        500       2148        564       2150        688       2148        737       2146        874
GR     2146        885       2147        983     2146.2       1000       2144       1132       2140       1168
GR     2136       1192       2132       1204     2130.9       1213       2132       1262     2129.1       1354
GR     2132       1367       2136       1377       2136       1400

NC                                       .1         .3

   SECTION CUT FROM KENNY TOPO
X1    31500         18       1168       1302        265        265        265
GR     2154        582       2152        678       2148        772       2146        802       2148        880
GR   2150.2       1000       2148       1064       2144       1117       2140       1142       2136       1168
GR   2132.9       1185       2132       1257       2132       1260       2136       1302       2136       1321
GR     2140       1352       2144       1371     2145.7       1390

1
   15APR98      13:31:06                                                                                    PAGE     3


X1    32044         18     1049.5    1400.79        544        544        544
X3       10
GR   2158.1       1000     2157.3     1049.5     2141.3    1082.69     2142.3    1093.37     2141.5    1115.96
GR   2139.6    1237.28     2138.9     1182.3     2138.1    1189.12     2137.5    1206.04     2138.6    1223.55
GR   2138.7    1240.23       2144     1279.77       2145    1302.32     2144.8    1321.6      2152.9    1344.81
GR   2155.4    1376.98     2157.3    1400.79     2157.3    1415.34

X1    33671         21     1204.79    1475.62       1627       1627       1627
X3       10
GR   2180.2       1000       2179     1024.4     2180.2    1043.16     2179.7    1093.26     2178.7    1142.94
GR   2176.6    1171.86     2176.2    1204.79     2175.1    1224.56     2171.8    1250.5      2154.2    1263.09
GR     2153    1291.82     2154.8    1301.91     2156.8    1321.79     2157.2    1339.36     2156.3     1354.2
GR   2159.7    1372.19     2160.1    1394.16     2162.6    1412.97     2171.1    1450.07     2173.5    1465.27
GR   2173.8    1475.62

X1    35645         30       1000    1337.03       1974       1974       1974
X3       10          0          0          0          0          0          0          0          0
GR   2191.9       1000     2190.5    1035.15     2189.2    1056.16     2183.9    1086.97     2169.5    1224.69
GR     2172    1127.15     2170.3    1142.71     2172.5    1155.59     2173.2    1199.87     2172.3    1206.34
GR   2174.5    1221.77     2176.2    1273.66       2176    1288.49       2179    1306.24     2186.4    1337.03
GR   2179.5    1363.03     2177.1    1386.96     2177.2    1394.97     2180.2    1415.21     2177.5    1430.47
GR   2178.1    1448.81     2177.3    1455.93       2180    1473.27     2185.4    1493.31     2194.3    1507.23
GR   2194.3    1534.84     2195.1    1550.86       2195    1587.25     2194.3    1607.37     2195.2    1639.04

X1    36822         29     1158.79    1435.70       1177       1177       1177
X3       10
GR   2209.7       1000     2208.6    1063.99     2207.9    1072.65     2209.2    1088.92     2208.6    1121.69
GR   2207.9    1158.79     2187.8    1186.45     2182.8    1209.18     2183.6    1216.84     2184.8    1235.06
GR   2183.6    1258.34     2181.4    1263.44     2182.5    1304.28     2181.4    1317.16     2181.9    1350.52
GR   2179.6    1359.84     2179.3    1366.43     2183.9     1386.2     2184.5    1397.54     2191.8    1419.91
GR   2207.6     1435.7     2210.1    1479.38     2210.2    1507.51     2208.1    1538.62     2207.6    1574.12
GR   2209.1    1593.29     2208.8    1608.66     2209.3    1620.15     2210.6    1643.71

X1    38410         20     1029.6    1422.47       1588       1588       1588
X3       10
GR   2224.3       1000     2224.1     1029.6     2222.8    1054.58     2201.7    1075.23     2198.5    1104.94
GR   2196.6    1119.69     2196.9    2148.79     2196.1    1170.51     2196.7    1204.61     2196.2    1229.06
GR   2197.3    1243.68     2196.9    1295.89     2197.7    1303.88     2198.8    1342.31     2211.8    1381.14
GR   2212.9    1388.48     2223.9    1422.47     2218.8    1442.88     2212.5    1475.26     2223.9    1502.25

X1    39519         26     1146.69    1409.05       1109       1109       1109
X3       10
GR   2236.6       1000     2235.1    1019.12     2234.3    1062.93     2234.4    1104.13     2233.6    1146.69
GR   2212.3    1170.36     2208.1    1182.19     2206.4    1231.27     2205.6    1241.98     2205.3    1257.55
GR     2206    1268.98       2203    1285.67     2204.1    1294.37     2203.7    1303.55     2204.9    1311.89
GR   2205.7    1328.63     2204.7    1334.67     2206.4    1357.76     2203.7    1365.15     2205.9    1376.22
GR   2229.1    1394.81     2232.4    1409.05     2232.5    1416.82     2230.1    1423.89       2233    1441.47
GR   2233.1    1474.39
1
   15APR98      13:31:06                                                                                    PAGE     4


X1    40616         33     1123.66    1515.47       1097       1097       1097
X3       10          0          0          0          0          0          0          0          0
GR   2244.3       1000     2244.1     1066.3     2243.2    1106.79     2244.1    1123.66     2244.1    1149.12
GR   2242.5    1158.12     2233.3     1162.5     2219.6    1192.34     2217.1    1227.15     2213.7    1238.63
GR   2215.5    1245.44     2214.1    1253.06     2215.8    1261.34     2216.5    1282.07     2215.9    1325.99
GR   2215.1     1342.1     2213.8    1349.77     2216.3    1364.81     2217.5    1400.24     2217.8    1426.25
```

GR	2217.6	1443.84	2225.9	1466.22	2233.5	1479.71	2235.5	1515.47	2222.8	1540.82
GR	2227.2	1552.45	2224.5	1559.89	2226.1	1568	2225.2	1571.41	2229.2	1583.55
GR	2229.3	1598.8	2241.9	1627.55	2242.7	1657.06				
X1	42138	44	1213.96	1728.02	1522	1522	1522			
X3	10									
GR	2251.5	1000	2253.4	1017.64	2254.1	1049.84	2253.5	1063.28	2247.1	1083
GR	2249.4	1098.09	2242.2	1116.44	2242.5	1129.95	2244.6	1143.43	2239.3	1160.74
GR	2233.8	1177.19	2233.4	1189.21	2238.8	1213.96	2233.9	1253.33	2228.5	1277.66
GR	2229.7	1288.2	2228.4	1304.47	2229.9	1326.9	2230.9	1360.58	2231.4	1393.79
GR	2231.4	1426.33	2230.4	1464.21	2228.5	1524.29	2227.4	1536.47	2228.3	1547.24
GR	2228.5	1558.96	2227.4	1569.97	2226.6	1577.62	2227.3	1583.2	2226.8	1592.21
GR	2224.8	1605.36	2226.7	1617.66	2225.8	1630.67	2230.2	1640.3	2231.2	1648.47
GR	2240.6	1681.86	2254	1709.4	2254.3	1728.02	2251.8	1744.52	2254.1	1760.1
GR	2254.7	1782.16	2255.1	1804.57	2254.3	1822.71	2249.5	1848.51		
X1	43231	49	1106.47	1469.25	1093	1093	1093			
X3	10	0	0	0	0	0	0	0	0	
GR	2263.8	1000	2264.4	1023.3	2261.1	1046.23	2257.2	1058.41	2262	1077.29
GR	2252.7	1095.53	2261	1106.47	2249.8	1124.35	2245	1147.12	2241.8	1163.12
GR	2239.5	1200.3	2238.7	1240.18	2238	1269.24	2238.5	1280.3	2237.1	1291.77
GR	2238	1299.95	2238.2	1312.83	2235.9	1331.36	2236.5	1339.42	2233.7	1356.07
GR	2235.6	1366.3	2235.4	1375.55	2236.1	1385.03	2234.7	1401.09	2235.4	1415.06
GR	2235.6	1431.52	2246.2	1438.62	2243.6	1447.5	2254.3	1469.25	2253.9	1480.38
GR	2244.5	1496.61	2239.2	1512.44	2238.8	1526.2	2239.8	1539.18	2245.1	1563.54
GR	2258.7	1578.39	2247.5	1593.16	2241.1	1617.51	2240	1647.34	2241.4	1668.04
GR	2244.7	1686.2	2259.1	1702.55	2254.9	1713.55	2260.8	1729.56	2261.4	1744.02
GR	2261.6	1760.79	2261.9	1787.85	2261.3	1824.97	2256.8	1863.39		
X1	44345	39	1221.18	1515.88	1114	1114	1114			
X3	10									
GR	2269.7	1000	2269.6	1006.12	2257.3	1026.82	2257	1040.24	2268.9	1059.94
GR	2269.9	1069.59	2269.6	1081.36	2265.6	1098.06	2260.9	1115.59	2260.3	1136.88
GR	2258.2	1146.77	2261	1166.42	2260.8	1182.18	2257.5	1202.07	2254.8	1221.18
GR	2247.6	1239.77	2252.2	1259.07	2251	1271.59	2251.1	1292.54	2245.2	1310.07
GR	2245.2	1335.3	2242.8	1349.07	2244.1	1356.77	2245.1	1368.71	2245.7	1381.66
GR	2245.2	1393.07	2244.5	1407.83	2245.5	1417.19	2245	1424.77	2245	1441.66
GR	2246.5	1448.07	2246.1	1455.41	2259.2	1471.74	2257.6	1485.68	2263.4	1504.65
GR	2265.4	1515.88	2267.6	1539.42	2269.9	1555.59	2269.6	1564.23		
X1	45725	45	1000	1450.19	1380	1380	1380			
X3	10									
GR	2279.8	1000	2259.5	1040.16	2258.4	1052.51	2258.7	1061.16	2258.5	1087.96
GR	2257.4	1117.06	2257.9	1137.71	2258.3	1161.47	2257.3	1196.3	2256.1	1238.36
GR	2255.6	1253.42	2255.6	1266.47	2254.9	1274.24	2255.4	1301.59	2255.6	1320.54
GR	2253	1329.48	2255.1	1337.89	2253.7	1344.71	2253.9	1361.71	2254.9	1393.66
GR	2256.3	1400.95	2256.3	1407.3	2264	1433.95	2276.3	1450.19	2265.6	1472.6

1

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GR	2262.3	1485.48	2261.9	1501.65	2260.1	1508.19	2259	1522.48	2257.8	1547.95
GR	2257.5	1576.17	2264	1596.88	2277.9	1611.57	2279.5	1629.04	2280.1	1651.98
GR	2279.5	1677.75	2278.8	1695.15	2273.6	1727.34	2277.7	1757.11	2279.8	1782.27
GR	2278.9	1796.15	2276.6	1818.5	2277.8	1824.57	2277.9	1836.27	2277.4	1846.59
X1	46746	35	1050.59	1558.44	1021	1021	1021			
X3	10									
GR	2285.1	1000	2284	1016.17	2273.9	1045.65	2274.9	1050.59	2270.8	1071.77
GR	2266	1101.47	2264.9	1124.86	2263.9	1155.74	2264.5	1163.51	2264.2	1200.51
GR	2263.1	1256.82	2262.2	1267.06	2262.4	1275.41	2261.3	1291	2260.7	1308.7
GR	2260.5	1323.53	2262.4	1338.06	2261.7	1352.1	2261.2	1364.34	2260.3	1372.42
GR	2262.4	1380.73	2262.5	1392.85	2261.1	1400.96	2260.6	1426.44	2258.8	1437.68
GR	2261.7	1448.32	2261	1458.68	2261.5	1465.62	2261.5	1482.78	2260	1494.31
GR	2262.1	1503.25	2262.7	1513.17	2269.6	1524.52	2268.7	1537.22	2273.2	1558.44
X1	48046	43	1058.02	1454.12	1300	1300	1300			
X3	10	0	0	0	0	0	0	0	0	
GR	2273.4	1000	2280.9	1017.83	2276.8	1029.39	2285.7	1045.35	2288.7	1058.02
GR	2280.2	1081.02	2272.5	1100.91	2270.3	1120.39	2270.5	1129.2	2271.1	1138.24
GR	2270.5	1147.55	2271	1156.18	2270.9	1180.13	2271	1210.57	2270.2	1239.18
GR	2270.7	1246.95	2270.2	1261.99	2270	1281.1	2270.3	1295.75	2270.5	1351.34
GR	2268	1360.9	2269.7	1371.93	2269.7	1388.14	2266.9	1400.75	2269.7	1418.64
GR	2270.9	1431.31	2277.3	1440.75	2279.9	1454.12	2278.1	1463.22	2275.8	1487.56
GR	2277	1499.89	2274.4	1519.24	2273.7	1548.76	2276.1	1556.62	2276.6	1574.81
GR	2275.2	1587.19	2276.5	1611.71	2287	1637.99	2294.1	1654.25	2293.7	1669.5
GR	2288.3	1679.36	2293.7	1700.95	2294.3	1721.96				
X1	49654	47	1032.79	1431.43	1608	1608	1608			
X3	10	0	0	0	0	0	0	0	0	
GR	2309.3	1000	2308.1	1032.79	2305.5	1043.94	2284.5	1072.73	2283.9	1094.91
GR	2281.3	1102.48	2283.5	1109.46	2283.2	1134.02	2281.5	1140.58	2281.6	1151.62
GR	2284.1	1160.54	2283.5	1169.44	2281.1	1177.45	2283.6	1186.66	2284.5	1193.04
GR	2285.8	1217.3	2286.6	1254.87	2287.1	1271.42	2286	1279.86	2287	1293.39
GR	2287.5	1307.27	2286.5	1321.92	2284.8	1345.47	2285.1	1362.99	2284.6	1385.8
GR	2285.3	1399.15	2303.2	1414.61	2307.2	1431.43	2306.5	1451.9	2303.3	1468.55
GR	2293.1	1489.38	2289.1	1499.53	2289	1518.72	2290.6	1529.28	2292	1549.81
GR	2301.7	1572.7	2300.2	1585.5	2297.4	1595.23	2297.2	1605.85	2298.8	1611.19
GR	2293.6	1621.87	2291.3	1634.25	2293.1	1671.79	2289.3	1685.05	2287.7	1706.34
GR	2287.4	1739.52	2287.7	1785.34						
X1	50964	45	1049.63	1464.67	1310	1310	1310			
X3	10									
GR	2318.1	1000	2311.1	1013.78	2308.4	1031.27	2312.3	1049.63	2311.9	1069.23
GR	2297.2	1091.23	2295.3	1108.11	2296.1	1131.27	2293.6	1144.23	2293.1	1162.01
GR	2292.4	1169.11	2292.2	1186.62	2292.7	1193.19	2292.2	1217.33	2293	1227.27
GR	2292.9	1243.43	2291.4	1252.76	2292.4	1267.59	2292.6	1276.62	2296.2	1289.29
GR	2297.2	1306.89	2295.1	1321.97	2293.9	1339.43	2294.6	1349.87	2292.4	1365.53
GR	2293.5	1371.75	2293.9	1393.37	2292.4	1407.91	2292	1430.97	2292.4	1456.81

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GR   2313.4    1464.67    2312.3    1487.14    2305.1    1521.69    2305.2    1535.42    2308.6    1542.11
GR     2314    1575.52    2314.7    1599.55    2320.7    1634.21    2320.2    1664.36    2319.3     1708.3
GR   2319.7    1730.48    2319.9    1763.82    2319.5     1801.4    2319.2    1833.03    2316.9    1882.06
1
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X1   52020         23        1000    1368.67        1056        1056        1056
X3      10
GR   2326.2       1000      2320.6    1024.49      2310.9     1049.68      2302.6    1077.44      2300.5    1097.02
GR   2299.8    1114.55        2297    1124.84      2297.3     1134.36        2299    1144.48        2299    1184.46
GR     2298    1202.4       2297.3    1235.27      2299.1     1258.85      2299.4    1282.12      2298.4    1301.35
GR   2299.8    1315.61      2308.7    1338.21      2325.9     1368.67      2325.3    1395.58      2325.8    1411.94
GR   2325.9    1451.45      2325.9    1492.84      2326.2     1513.64

X1   53183         35      1023.46    1584.75        1163        1163        1163
X3      10
GR   2335.9       1000      2321.2    1009.35      2324.6     1023.46      2317.6    1030.59      2311.5    1051.21
GR   2310.6    1063.56      2311.1    1069.39      2309.9     1083.59      2310.8    1090.73      2310.4    1111.32
GR   2309.2    1118.92      2311.3    1128.82      2311.3     1174.74      2311.1    1214.76      2310.9    1246.96
GR   2309.7    1311.05      2309.2    1343.78        2309     1377.97      2306.5    1382.06      2309.5     1387.2
GR   2309.7    1398.02      2305.7    1410.17      2307.3     1422.56      2308.5    1435.3       2308.8    1459.21
GR   2308.7    1488.67      2310.5    1499.24      2315.8     1510.35        2325    1542.44      2329.4    1557.17
GR   2332.3    1572.24      2336.2    1584.75      2337.2     1606.24      2337.4    1626.09      2336.9    1659.02

X1   54519         59      1634.57    2040.91        1336        1336        1336
X3      10
GR   2341.7       1000      2344.5    1017.65      2344.3     1033.32      2344.9    1047.14        2336    1065.57
GR   2323.8    1098.95      2322.2    1127.07      2321.8     1162.12        2322       1197      2321.8     1204.3
GR   2322.6    1222.77      2323.8    1253.57      2324.6     1278.58      2328.9    1296.06      2326.7    1326.39
GR   2339.6    1338.01        2344    1360.82      2342.9     1384.17        2344    1406.09      2344.5    1422.52
GR   2343.6    1436.76      2344.4     1470.2      2343.6     1484.06      2345.7     1519.4      2345.7    1543.04
GR     2346    1568.82      2344.1    1591.74      2343.3     1602.9       2343.7    1623.39      2343.3    1634.57
GR   2326.1    1644.21      2319.9    1663.17      2319.4     1676.21      2319.7    1696.04      2318.8    1703.14
GR   2319.7    1711.21      2319.2     1735.5      2318.7     1749.97      2319.8    1765.72      2319.9    1779.36
GR     2319    1792.44        2319    1801.18      2317.9     1805.49      2318.9    1812.55      2319.5    1828.22
GR   2319.4    1856.87      2319.4    1901.62      2318.2     1911.73      2319.2    1916.64      2319.2    1935.72
GR   2327.8    1956.94      2345.4    1973.64      2344.9     1989.31      2346.3    1996.61      2345.7    2017.16
GR   2347.4    2040.91      2347.8    2058.42        2348     2081.27      2347.9     2107.8


X1   55570         23      1016.93    1551.34        1051        1051        1051
X3      10
GR   2356.2       1000        2356    1016.93      2337.6     1046.3       2331.8    1067.36        2331    1091.77
GR   2330.5    1139.87      2330.2    1187.66      2328.6     1236.66      2328.3    1283.38      2327.7    1319.99
GR   2327.3    1341.77      2326.8    1347.63      2327.1      1380.3      2325.3    1389.21      2326.8    1402.91
GR   2324.7    1415.77      2327.3    1426.84      2328.8     1472.84        2328    1489.71      2332.4    1511.96
GR     2338    1526.49      2349.3    1537.66      2354.2     1551.34

     SECTION CUT FROM UNLV DETENTION BASIN TOPO

X1   55870          8           0         660         300         300         300
GR    2350          0        2332         180      2326.7         200      2326.7         570        2332         585
GR    2334        625        2336         660        2338         682

     SECTION CUT FROM UNLV DETENTION BASIN TOPO
1
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X1   56010          7           0         770         140         140         140
X3                                                                 610
GR    2350          0        2334         134        2332         143      2328.9         150      2328.9         727
GR    2332        736        2350         770

     SECTION CUT FROM UNLV DETENTION BASIN TOPO

X1   56230          6           0         667         220         220         220
X3                                                                 630
GR    2350          0        2333          35      2332.5          40      2332.5         630        2333         633
GR    2350        667


NC                                          .3          .5
     SECTION 564+20 IS 67' D/S OF THE ULVW SPILLWAY
X1   56420          9          87         743         190         190         190
GR    2368          0        2364          26        2360          42        2352          60        2348          87
GR    2336        116      2334.3         121      2334.3         709        2348         743

X1   56487                                              67          67          67                    .67


1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *PROF 1
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CCHV=     .100 CEHV=     .300
*SECNO 28903.000
3720 CRITICAL DEPTH ASSUMED
 28903.000      5.52   2119.92   2119.92   2115.10   2122.13      2.21       .00       .00   2145.00
    2939.0        .0    2939.0        .0        .0     246.2        .0        .0        .0   2126.60
       .00       .00     11.94       .00      .000      .025      .000      .000   2114.40   1047.36
   .005975        0.        0.        0.         0        29         0       .00     56.27   1103.64


*SECNO 29486.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 29486.000      5.52   2124.34   2124.34       .00   2126.55      2.21      3.48       .00   2149.42
    2939.0        .0    2939.0        .0        .0     246.2        .0       3.3        .8   2131.02
       .01       .00     11.94       .00      .000      .025      .000      .000   2118.82   1047.36
   .005975       582.      582.      582.         2         5         0       .00     56.27   1103.64


*SECNO 30067.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000      5.52   2128.76   2128.76       .00   2130.97      2.21      3.48       .00   2153.84
    2939.0        .0    2939.0        .0        .0     246.2        .0       6.6       1.5   2135.44
       .01       .00     11.94       .00      .000      .025      .000      .000   2123.24   1047.36
   .005975       582.      582.      582.         2         5         0       .00     56.27   1103.64


*SECNO 30650.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000      5.57   2133.07   2133.07       .00   2135.30      2.24      3.47       .01   2145.00
    2939.0        .0    2939.0        .0        .0     244.9        .0       9.9       2.2   2145.00
       .04       .00     12.00       .00      .000      .025      .000      .000   2127.50   1037.21
   .005931       582.      582.      582.         2         5         0       .00     54.97   1092.19


CCHV=     .300 CEHV=     .500
1                                                                                                  PAGE    9
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000      5.55   2133.28   2133.28       .00   2135.53      2.25       .18       .01   2145.23
    2939.0        .0    2939.0        .0        .0     244.2        .0      10.0       2.3   2145.23
       .04       .00     12.03       .00      .000      .025      .000      .000   2127.73   1037.24
   .005975        30.       30.       30.         2         5         0       .00     54.93   1092.16


*SECNO 30765.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING.  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.91

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.90 ELREA=      2142.00

 30765.000      8.10   2136.00       .00       .00   2136.22       .23       .08       .61   2142.00
    2939.0        .0    2939.0        .0        .0     769.9        .0      11.0       2.5   2142.00
       .05       .00      3.82       .00      .000      .025      .000      .000   2127.90   1038.98
   .000192        85.       85.       85.         3         0         0       .00    129.85   1168.82


*SECNO 30935.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.34 ELREA=      2142.34

 30935.000      7.82   2136.06       .00       .00   2136.31       .25       .07       .01   2142.34
    2939.0        .0    2939.0        .0        .0     734.1        .0      14.0       3.0   2142.34
       .06       .00      4.00       .00      .000      .025      .000      .000   2128.24   1040.09
   .000448       170.      170.      170.         3         0         0       .00    127.63   1167.71


CCHV=     .100 CEHV=     .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED        .34 FEET

 31235.000      7.24   2136.34       .00       .00   2136.49       .15       .18       .01   2136.00
    2939.0        .1    2934.8       4.0        .4     943.6       7.9      19.8       4.1   2136.00
       .09       .32      3.11       .51      .040      .040      .040      .000   2129.10   1189.94
   .000809       300.      300.      300.         2         0         0       .00    210.06   1400.00
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300
*SECNO 31500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .35

31500.000	4.44	2136.44	.00	.00	2137.13	.69	.47	.16	2136.00
2939.0	.7	2922.9	15.4	.6	436.4	9.0	24.0	5.3	2136.00
.10	1.10	6.70	1.70	.040	.040	.040	.000	2132.00	1165.16
.006762	265.	265.	265.	2	0	0	.00	159.22	1324.38

*SECNO 32044.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	4.13	2141.63	2141.53	.00	2142.69	1.06	5.45	.11	2157.30
2939.0	.0	2939.0	.0	.0	355.0	.0	29.0	7.2	2157.30
.12	.00	8.28	.00	.000	.040	.000	.000	2137.50	1082.01
.016370	544.	544.	544.	15	11	0	.00	153.94	1262.08

*SECNO 33671.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	6.27	2159.27	.00	.00	2160.13	.85	17.41	.02	2176.20
2939.0	.0	2939.0	.0	.0	396.3	.0	43.0	12.1	2173.80
.18	.00	7.42	.00	.000	.040	.000	.000	2153.00	1259.46
.007539	1627.	1627.	1627.	6	0	0	.00	110.47	1369.93

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 35645.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	6.20	2175.70	.00	.00	2176.43	.73	16.29	.01	2191.90
2939.0	.0	2939.0	.0	.0	427.5	.0	61.7	18.2	2186.40
.26	.00	6.88	.00	.000	.040	.000	.000	2169.50	1102.76
.009076	1974.	1974.	1974.	5	0	0	.00	155.62	1258.38

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	5.84	2185.14	.00	.00	2185.64	.51	9.18	.02	2207.90
2939.0	.0	2939.0	.0	.0	515.3	.0	74.4	23.0	2207.60
.31	.00	5.70	.00	.000	.040	.000	.000	2179.30	1198.57
.006781	1177.	1177.	1177.	4	0	0	.00	200.92	1399.49

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	2.91	2199.01	.00	.00	2199.61	.61	13.94	.03	2224.10
2939.0	.0	2939.0	.0	.0	469.3	.0	92.4	31.1	2223.90
.38	.00	6.26	.00	.000	.040	.000	.000	2196.10	1100.24
.011813	1588.	1588.	1588.	4	0	0	.00	242.68	1342.92

*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	5.31	2208.31	.00	.00	2208.79	.48	9.16	.01	2233.60
2939.0	.0	2939.0	.0	.0	528.5	.0	105.1	36.7	2232.40

```
      .44       .00      5.56       .00      .000      .040      .000      .000   2203.00   1181.60
   .006097     1109.     1109.     1109.         5         0         0       .00    196.55   1378.15


 *SECNO 40616.000
1
    15APR98      13:31:06                                                                          PAGE   12

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .63

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2244.10 ELREA=      2235.50

  40616.000      4.46   2218.16       .00       .00   2218.89       .73     10.03       .07   2244.10
     2939.0        .0    2939.0        .0        .0     429.1        .0     117.2      42.1   2235.50
        .48       .00      6.85       .00      .000      .040      .000      .000   2213.70   1212.34
   .015189     1097.     1097.     1097.         2         0         0       .00    233.03   1445.36


 *SECNO 42138.000

 3265 DIVIDED FLOW

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2238.80 ELREA=      2254.30

  42138.000      6.15   2230.95       .00       .00   2231.25       .31     12.32       .04   2238.80
     2939.0        .0    2939.0        .0        .0     661.7        .0     136.2      51.4   2254.30
        .58       .00      4.44       .00      .000      .040      .000      .000   2224.80   1266.64
   .005022     1522.     1522.     1522.         6         0         0       .00    299.91   1646.40


 *SECNO 43231.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2261.00 ELREA=      2254.30

  43231.000      5.09   2238.79       .00       .00   2239.52       .72      8.14       .12   2261.00
     2939.0        .0    2939.0        .0        .0     431.0        .0     149.9      57.6   2254.30
        .62       .00      6.82       .00      .000      .040      .000      .000   2233.70   1235.39
   .012172     1093.     1093.     1093.         4         0         0       .00    198.28   1433.66


 *SECNO 44345.000
1
    15APR98      13:31:06                                                                          PAGE   13

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3265 DIVIDED FLOW

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2254.80 ELREA=      2265.40

  44345.000      5.44   2248.24       .00       .00   2248.80       .56      9.26       .02   2254.80
     2939.0        .0    2939.0        .0        .0     489.8        .0     161.7      62.2   2265.40
        .67       .00      6.00       .00      .000      .040      .000      .000   2242.80   1238.12
   .006037     1114.     1114.     1114.         3         0         0       .00    161.37   1458.08


 *SECNO 45725.000

 3265 DIVIDED FLOW

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2279.80 ELREA=      2276.30

  45725.000      4.83   2257.83       .00       .00   2258.27       .45      9.46       .01   2279.80
     2939.0        .0    2939.0        .0        .0     548.8        .0     178.1      69.0   2276.30
        .75       .00      5.36       .00      .000      .040      .000      .000   2253.00   1105.80
   .007859     1380.     1380.     1380.         5         0         0       .00    263.41   1412.58


 *SECNO 46746.000

 3265 DIVIDED FLOW
```

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2274.90 ELREA= 2273.20

46746.000	5.14	2263.94	.00	.00	2264.23	.28	5.94	.02	2274.90
2939.0	.0	2939.0	.0	.0	687.9	.0	192.6	75.6	2273.20
.81	.00	4.27	.00	.000	.040	.000	.000	2258.80	1154.44
.004478	1021.	1021.	1021.	5	0	0	.00	303.35	1515.21

*SECNO 48046.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	5.07	2271.97	.00	.00	2272.39	.41	8.12	.04	2288.70
2939.0	.0	2939.0	.0	.0	568.8	.0	211.4	85.0	2279.90
.88	.00	5.17	.00	.000	.040	.000	.000	2266.90	1105.59
.009316	1300.	1300.	1300.	2	0	0	.00	327.30	1432.89

*SECNO 49654.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	5.25	2286.35	2285.80	.00	2286.83	.48	14.43	.02	2308.10
2939.0	.0	2939.0	.0	.0	529.5	.0	231.7	95.8	2307.20
.96	.00	5.55	.00	.000	.040	.000	.000	2281.10	1070.19
.008645	1608.	1608.	1608.	11	10	0	.00	256.65	1400.06

*SECNO 50964.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	3.80	2295.20	.00	.00	2295.52	.32	8.68	.02	2312.30
2939.0	.0	2939.0	.0	.0	642.7	.0	249.3	104.0	2313.40
1.04	.00	4.57	.00	.000	.040	.000	.000	2291.40	1135.91
.005235	1310.	1310.	1310.	5	0	0	.00	286.52	1457.86

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	4.15	2301.15	.00	.00	2301.59	.44	6.04	.03	2326.20
2939.0	.0	2939.0	.0	.0	554.5	.0	263.8	110.2	2325.90
1.10	.00	5.30	.00	.000	.040	.000	.000	2297.00	1090.91
.006265	1056.	1056.	1056.	5	0	0	.00	228.14	1319.05

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 53183.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	5.36	2311.06	2310.66	.00	2311.52	.47	9.92	.01	2324.60
2939.0	.0	2939.0	.0	.0	536.8	.0	278.4	117.9	2336.20
1.16	.00	5.47	.00	.000	.040	.000	.000	2305.70	1058.28
.012299	1163.	1163.	1163.	13	11	0	.00	347.44	1500.41

*SECNO 54519.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.52

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	3.69	2321.59	.00	.00	2321.92	.33	10.38	.01	2343.30
2939.0	.0	2939.0	.0	.0	634.3	.0	296.3	127.6	2347.40

```
      1.24       .00      4.63       .00       .000       .040       .000       .000   2317.90   1658.01
   .005352     1336.      1336.      1336.          6          0          0        .00    283.60   1941.61


*SECNO 55570.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2356.00 ELREA=      2354.20

 55570.000      4.77   2329.47       .00        .00   2329.99        .53      8.02       .06   2356.00
    2939.0         .0    2939.0        .0         .0     503.4         .0     310.1     134.5    2354.20
      1.29       .00      5.84       .00       .000       .040       .000       .000   2324.70   1210.03
   .011734     1051.      1051.      1051.          4          0          0        .00    287.11   1497.14


*SECNO 55870.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.59

1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 55870.000      3.73   2330.43       .00        .00   2330.49        .07        .45        .05   2350.00
    2939.0         .0    2939.0        .0         .0    1426.2         .0     316.7     136.8    2336.00
      1.33       .00      2.06       .00       .000       .040       .000       .000   2326.70    185.92
   .000557      300.       300.       300.          3          0          0        .00    394.63    580.56


*SECNO 56010.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .29


3470 ENCROACHMENT STATIONS=          .0     610.0  TYPE=       1  TARGET=      609.999
 56010.000      1.58   2330.48       .00        .00   2330.73        .25        .19        .06   2350.00
    2939.0         .0    2939.0        .0         .0     731.1         .0     320.2     138.2  100000.00
      1.34       .00      4.02       .00       .000       .040       .000       .000   2328.90    146.43
   .006413      140.       140.       140.          3          0          0        .00    463.57    610.00


*SECNO 56230.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     630.0  TYPE=       1  TARGET=      629.999
 56230.000       .91   2333.41   2333.41        .00   2333.87        .46       2.46        .06   2350.00
    2939.0         .0    2939.0        .0         .0     541.9         .0     323.4     140.9  100000.00
      1.35       .00      5.42       .00       .000       .040       .000       .000   2332.50     34.15
   .024241      220.       220.       220.          4         11          0        .00    595.85    630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.07

 56420.000      1.42   2335.72       .00        .00   2335.91        .19       1.96        .08   2348.00
    2939.0         .0    2939.0        .0         .0     837.6         .0     326.4     143.5    2348.00
      1.36       .00      3.51       .00       .000       .040       .000       .000   2334.30     116.84
   .005669      190.       190.       190.          5          0          0        .00    595.68     712.51


*SECNO 56487.000
 56487.000      1.20   2336.17       .00        .00   2336.44        .27        .49        .04   2348.67
    2939.0         .0    2939.0        .0         .0     709.5         .0     327.6     144.4    2348.67
      1.37       .00      4.14       .00       .000       .040       .000       .000   2334.97     117.47
   .009832       67.        67.        67.          3          0          0        .00    594.51     711.98


T1       FEMA 50-YEAR HEC-2 ANALYSIS
1
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T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       MIDDLE NO. LAS VEGAS WASH

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                                                                            2121.5

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2                    -1

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
```

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROP 2
0

CCHV= .100 CEHV= .300
*SECNO 28903.000
3720 CRITICAL DEPTH ASSUMED

28903.000	8.91	2123.31	2123.31	2121.50	2126.65	3.35	.00	.00	2145.00
6751.0	.0	6751.0	.0	.0	459.9	.0	.0	.0	2126.60
.00	.00	14.68	.00	.000	.025	.000	.000	2114.40	1040.58
.005331	0.	0.	0.	0	10	0	.00	69.83	1110.42

*SECNO 29486.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

29486.000	8.93	2127.75	2127.75	.00	2131.07	3.33	3.09	.00	2149.42
6751.0	.0	6751.0	.0	.0	461.2	.0	6.2	.9	2131.02
.01	.00	14.64	.00	.000	.025	.000	.000	2118.82	1040.55
.005291	582.	582.	582.	3	5	0	.00	69.90	1110.45

*SECNO 30067.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

30067.000	8.92	2132.16	2132.16	.00	2135.49	3.33	3.08	.00	2153.84
6751.0	.0	6751.0	.0	.0	460.7	.0	12.3	1.9	2135.44
.02	.00	14.65	.00	.000	.025	.000	.000	2123.24	1040.56
.005306	582.	582.	582.	3	5	0	.00	69.87	1110.44

*SECNO 30650.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2144.00 ELREA= 2145.00

30650.000	9.03	2136.53	2136.53	.00	2139.91	3.38	3.08	.01	2145.00
6751.0	.0	6751.0	.0	.0	457.3	.0	18.5	2.8	2145.00
.03	.00	14.76	.00	.000	.025	.000	.000	2127.50	1030.77
.005271	582.	582.	582.	3	5	0	.00	67.85	1098.63

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2144.00 ELREA= 2145.23

30680.000	9.01	2136.74	2136.74	.00	2140.14	3.40	.16	.01	2145.23
6751.0	.0	6751.0	.0	.0	456.1	.0	18.8	2.8	2145.23
.03	.00	14.80	.00	.000	.025	.000	.000	2127.73	1030.81
.005312	30.	30.	30.	2	5	0	.00	67.78	1098.59

*SECNO 30765.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.03

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2142.90 ELREA= 2142.00

30765.000	12.91	2140.81	.00	.00	2141.13	.32	.07	.92	2142.00
6751.0	.0	6751.0	.0	.0	1487.2	.0	20.7	3.1	2142.00
.04	.00	4.54	.00	.000	.025	.000	.000	2127.90	1019.76
.000327	85.	85.	85.	3	0	0	.00	168.27	1188.04

*SECNO 30935.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2142.34 ELREA= 2142.34

30935.000	12.62	2140.86	.00	.00	2141.20	.34	.06	.01	2142.34
6751.0	.0	6751.0	.0	.0	1438.0	.0	26.4	3.7	2142.34
.05	.00	4.69	.00	.000	.025	.000	.000	2128.24	1020.94
.000359	170.	170.	170.	2	0	0	.00	165.92	1186.86

CCHV= .100 CEHV= .300
*SECNO 31235.000
3280 CROSS SECTION 31235.00 EXTENDED 5.16 FEET

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
31235.000	12.05	2141.16	.00	.00	2141.34	.18	.12	.02	2136.00
6751.0	125.9	6390.1	235.0	81.7	1833.9	118.6	38.3	5.1	2136.00
.07	1.54	3.48	1.98	.040	.040	.040	.000	2129.10	1157.60
.000419	300.	300.	300.	2	0	0	.00	242.40	1400.00

CCHV= .100 CEHV= .300
*SECNO 31500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

31500.000	9.17	2141.17	.00	.00	2141.59	.42	.18	.07	2136.00
6751.0	244.6	5815.7	690.7	86.8	1071.1	199.9	48.6	6.5	2136.00
.09	2.82	5.43	3.46	.040	.040	.040	.000	2132.00	1134.67
.001343	265.	265.	265.	2	0	0	.00	222.90	1357.57

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	5.72	2143.22	2143.22	.00	2144.92	1.70	1.76	.39	2157.30
6751.0	.0	6751.0	.0	.0	644.8	.0	61.1	9.1	2157.30
.10	.00	10.47	.00	.000	.040	.000	.000	2137.50	1078.71
.016259	544.	544.	544.	20	14	0	.00	195.24	1273.95

*SECNO 33671.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	8.69	2161.69	.00	.00	2163.06	1.37	18.10	.03	2176.20
6751.0	.0	6751.0	.0	.0	719.7	.0	86.6	15.6	2173.80
.15	.00	9.38	.00	.000	.040	.000	.000	2153.00	1257.73
.008091	1627.	1627.	1627.	5	0	0	.00	148.42	1406.15

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 35645.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	8.26	2177.76	.00	.00	2178.83	1.07	15.74	.03	2191.90
6751.0	.0	6751.0	.0	.0	813.0	.0	121.4	23.5	2186.40
.22	.00	8.30	.00	.000	.040	.000	.000	2169.50	1098.80
.007857	1974.	1974.	1974.	4	0	0	.00	200.09	1298.88

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	7.45	2186.75	.00	.00	2187.73	.98	8.89	.01	2207.90
6751.0	.0	6751.0	.0	.0	851.8	.0	143.8	29.0	2207.60
.26	.00	7.93	.00	.000	.040	.000	.000	2179.30	1191.18
.007268	1177.	1177.	1177.	3	0	0	.00	213.29	1404.47

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	4.32	2200.42	.00	.00	2201.46	1.04	13.71	.02	2224.10
6751.0	.0	6751.0	.0	.0	825.3	.0	174.4	37.7	2223.90
.31	.00	8.18	.00	.000	.040	.000	.000	2196.10	1087.10
.010430	1588.	1588.	1588.	4	0	0	.00	260.06	1347.15

*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	6.89	2209.89	.00	.00	2210.89	.99	9.42	.00	2233.60
6751.0	.0	6751.0	.0	.0	844.6	.0	195.7	43.6	2232.40
.35	.00	7.99	.00	.000	.040	.000	.000	2203.00	1177.14
.007050	1109.	1109.	1109.	4	0	0	.00	202.28	1379.42

*SECNO 40616.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2244.10 ELREA= 2235.50

40616.000	5.95	2219.65	.00	.00	2220.77	1.13	9.85	.04	2244.10
6751.0	.0	6751.0	.0	.0	792.8	.0	216.3	49.3	2235.50
.39	.00	8.52	.00	.000	.040	.000	.000	2213.70	1192.24
.011819	1097.	1097.	1097.	3	0	0	.00	257.12	1449.36

*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2238.80 ELREA= 2254.30

42138.000	7.53	2232.33	.00	.00	2232.85	.52	12.01	.06	2238.80
6751.0	.0	6751.0	.0	.0	1171.2	.0	250.6	60.7	2254.30
.46	.00	5.76	.00	.000	.040	.000	.000	2224.80	1260.40
.005641	1522.	1522.	1522.	5	0	0	.00	392.09	1652.49

*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2261.00 ELREA= 2254.30

43231.000	6.68	2240.38	.00	.00	2241.50	1.12	8.47	.18	2261.00
6751.0	.0	6751.0	.0	.0	794.8	.0	275.3	68.7	2254.30
.49	.00	8.49	.00	.000	.040	.000	.000	2233.70	1186.11
.011305	1093.	1093.	1093.	4	0	0	.00	248.61	1434.72

*SECNO 44345.000

3265 DIVIDED FLOW

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2254.80 ELREA= 2265.40

44345.000	7.34	2250.14	.00	.00	2251.20	1.06	9.70	.01	2254.80
6751.0	.0	6751.0	.0	.0	815.5	.0	295.9	74.2	2265.40
.53	.00	8.28	.00	.000	.040	.000	.000	2242.80	1233.22
.006912	1114.	1114.	1114.	3	0	0	.00	182.21	1460.44

*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2279.80 ELREA= 2276.30

45725.000	6.54	2259.54	.00	.00	2260.09	.55	8.83	.05	2279.80
6751.0	.0	6751.0	.0	.0	1136.0	.0	326.8	83.1	2276.30
.60	.00	5.94	.00	.000	.040	.000	.000	2253.00	1040.08
.005961	1380.	1380.	1380.	5	0	0	.00	378.45	1418.52

*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2274.90 ELREA= 2273.20

46746.000	6.54	2265.34	.00	.00	2265.83	.49	5.74	.01	2274.90
6751.0	.0	6751.0	.0	.0	1203.9	.0	354.2	92.3	2273.20
.65	.00	5.61	.00	.000	.040	.000	.000	2258.80	1115.52
.005320	1021.	1021.	1021.	4	0	0	.00	401.99	1517.51

*SECNO 48046.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	6.41	2273.31	.00	.00	2273.99	.69	8.11	.06	2288.70
6751.0	.0	6751.0	.0	.0	1014.7	.0	387.3	103.3	2279.90
.70	.00	6.65	.00	.000	.040	.000	.000	2266.90	1098.81
.007411	1300.	1300.	1300.	4	0	0	.00	336.05	1434.87

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 49654.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	6.48	2287.58	2287.13	.00	2288.45	.88	14.40	.06	2308.10
6751.0	.0	6751.0	.0	.0	899.0	.0	422.6	115.6	2307.20
.76	.00	7.51	.00	.000	.040	.000	.000	2281.10	1068.51
.011045	1608.	1608.	1608.	15	11	0	.00	332.61	1401.12

*SECNO 50964.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	5.53	2296.93	.00	.00	2297.42	.49	8.92	.04	2312.30
6751.0	.0	6751.0	.0	.0	1203.1	.0	454.2	126.0	2313.40
.83	.00	5.61	.00	.000	.040	.000	.000	2291.40	1093.64
.004616	1310.	1310.	1310.	5	0	0	.00	358.16	1458.51

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	5.64	2302.64	.00	.00	2303.50	.86	5.97	.11	2326.20
6751.0	.0	6751.0	.0	.0	906.8	.0	479.8	133.3	2325.90
.87	.00	7.45	.00	.000	.040	.000	.000	2297.00	1077.30
.007088	1056.	1056.	1056.	3	0	0	.00	245.52	1322.83

*SECNO 53183.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	6.58	2312.28	2311.77	.00	2312.90	.62	9.38	.02	2324.60
6751.0	.0	6751.0	.0	.0	1069.8	.0	506.2	142.6	2336.20
.92	.00	6.31	.00	.000	.040	.000	.000	2305.70	1050.30
.009259	1163.	1163.	1163.	7	8	0	.00	452.68	1502.98

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 54519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	4.89	2322.79	.00	.00	2323.53	.74	10.59	.04	2343.30
6751.0	.0	6751.0	.0	.0	979.2	.0	537.6	154.0	2347.40
.97	.00	6.89	.00	.000	.040	.000	.000	2317.90	1654.33
.006862	1336.	1336.	1336.	4	0	0	.00	290.24	1944.58

*SECNO 55570.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	6.36	2331.06	.00	.00	2331.71	.65	8.17	.01	2356.00
6751.0	.0	6751.0	.0	.0	1044.4	.0	562.0	162.5	2354.20
1.02	.00	6.46	.00	.000	.040	.000	.000	2324.70	1089.82
.008887	1051.	1051.	1051.	3	0	0	.00	415.39	1505.20

*SECNO 55870.000

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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.30

 55870.000      5.48   2332.18       .00       .00   2332.34       .16       .58       .05   2350.00
    6751.0        .0    6751.0        .0        .0    2127.8        .0     572.9     165.4   2336.00
      1.04       .00      3.17       .00      .000      .040      .000      .000   2326.70    178.18
   .000817      300.      300.      300.         3         0         0       .00    410.45    588.63


*SECNO 56010.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .55


3470 ENCROACHMENT STATIONS=          .0     610.0  TYPE=       1  TARGET=      609.999
 56010.000      3.38   2332.28       .00       .00   2332.57       .29       .19       .04   2350.00
    6751.0        .0    6751.0        .0        .0    1570.1        .0     578.9     166.8 100000.00
      1.05       .00      4.30       .00      .000      .040      .000      .000   2328.90    141.72
   .002700      140.      140.      140.         2         0         0       .00    468.28    610.00


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     630.0  TYPE=       1  TARGET=      629.999
 56230.000      1.59   2334.09   2334.09       .00   2334.88       .79      1.27       .15   2350.00
    6751.0        .0    6751.0        .0        .0     946.7        .0     585.2     169.5 100000.00
      1.06       .00      7.13       .00      .000      .040      .000      .000   2332.50     32.75
   .020022      220.      220.      220.        20        11         0       .00    597.25    630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.79

 56420.000      2.26   2336.56       .00       .00   2336.95       .39      1.95       .12   2348.00
    6751.0        .0    6751.0        .0        .0    1346.0        .0     590.2     172.1   2348.00
      1.07       .00      5.02       .00      .000      .040      .000      .000   2334.30    114.63
   .006218      190.      190.      190.         3         0         0       .00    599.99    714.62


*SECNO 56487.000
 56487.000      2.04   2337.01       .00       .00   2337.49       .48       .49       .05   2348.67
    6751.0        .0    6751.0        .0        .0    1208.0        .0     592.2     173.0   2348.67
      1.07       .00      5.59       .00      .000      .040      .000      .000   2334.97    115.19
   .008893       67.       67.       67.         3         0         0       .00    598.86    714.05


T1       FEMA 100-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       MIDDLE NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                 4                                                                          2125.0

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      3                    -1

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 3
0

 CCHV=      .100 CEHV=      .300
 *SECNO 28903.000
  28903.000     10.60   2125.00       .00   2125.00   2128.17      3.17       .00       .00   2145.00
     8343.0        .0    8343.0        .0        .0     583.8        .0        .0        .0   2126.60
        .00       .00     14.29       .00      .000      .025      .000      .000   2114.40   1037.20
    .004186        0.        0.        0.         0         0         0       .00     76.60   1113.80


 *SECNO 29486.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
 29486.000      10.08    2128.90    2128.90        .00    2132.55       3.65       2.68        .14    2149.42
    8343.0         .0     8343.0         .0         .0     544.4          .0        7.5        1.0    2131.02
       .01        .00      15.33        .00        .000      .025       .000       .000    2118.82    1038.24
   .005085       582.       582.       582.         20          8          0        .00      74.51    1112.76


*SECNO 30067.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000      10.04    2133.28    2133.28        .00    2136.97       3.69       2.98        .01    2153.84
    8343.0         .0     8343.0         .0         .0     541.2          .0       14.8        2.0    2135.44
       .02        .00      15.41        .00        .000      .025       .000       .000    2123.24    1038.33
   .005167       582.       582.       582.         20          5          0        .00      74.34    1112.67


*SECNO 30650.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000      10.17    2137.67    2137.67        .00    2141.41       3.74       2.99        .01    2145.00
    8343.0         .0     8343.0         .0         .0     537.7          .0       22.0        3.0    2145.00
       .03        .00      15.52        .00        .000      .025       .000       .000    2127.50    1028.64
   .005119       582.       582.       582.         20          5          0        .00      72.12    1100.76


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000      10.14    2137.87    2137.87        .00    2141.64       3.77        .15        .01    2145.23
    8343.0         .0     8343.0         .0         .0     535.6          .0       22.4        3.0    2145.23
       .03        .00      15.58        .00        .000      .025       .000       .000    2127.73    1028.69
   .005172        30.        30.        30.          2          5          0        .00      72.02    1100.71


*SECNO 30765.000
3280 CROSS SECTION  30765.00 EXTENDED        .37 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.10


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.90 ELREA=      2142.00

 30765.000      14.47    2142.37        .00        .00    2142.73        .37        .07       1.02    2142.00
    8537.0         .0     8537.0         .0         .0    1758.7          .0       24.6        3.3    2142.00
       .04        .00       4.85        .00        .000      .025       .000       .000    2127.90    1015.00
   .000323         85.        85.        85.          4          0          0        .00     177.80    1192.80


*SECNO 30935.000

3265 DIVIDED FLOW

3280 CROSS SECTION  30935.00 EXTENDED        .17 FEET

 30935.000      14.27    2142.51        .00        .00    2142.80        .30        .05        .02    2142.34
    8537.0      768.6     7768.4         .0      319.6     1723.8          .0       32.0        4.3    2142.34
       .05       2.41       4.51        .00        .025      .025       .000       .000    2128.24     721.20
   .000285        170.       170.       170.          2          0          0        .00     328.78    1192.80


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED       6.71 FEET

 31235.000      13.61    2142.71        .00        .00    2142.91        .21        .10        .01    2136.00
    8537.0      262.6     7931.9      342.5      146.0     2121.0      154.3       47.4        6.3    2136.00
```

.07	1.80	3.74	2.22	.040	.040	.040	.000	2129.10	1143.63
.000397	300.	300.	300.	2	0	0	.00	256.37	1400.00

CCHV= .100 CEHV= .300
*SECNO 31500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

31500.000	10.72	2142.72	.00	.00	2143.14	.42	.16	.06	2136.00
8537.0	452.9	7003.0	1081.2	146.0	1278.8	291.8	60.0	7.8	2136.00
.09	3.10	5.48	3.71	.040	.040	.040	.000	2132.00	1124.98
.001078	265.	265.	265.	2	0	0	.00	239.95	1364.93

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	6.30	2143.80	2143.80	.00	2145.76	1.96	1.47	.46	2157.30
8537.0	.0	8537.0	.0	.0	760.0	.0	75.5	10.5	2157.30
.10	.00	11.23	.00	.000	.040	.000	.000	2137.50	1077.50
.015617	544.	544.	544.	20	14	0	.00	200.79	1278.29

*SECNO 33671.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	9.42	2162.42	.00	.00	2164.06	1.64	18.27	.03	2176.20
8537.0	.0	8537.0	.0	.0	831.2	.0	105.2	17.2	2173.80
.14	.00	10.27	.00	.000	.040	.000	.000	2153.00	1257.20
.008461	1627.	1627.	1627.	5	0	0	.00	154.49	1411.69

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 35645.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	9.00	2178.50	.00	.00	2179.72	1.22	15.61	.04	2191.90
8537.0	.0	8537.0	.0	.0	963.8	.0	145.8	25.3	2186.40
.20	.00	8.86	.00	.000	.040	.000	.000	2169.50	1097.37
.007410	1974.	1974.	1974.	5	0	0	.00	205.91	1303.28

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	8.04	2187.34	.00	.00	2188.52	1.18	8.80	.00	2207.90
8537.0	.0	8537.0	.0	.0	978.0	.0	172.1	31.1	2207.60
.24	.00	8.73	.00	.000	.040	.000	.000	2179.30	1188.52
.007544	1177.	1177.	1177.	3	0	0	.00	217.74	1406.26

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	4.90	2201.00	.00	.00	2202.19	1.19	13.67	.00	2224.10
8537.0	.0	8537.0	.0	.0	975.2	.0	207.7	39.9	2223.90
.29	.00	8.75	.00	.000	.040	.000	.000	2196.10	1081.81
.009910	1588.	1588.	1588.	3	0	0	.00	267.04	1348.85

*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	7.46	2210.46	.00	.00	2211.69	1.23	9.49	.01	2233.60
8537.0	.0	8537.0	.0	.0	960.5	.0	232.3	45.9	2232.40
.33	.00	8.89	.00	.000	.040	.000	.000	2203.00	1175.53
.007459	1109.	1109.	1109.	3	0	0	.00	204.34	1379.88

*SECNO 40616.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2244.10 ELREA= 2235.50

40616.000	6.52	2220.22	.00	.00	2221.50	1.28	9.80	.02	2244.10
8537.0	.0	8537.0	.0	.0	939.7	.0	256.2	51.7	2235.50
.36	.00	9.08	.00	.000	.040	.000	.000	2213.70	1191.00
.010889	1097.	1097.	1097.	3	0	0	.00	259.89	1450.89

*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2238.80 ELREA= 2254.30

42138.000	7.95	2232.75	.00	.00	2233.38	.63	11.82	.07	2238.80
8537.0	.0	8537.0	.0	.0	1341.1	.0	296.1	63.2	2254.30
.43	.00	6.37	.00	.000	.040	.000	.000	2224.80	1258.46
.005813	1522.	1522.	1522.	5	0	0	.00	395.56	1654.02

*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2261.00 ELREA= 2254.30

43231.000	7.20	2240.90	.00	.00	2242.21	1.31	8.62	.21	2261.00
8537.0	.0	8537.0	.0	.0	928.0	.0	324.6	71.4	2254.30
.46	.00	9.20	.00	.000	.040	.000	.000	2233.70	1177.60
.011309	1093.	1093.	1093.	3	0	0	.00	257.47	1435.07

*SECNO 44345.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2254.80 ELREA= 2265.40

44345.000	8.03	2250.83	.00	.00	2252.09	1.26	9.88	.00	2254.80
8537.0	.0	8537.0	.0	.0	946.1	.0	348.5	77.1	2265.40
.49	.00	9.02	.00	.000	.040	.000	.000	2242.80	1231.41
.007140	1114.	1114.	1114.	5	0	0	.00	189.93	1461.31

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2279.80 ELREA= 2276.30

45725.000	7.10	2260.10	.00	.00	2260.72	.62	8.56	.06	2279.80
8537.0	.0	8537.0	.0	.0	1147.2	.0	384.8	86.2	2276.30
.55	.00	6.34	.00	.000	.040	.000	.000	2253.00	1038.98
.005444	1380.	1380.	1380.	6	0	0	.00	381.47	1420.45

*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2274.90 ELREA= 2273.20

46746.000	6.97	2265.77	.00	.00	2266.36	.60	5.64	.00	2274.90
8537.0	.0	8537.0	.0	.0	1378.0	.0	416.8	95.5	2273.20
.60	.00	6.20	.00	.000	.040	.000	.000	2258.80	1106.42
.005601	1021.	1021.	1021.	4	0	0	.00	411.79	1518.22

*SECNO 48046.000
3280 CROSS SECTION 48046.00 EXTENDED .42 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	6.91	2273.81	.00	.00	2274.62	.81	8.19	.06	2288.70
8537.0	.0	8537.0	.0	.0	1184.6	.0	455.0	106.7	2279.90
.65	.00	7.21	.00	.000	.040	.000	.000	2266.90	1097.51
.007138	1300.	1300.	1300.	4	0	0	.00	338.10	1435.61

*SECNO 49654.000
3280 CROSS SECTION 49654.00 EXTENDED .26 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	6.86	2287.96	2287.67	.00	2289.03	1.08	14.34	.08	2308.10
8537.0	.0	8537.0	.0	.0	1025.2	.0	495.8	119.0	2307.20
.70	.00	8.33	.00	.000	.040	.000	.000	2281.10	1067.99
.011451	1608.	1608.	1608.	14	10	0	.00	333.46	1401.45

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 50964.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.59

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	6.08	2297.48	.00	.00	2298.05	.57	8.97	.05	2312.30
8537.0	.0	8537.0	.0	.0	1406.7	.0	532.4	129.6	2313.40
.76	.00	6.07	.00	.000	.040	.000	.000	2291.40	1090.80
.004550	1310.	1310.	1310.	5	0	0	.00	367.91	1458.71

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	6.17	2303.17	.00	.00	2304.22	1.05	6.02	.14	2326.20
8537.0	.0	8537.0	.0	.0	1037.5	.0	562.0	137.1	2325.90
.80	.00	8.23	.00	.000	.040	.000	.000	2297.00	1075.53
.007363	1056.	1056.	1056.	3	0	0	.00	248.64	1324.17

*SECNO 53183.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	7.02	2312.72	.00	.00	2313.43	.70	9.17	.03	2324.60
8537.0	.0	8537.0	.0	.0	1268.2	.0	592.8	146.5	2336.20
.85	.00	6.73	.00	.000	.040	.000	.000	2305.70	1048.68
.008464	1163.	1163.	1163.	5	0	0	.00	455.22	1503.90

*SECNO 54519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	5.31	2323.21	.00	.00	2324.14	.93	10.64	.07	2343.30
8537.0	.0	8537.0	.0	.0	1100.7	.0	629.1	157.9	2347.40
.90	.00	7.76	.00	.000	.040	.000	.000	2317.90	1653.06
.007513	1336.	1336.	1336.	3	0	0	.00	292.55	1945.61

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55570.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	6.88	2331.58	.00	.00	2332.29	.71	8.13	.02	2356.00
8537.0	.0	8537.0	.0	.0	1264.5	.0	657.6	166.7	2354.20
.94	.00	6.75	.00	.000	.040	.000	.000	2324.70	1074.00
.007961	1051.	1051.	1051.	2	0	0	.00	433.82	1507.83

*SECNO 55870.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.88

55870.000	6.07	2332.77	.00	.00	2332.97	.20	.63	.05	2350.00
8537.0	.0	8537.0	.0	.0	2375.9	.0	670.2	169.7	2336.00
.96	.00	3.59	.00	.000	.040	.000	.000	2326.70	172.27
.000957	300.	300.	300.	3	0	0	.00	428.20	600.46

*SECNO 56010.000

```
3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62


3470 ENCROACHMENT STATIONS=          .0     610.0  TYPE=      1  TARGET=      609.999
 56010.000      3.99   2332.89       .00       .00   2333.22       .33       .20       .04   2350.00
    8537.0        .0    8537.0        .0        .0    1854.7        .0     677.0     171.1 100000.00
       .97       .00      4.60       .00      .000      .040      .000      .000   2328.90    138.99
   .002502       140.      140.      140.         2         0         0       .00    471.01    610.00


*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1                                                                                          PAGE   35
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=          .0     630.0  TYPE=      1  TARGET=      629.999
 56230.000      1.85   2334.35   2334.35       .00   2335.28       .93      1.19       .18   2350.00
    8537.0        .0    8537.0        .0        .0    1103.3        .0     684.5     173.8 100000.00
       .98       .00      7.74       .00      .000      .040      .000      .000   2332.50     32.21
   .019253       220.      220.      220.        20        14         0       .00    597.79    630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

 56420.000      2.59   2336.89       .00       .00   2337.36       .48      1.95       .14   2348.00
    8537.0        .0    8537.0        .0        .0    1542.1        .0     690.2     176.4   2348.00
       .99       .00      5.54       .00      .000      .040      .000      .000   2334.30    113.84
   .006342       190.      190.      190.         3         0         0       .00    601.59    715.43


*SECNO 56487.000
 56487.000      2.36   2337.33       .00       .00   2337.91       .57       .49       .05   2348.67
    8537.0        .0    8537.0        .0        .0    1404.2        .0     692.5     177.3   2348.67
       .99       .00      6.08       .00      .000      .040      .000      .000   2334.97    114.40
   .008644        67.       67.       67.         3         0         0       .00    600.46    714.86


T1       FEMA 500-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       MIDDLE NO. LAS VEGAS WASH

J1   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                  5                                                                   2129.0

J2   NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

        4                   -1



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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 4
0

 CCHV=      .100 CEHV=      .300
 *SECNO 28903.000
  28903.000     14.60   2129.00       .00   2129.00   2131.22      2.22       .00       .00   2145.00
    11017.0        .0   10983.5      33.5        .0     916.7      11.5        .0        .0   2126.60
       .00       .00     11.98      2.91      .000      .025      .025      .000   2114.40   1029.27
   .001952         0.        0.        0.         0         0         0       .00     97.43   1126.70


 *SECNO 29486.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  29486.000     11.70   2130.52   2130.52       .00   2134.71      4.20      1.72       .59   2149.42
    11017.0        .0   11017.0        .0        .0     670.2        .0      10.7       1.2   2131.02
       .01       .00     16.44       .00      .000      .025      .000      .000   2118.82   1035.01
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   .004980      582.      582.      582.       20        15         0       .00     80.99   1115.99


*SECNO 30067.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000     11.71   2134.95   2134.95       .00   2139.13      4.18      2.89       .00   2153.84
   11017.0        .0   11017.0        .0        .0     671.4        .0      19.6       2.3   2135.44
       .02       .00     16.41       .00      .000      .025      .000      .000   2123.24   1034.98
   .004958      582.      582.      582.       20         5         0       .00     81.04   1116.02


*SECNO 30650.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000     11.87   2139.37   2139.37       .00   2143.63      4.25      2.88       .02   2145.00
   11017.0        .0   11017.0        .0        .0     665.6        .0      28.6       3.3   2145.00
       .03       .00     16.55       .00      .000      .025      .000      .000   2127.50   1025.47
   .004933      582.      582.      582.       20         5         0       .00     78.45   1103.93


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000     11.84   2139.57   2139.57       .00   2143.86      4.29       .15       .02   2145.23
   11017.0        .0   11017.0        .0        .0     662.8        .0      29.0       3.4   2145.23
       .03       .00     16.62       .00      .000      .025      .000      .000   2127.73   1025.54
   .004992       30.       30.       30.         2         5         0       .00     78.32   1103.86


*SECNO 30765.000
3280 CROSS SECTION  30765.00 EXTENDED      2.21 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.84

 30765.000     16.31   2144.21       .00       .00   2145.00       .79       .09      1.05   2142.00
   19217.0   3247.0    15970.0        .0     901.8     2086.6        .0      32.6       4.0   2142.00
       .03      3.60       7.65       .00      .025      .025      .000      .000   2127.90    682.29
   .000648       85.       85.       85.         6         0         0       .00     510.51   1192.80


*SECNO 30935.000
3280 CROSS SECTION  30935.00 EXTENDED      1.95 FEET

 30935.000     16.05   2144.29       .00       .00   2145.15       .86       .12       .03   2142.34
   19217.0   3010.9    16206.1        .0     817.1     2040.6        .0      44.0       5.9   2142.34
       .04      3.68       7.94       .00      .025      .025      .000      .000   2128.24    691.80
   .000717      170.      170.      170.         3         0         0       .00     501.00   1192.80


CCHV=      .100 CEHV=      .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED      8.72 FEET

 31235.000     15.62   2144.72       .00       .00   2145.43       .71       .27       .02   2136.00
   19217.0      953.0    17412.5     851.5     275.2     2494.1     200.6      64.1       8.7   2136.00
       .05      3.46       6.98      4.24      .040      .040      .040      .000   2129.10   1088.57
   .001115      300.      300.      300.         2         0         0       .00     311.43   1400.00


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 31500.000

3301 HV CHANGED MORE THAN HVINS
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3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

31500.000	12.77	2144.77	.00	.00	2146.02	1.24	.43	.16	2136.00
19217.0	1429.8	14864.1	2923.1	249.6	1554.0	432.9	79.9	10.5	2136.00
.06	5.73	9.57	6.75	.040	.040	.040	.000	2132.00	1106.72
.002537	265.	265.	265.	2	0	0	.00	272.96	1379.67

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	9.09	2146.59	2146.59	.00	2149.45	2.86	2.70	.48	2157.30
19217.0	.0	19217.0	.0	.0	1416.4	.0	102.7	13.8	2157.30
.07	.00	13.57	.00	.000	.040	.000	.000	2137.50	1071.72
.013710	544.	544.	544.	3	19	0	.00	255.02	1326.73

*SECNO 33671.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	12.51	2165.51	.00	.00	2168.74	3.23	19.18	.11	2176.20
19217.0	.0	19217.0	.0	.0	1333.2	.0	154.1	21.8	2173.80
.10	.00	14.41	.00	.000	.040	.000	.000	2153.00	1255.00
.010244	1627.	1627.	1627.	5	0	0	.00	170.69	1425.68

*SECNO 35645.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	12.61	2182.11	.00	.00	2183.98	1.87	15.11	.14	2191.90
19217.0	.0	19217.0	.0	.0	1751.2	.0	224.0	30.8	2186.40
.15	.00	10.97	.00	.000	.040	.000	.000	2169.50	1090.40
.005935	1974.	1974.	1974.	5	0	0	.00	228.80	1319.20

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	10.74	2190.04	.00	.00	2192.32	2.28	8.22	.12	2207.90
19217.0	.0	19217.0	.0	.0	1585.2	.0	269.0	37.0	2207.60
.18	.00	12.12	.00	.000	.040	.000	.000	2179.30	1183.36
.008328	1177.	1177.	1177.	2	0	0	.00	231.16	1414.53

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	7.56	2203.66	.00	.00	2205.61	1.96	13.26	.03	2224.10
19217.0	.0	19217.0	.0	.0	1712.6	.0	329.1	46.4	2223.90
.22	.00	11.22	.00	.000	.040	.000	.000	2196.10	1073.32
.008369	1588.	1588.	1588.	3	0	0	.00	283.47	1356.79

*SECNO 39519.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	10.00	2213.00	.00	.00	2215.58	2.58	9.78	.19	2233.60
19217.0	.0	19217.0	.0	.0	1489.6	.0	369.9	52.7	2232.40
.24	.00	12.90	.00	.000	.040	.000	.000	2203.00	1169.58
.009304	1109.	1109.	1109.	2	0	0	.00	212.32	1381.91

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 40616.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2244.10 ELREA= 2235.50

40616.000	9.43	2223.13	.00	.00	2225.07	1.94	9.43	.06	2244.10
19217.0	.0	19217.0	.0	.0	1718.4	.0	410.3	58.8	2235.50
.27	.00	11.18	.00	.000	.040	.000	.000	2213.70	1184.65
.007962	1097.	1097.	1097.	3	0	0	.00	274.11	1458.75

*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2238.80 ELREA= 2254.30

42138.000	9.98	2234.78	.00	.00	2236.01	1.21	10.87	.07	2238.80
19217.0	.0	19217.0	.0	.0	2157.5	.0	478.0	70.9	2254.30
.32	.00	8.91	.00	.000	.040	.000	.000	2224.80	1246.25
.006442	1522.	1522.	1522.	4	0	0	.00	414.94	1661.19

*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2261.00 ELREA= 2254.30

43231.000	9.51	2243.21	.00	.00	2245.58	2.37	9.23	.34	2261.00
19217.0	.0	19217.0	.0	.0	1555.8	.0	524.6	79.6	2254.30
.34	.00	12.35	.00	.000	.040	.000	.000	2233.70	1156.06
.011536	1093.	1093.	1093.	3	0	0	.00	280.56	1436.62

*SECNO 44345.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2254.80 ELREA= 2265.40

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
44345.000	11.14	2253.94	.00	.00	2256.02	2.09	10.41	.03	2254.80
19217.0	.0	19217.0	.0	.0	1657.8	.0	565.7	86.3	2265.40
.37	.00	11.59	.00	.000	.040	.000	.000	2242.80	1223.42
.007727	1114.	1114.	1114.	3	0	0	.00	241.75	1465.17

*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2279.80 ELREA= 2276.30

45725.000	9.82	2262.82	.00	.00	2263.81	.99	7.68	.11	2279.80
19217.0	.0	19217.0	.0	.0	2408.2	.0	630.1	96.4	2276.30
.42	.00	7.98	.00	.000	.040	.000	.000	2253.00	1033.58
.004200	1380.	1380.	1380.	3	0	0	.00	396.31	1429.89

*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2274.90 ELREA= 2273.20

46746.000	9.00	2267.80	.00	.00	2268.95	1.14	5.09	.05	2274.90
19217.0	.0	19217.0	.0	.0	2238.4	.0	684.6	106.1	2273.20
.45	.00	8.59	.00	.000	.040	.000	.000	2258.80	1090.33
.006001	1021.	1021.	1021.	3	0	0	.00	431.23	1521.56

*SECNO 48046.000
3280 CROSS SECTION 48046.00 EXTENDED 2.65 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	9.15	2276.05	.00	.00	2277.56	1.51	8.50	.11	2288.70
19217.0	.0	19217.0	.0	.0	1949.1	.0	747.0	117.7	2279.90
.49	.00	9.86	.00	.000	.040	.000	.000	2266.90	1091.75
.007153	1300.	1300.	1300.	4	0	0	.00	347.15	1438.90

*SECNO 49654.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 49654.00 EXTENDED 2.24 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	8.84	2289.94	.00	.00	2291.95	2.01	14.24	.15	2308.10
19217.0	.0	19217.0	.0	.0	1688.9	.0	814.2	130.4	2307.20
.53	.00	11.38	.00	.000	.040	.000	.000	2281.10	1065.28
.011248	1608.	1608.	1608.	4	0	0	.00	337.88	1403.15

*SECNO 50964.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.57

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	8.50	2299.90	.00	.00	2300.99	1.08	8.95	.09	2312.30
19217.0	.0	19217.0	.0	.0	2300.6	.0	874.2	141.0	2313.40
.57	.00	8.35	.00	.000	.040	.000	.000	2291.40	1087.19
.004584	1310.	1310.	1310.	4	0	0	.00	372.43	1459.62

*SECNO 52020.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	8.61	2305.61	.00	.00	2307.69	2.08	6.40	.30	2326.20
19217.0	.0	19217.0	.0	.0	1661.8	.0	922.2	148.7	2325.90
.60	.00	11.56	.00	.000	.040	.000	.000	2297.00	1067.37
.008393	1056.	1056.	1056.	3	0	0	.00	263.00	1330.37

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 53183.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	9.27	2314.97	.00	.00	2316.05	1.08	8.26	.10	2324.60
19217.0	.0	19217.0	.0	.0	2305.3	.0	975.2	158.5	2336.20
.63	.00	8.34	.00	.000	.040	.000	.000	2305.70	1040.35
.006087	1163.	1163.	1163.	5	0	0	.00	468.26	1508.61

*SECNO 54519.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	7.03	2324.93	.00	.00	2327.13	2.20	10.74	.34	2343.30
19217.0	.0	19217.0	.0	.0	1614.4	.0	1035.3	170.3	2347.40
.67	.00	11.90	.00	.000	.040	.000	.000	2317.90	1647.77
.011110	1336.	1336.	1336.	2	0	0	.00	302.10	1949.87

*SECNO 55570.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.44

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	9.34	2334.04	.00	.00	2335.06	1.02	7.82	.12	2356.00
19217.0	.0	19217.0	.0	.0	2370.7	.0	1083.3	179.5	2354.20
.70	.00	8.11	.00	.000	.040	.000	.000	2324.70	1059.20
.005331	1051.	1051.	1051.	2	0	0	.00	457.03	1516.23

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55870.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.90

55870.000	8.75	2335.45	.00	.00	2335.88	.44	.76	.06	2350.00
19217.0	.0	19217.0	.0	.0	3628.3	.0	1104.0	182.8	2336.00
.72	.00	5.30	.00	.000	.040	.000	.000	2326.70	145.47
.001473	300.	300.	300.	2	0	0	.00	504.95	650.42

*SECNO 56010.000

3470 ENCROACHMENT STATIONS= .0 610.0 TYPE= 1 TARGET= 609.999

56010.000	6.70	2335.60	.00	.00	2336.18	.58	.25	.04	2350.00
19217.0	.0	19217.0	.0	.0	3154.3	.0	1114.9	184.4	100000.00
.72	.00	6.09	.00	.000	.040	.000	.000	2328.90	120.56
.002289	140.	140.	140.	2	0	0	.00	489.43	610.00

*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .46

3470 ENCROACHMENT STATIONS= .0 630.0 TYPE= 1 TARGET= 629.999

56230.000	3.57	2336.07	.00	.00	2337.33	1.26	.95	.20	2350.00
19217.0	.0	19217.0	.0	.0	2135.1	.0	1128.3	187.1	100000.00
.73	.00	9.00	.00	.000	.040	.000	.000	2332.50	28.67
.010938	220.	220.	220.	2	0	0	.00	601.33	630.00

CCHV= .300 CEHV= .500

*SECNO 56420.000

56420.000	3.84	2338.14	.00	.00	2339.23	1.09	1.84	.05	2348.00
19217.0	.0	19217.0	.0	.0	2295.9	.0	1137.9	189.8	2348.00
.74	.00	8.37	.00	.000	.040	.000	.000	2334.30	110.83
.008654	190.	190.	190.	3	0	0	.00	607.70	718.53

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 56487.000

56487.000	3.74	2338.71	.00	.00	2339.86	1.15	.60	.03	2348.67
19217.0	.0	19217.0	.0	.0	2237.7	.0	1141.4	190.7	2348.67
.74	.00	8.59	.00	.000	.040	.000	.000	2334.97	111.06
.009416	67.	67.	67.	2	0	0	.00	607.23	718.29

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THIS RUN EXECUTED 15APR98 13:31:08

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MIDDLE NO. LAS VEGAS WAS

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	28903.000	.00	.00	.00	2114.40	2939.00	2119.92	2119.92	2122.13	59.75	11.94	246.19	380.22
*	28903.000	.00	.00	.00	2114.40	6751.00	2123.31	2123.31	2126.65	53.31	14.68	459.93	924.66

	28903.000	.00	.00	.00	2114.40	8343.00	2125.00	.00	2128.17	41.86	14.29	583.82	1289.49
	28903.000	.00	.00	.00	2114.40	11017.00	2129.00	.00	2131.22	19.52	11.98	928.20	2493.55
*	29486.000	582.20	.00	.00	2118.82	2939.00	2124.34	2124.34	2126.55	59.75	11.94	246.19	380.22
*	29486.000	582.20	.00	.00	2118.82	6751.00	2127.75	2127.75	2131.07	52.91	14.64	461.15	928.12
*	29486.000	582.20	.00	.00	2118.82	8343.00	2128.90	2128.90	2132.55	50.85	15.33	544.36	1170.00
*	29486.000	582.20	.00	.00	2118.82	11017.00	2130.52	2130.52	2134.71	49.80	16.44	670.25	1561.10
*	30067.000	582.20	.00	.00	2123.24	2939.00	2128.76	2128.76	2130.97	59.75	11.94	246.19	380.22
*	30067.000	582.20	.00	.00	2123.24	6751.00	2132.16	2132.16	2135.49	53.06	14.65	460.68	926.77
*	30067.000	582.20	.00	.00	2123.24	8343.00	2133.28	2133.28	2136.97	51.67	15.41	541.23	1160.66
*	30067.000	582.20	.00	.00	2123.24	11017.00	2134.95	2134.95	2139.13	49.58	16.41	671.35	1564.66
*	30650.000	582.20	.00	.00	2127.50	2939.00	2133.07	2133.07	2135.30	59.31	12.00	244.86	381.63
*	30650.000	582.20	.00	.00	2127.50	6751.00	2136.53	2136.53	2139.91	52.71	14.76	457.34	929.90
*	30650.000	582.20	.00	.00	2127.50	8343.00	2137.67	2137.67	2141.41	51.19	15.52	537.65	1166.11
*	30650.000	582.20	.00	.00	2127.50	11017.00	2139.37	2139.37	2143.63	49.33	16.55	665.64	1568.64
*	30680.000	30.00	.00	.00	2127.73	2939.00	2133.28	2133.28	2135.53	59.75	12.03	244.23	380.21
*	30680.000	30.00	.00	.00	2127.73	6751.00	2136.74	2136.74	2140.14	53.12	14.80	456.09	926.31
*	30680.000	30.00	.00	.00	2127.73	8343.00	2137.87	2137.87	2141.64	51.72	15.58	535.65	1160.05
*	30680.000	30.00	.00	.00	2127.73	11017.00	2139.57	2139.57	2143.86	49.92	16.62	662.77	1559.29
*	30765.000	85.00	.00	.00	2127.90	2939.00	2136.00	.00	2136.22	3.92	3.82	769.89	1485.08
*	30765.000	85.00	.00	.00	2127.90	6751.00	2140.81	.00	2141.13	3.27	4.54	1487.24	3734.28
*	30765.000	85.00	.00	.00	2127.90	8537.00	2142.37	.00	2142.73	3.23	4.85	1758.68	4751.48
*	30765.000	85.00	.00	.00	2127.90	19217.00	2144.21	.00	2145.00	6.48	7.65	2988.34	7551.52
	30935.000	170.00	.00	.00	2128.24	2939.00	2136.06	.00	2136.31	4.48	4.00	734.12	1388.00
	30935.000	170.00	.00	.00	2128.24	6751.00	2140.86	.00	2141.20	3.59	4.69	1438.04	3564.36
	30935.000	170.00	.00	.00	2128.24	8537.00	2142.51	.00	2142.80	2.85	4.51	2043.39	5053.86
	30935.000	170.00	.00	.00	2128.24	19217.00	2144.29	.00	2145.15	7.17	7.94	2857.70	7177.01

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	31235.000	300.00	.00	.00	2129.10	2939.00	2136.34	.00	2136.49	8.09	3.11	951.80	1033.23
	31235.000	300.00	.00	.00	2129.10	6751.00	2141.16	.00	2141.34	4.19	3.48	2034.18	3299.52
	31235.000	300.00	.00	.00	2129.10	8537.00	2142.71	.00	2142.91	3.97	3.74	2421.22	4283.55
	31235.000	300.00	.00	.00	2129.10	19217.00	2144.72	.00	2145.43	11.15	6.98	2969.87	5754.17
*	31500.000	265.00	.00	.00	2132.00	2939.00	2136.44	.00	2137.13	67.62	6.70	446.10	357.40
*	31500.000	265.00	.00	.00	2132.00	6751.00	2141.17	.00	2141.59	13.43	5.43	1357.71	1842.23
*	31500.000	265.00	.00	.00	2132.00	8537.00	2142.72	.00	2143.14	10.78	5.48	1716.54	2599.76
*	31500.000	265.00	.00	.00	2132.00	19217.00	2144.77	.00	2146.02	25.37	9.57	2236.45	3815.12
*	32044.000	544.00	.00	.00	2137.50	2939.00	2141.63	2141.53	2142.69	163.70	8.28	354.96	229.71
*	32044.000	544.00	.00	.00	2137.50	6751.00	2143.22	2143.22	2144.92	162.59	10.47	644.76	529.45
*	32044.000	544.00	.00	.00	2137.50	8537.00	2143.80	2143.80	2145.76	156.17	11.23	759.97	683.13
*	32044.000	544.00	.00	.00	2137.50	19217.00	2146.59	2146.59	2149.45	137.10	13.57	1416.36	1641.21
*	33671.000	1627.00	.00	.00	2153.00	2939.00	2159.27	.00	2160.13	75.39	7.42	396.28	338.48
*	33671.000	1627.00	.00	.00	2153.00	6751.00	2161.69	.00	2163.06	80.91	9.38	719.65	750.51
	33671.000	1627.00	.00	.00	2153.00	8537.00	2162.42	.00	2164.06	84.61	10.27	831.17	928.12
	33671.000	1627.00	.00	.00	2153.00	19217.00	2165.51	.00	2168.74	102.44	14.41	1333.17	1898.64
	35645.000	1974.00	.00	.00	2169.50	2939.00	2175.70	.00	2176.43	90.76	6.88	427.49	308.50
	35645.000	1974.00	.00	.00	2169.50	6751.00	2177.76	.00	2178.83	78.57	8.30	812.99	761.64
	35645.000	1974.00	.00	.00	2169.50	8537.00	2178.50	.00	2179.72	74.10	8.86	963.81	991.73
	35645.000	1974.00	.00	.00	2169.50	19217.00	2182.11	.00	2183.98	59.35	10.97	1751.23	2494.44
	36822.000	1177.00	.00	.00	2179.30	2939.00	2185.14	.00	2185.64	67.81	5.70	515.26	356.90
	36822.000	1177.00	.00	.00	2179.30	6751.00	2186.75	.00	2187.73	72.68	7.93	851.80	791.87
	36822.000	1177.00	.00	.00	2179.30	8537.00	2187.34	.00	2188.52	75.44	8.73	977.97	982.87
	36822.000	1177.00	.00	.00	2179.30	19217.00	2190.04	.00	2192.32	83.28	12.12	1585.17	2105.85
	38410.000	1588.00	.00	.00	2196.10	2939.00	2199.01	.00	2199.61	118.13	6.26	469.31	270.41
	38410.000	1588.00	.00	.00	2196.10	6751.00	2200.42	.00	2201.46	104.30	8.18	825.26	661.04
	38410.000	1588.00	.00	.00	2196.10	8537.00	2201.00	.00	2202.19	99.10	8.75	975.18	857.57
	38410.000	1588.00	.00	.00	2196.10	19217.00	2203.66	.00	2205.61	83.69	11.22	1712.60	2100.59
	39519.000	1109.00	.00	.00	2203.00	2939.00	2208.31	.00	2208.79	60.97	5.56	528.49	376.39
	39519.000	1109.00	.00	.00	2203.00	6751.00	2209.89	.00	2210.89	70.50	7.99	844.56	804.05
	39519.000	1109.00	.00	.00	2203.00	8537.00	2210.46	.00	2211.69	74.59	8.89	960.46	988.48
	39519.000	1109.00	.00	.00	2203.00	19217.00	2213.00	.00	2215.58	93.04	12.90	1489.60	1992.24
*	40616.000	1097.00	.00	.00	2213.70	2939.00	2218.16	.00	2218.89	151.89	6.85	429.13	238.47
	40616.000	1097.00	.00	.00	2213.70	6751.00	2219.65	.00	2220.77	118.19	8.52	792.82	620.98
	40616.000	1097.00	.00	.00	2213.70	8537.00	2220.22	.00	2221.50	108.89	9.08	939.74	818.11
	40616.000	1097.00	.00	.00	2213.70	19217.00	2223.13	.00	2225.07	79.62	11.18	1718.44	2153.67
*	42138.000	1522.00	.00	.00	2224.80	2939.00	2230.95	.00	2231.25	50.22	4.44	661.72	414.74
*	42138.000	1522.00	.00	.00	2224.80	6751.00	2232.33	.00	2232.85	56.41	5.76	1171.21	898.83
	42138.000	1522.00	.00	.00	2224.80	8537.00	2232.75	.00	2233.38	58.13	6.37	1341.10	1119.72
	42138.000	1522.00	.00	.00	2224.80	19217.00	2234.78	.00	2236.01	64.42	8.91	2157.46	2394.25

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	43231.000	1093.00	.00	.00	2233.70	2939.00	2238.79	.00	2239.52	121.72	6.82	430.98	266.40
	43231.000	1093.00	.00	.00	2233.70	6751.00	2240.38	.00	2241.50	113.05	8.49	794.77	634.95
	43231.000	1093.00	.00	.00	2233.70	8537.00	2240.90	.00	2242.21	113.09	9.20	928.02	802.78
	43231.000	1093.00	.00	.00	2233.70	19217.00	2243.21	.00	2245.58	115.36	12.35	1555.80	1789.19

*	44345.000	1114.00	.00	.00	2242.80	2939.00	2248.24	.00	2248.80	60.37	6.00	489.84	378.25
	44345.000	1114.00	.00	.00	2242.80	6751.00	2250.14	.00	2251.20	69.12	8.28	815.52	812.02
	44345.000	1114.00	.00	.00	2242.80	8537.00	2250.83	.00	2252.09	71.40	9.02	946.12	1010.31
	44345.000	1114.00	.00	.00	2242.80	19217.00	2253.94	.00	2256.02	77.27	11.59	1657.80	2186.18
	45725.000	1380.00	.00	.00	2253.00	2939.00	2257.83	.00	2258.27	78.59	5.36	548.76	331.53
	45725.000	1380.00	.00	.00	2253.00	6751.00	2259.54	.00	2260.09	59.41	5.94	1136.02	875.85
	45725.000	1380.00	.00	.00	2253.00	8537.00	2260.10	.00	2260.72	54.44	6.34	1347.15	1157.07
	45725.000	1380.00	.00	.00	2253.00	19217.00	2262.82	.00	2263.81	42.00	7.98	2408.15	2965.25
	46746.000	1021.00	.00	.00	2258.80	2939.00	2263.94	.00	2264.23	44.78	4.27	687.89	439.20
	46746.000	1021.00	.00	.00	2258.80	6751.00	2265.34	.00	2265.83	53.20	5.61	1203.89	925.57
	46746.000	1021.00	.00	.00	2258.80	8537.00	2265.77	.00	2266.36	56.01	6.20	1378.03	1140.70
	46746.000	1021.00	.00	.00	2258.80	19217.00	2267.80	.00	2268.95	60.01	8.59	2238.42	2480.62
*	48046.000	1300.00	.00	.00	2266.90	2939.00	2271.97	.00	2272.39	93.16	5.17	568.82	304.51
	48046.000	1300.00	.00	.00	2266.90	6751.00	2273.31	.00	2273.99	74.11	6.65	1014.73	784.23
	48046.000	1300.00	.00	.00	2266.90	8537.00	2273.81	.00	2274.62	71.38	7.21	1184.58	1010.45
	48046.000	1300.00	.00	.00	2266.90	19217.00	2276.05	.00	2277.56	71.53	9.86	1949.05	2272.16
	49654.000	1608.00	.00	.00	2281.10	2939.00	2286.35	2285.80	2286.83	86.45	5.55	529.54	316.10
	49654.000	1608.00	.00	.00	2281.10	6751.00	2287.58	2287.13	2288.45	110.45	7.51	899.02	642.37
	49654.000	1608.00	.00	.00	2281.10	8537.00	2287.96	2287.67	2289.03	114.51	8.33	1025.21	797.77
	49654.000	1608.00	.00	.00	2281.10	19217.00	2289.94	.00	2291.95	112.48	11.38	1688.92	1811.95
	50964.000	1310.00	.00	.00	2291.40	2939.00	2295.20	.00	2295.52	52.35	4.57	642.69	406.19
*	50964.000	1310.00	.00	.00	2291.40	6751.00	2296.93	.00	2297.42	46.16	5.61	1203.08	993.65
*	50964.000	1310.00	.00	.00	2291.40	8537.00	2297.48	.00	2298.05	45.50	6.07	1406.67	1265.68
*	50964.000	1310.00	.00	.00	2291.40	19217.00	2299.90	.00	2300.99	45.84	8.35	2300.56	2838.41
	52020.000	1056.00	.00	.00	2297.00	2939.00	2301.15	.00	2301.59	62.65	5.30	554.51	371.30
	52020.000	1056.00	.00	.00	2297.00	6751.00	2302.64	.00	2303.50	70.88	7.45	906.76	801.86
	52020.000	1056.00	.00	.00	2297.00	8537.00	2303.17	.00	2304.22	73.63	8.23	1037.54	994.91
	52020.000	1056.00	.00	.00	2297.00	19217.00	2305.61	.00	2307.69	83.93	11.56	1661.85	2097.56
	53183.000	1163.00	.00	.00	2305.70	2939.00	2311.06	2310.66	2311.52	122.99	5.47	536.85	265.01
	53183.000	1163.00	.00	.00	2305.70	6751.00	2312.28	2311.77	2312.90	92.59	6.31	1069.83	701.59
	53183.000	1163.00	.00	.00	2305.70	8537.00	2312.72	.00	2313.43	84.64	6.73	1268.22	927.92
	53183.000	1163.00	.00	.00	2305.70	19217.00	2314.97	.00	2316.05	60.87	8.34	2305.32	2463.07
*	54519.000	1336.00	.00	.00	2317.90	2939.00	2321.59	.00	2321.92	53.52	4.63	634.30	401.76
	54519.000	1336.00	.00	.00	2317.90	6751.00	2322.79	.00	2323.53	68.62	6.89	979.15	814.96
	54519.000	1336.00	.00	.00	2317.90	8537.00	2323.21	.00	2324.14	75.13	7.76	1100.66	984.90
	54519.000	1336.00	.00	.00	2317.90	19217.00	2324.93	.00	2327.13	111.10	11.90	1614.37	1823.16

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	55570.000	1051.00	.00	.00	2324.70	2939.00	2329.47	.00	2329.99	117.34	5.84	503.39	271.32
	55570.000	1051.00	.00	.00	2324.70	6751.00	2331.06	.00	2331.71	88.87	6.46	1044.40	716.12
	55570.000	1051.00	.00	.00	2324.70	8537.00	2331.58	.00	2332.29	79.61	6.75	1264.47	956.79
*	55570.000	1051.00	.00	.00	2324.70	19217.00	2334.04	.00	2335.06	53.31	8.11	2370.73	2632.02
*	55870.000	300.00	.00	.00	2326.70	2939.00	2330.43	.00	2330.49	5.57	2.06	1426.22	1245.47
*	55870.000	300.00	.00	.00	2326.70	6751.00	2332.18	.00	2332.34	8.17	3.17	2127.83	2361.76
*	55870.000	300.00	.00	.00	2326.70	8537.00	2332.77	.00	2332.97	9.57	3.59	2375.88	2759.38
*	55870.000	300.00	.00	.00	2326.70	19217.00	2335.45	.00	2335.88	14.73	5.30	3628.26	5007.12
*	56010.000	140.00	.00	.00	2328.90	2939.00	2330.48	.00	2330.73	64.13	4.02	731.12	367.01
*	56010.000	140.00	.00	.00	2328.90	6751.00	2332.28	.00	2332.57	27.00	4.30	1570.13	1299.24
*	56010.000	140.00	.00	.00	2328.90	8537.00	2332.89	.00	2333.22	25.02	4.60	1854.71	1706.81
	56010.000	140.00	.00	.00	2328.90	19217.00	2335.60	.00	2336.18	22.89	6.09	3154.29	4016.55
*	56230.000	220.00	.00	.00	2332.50	2939.00	2333.41	2333.41	2333.87	242.41	5.42	541.92	188.77
*	56230.000	220.00	.00	.00	2332.50	6751.00	2334.09	2334.09	2334.88	200.22	7.13	946.66	477.11
*	56230.000	220.00	.00	.00	2332.50	8537.00	2334.35	2334.35	2335.28	192.53	7.74	1103.33	615.25
*	56230.000	220.00	.00	.00	2332.50	19217.00	2336.07	.00	2337.33	109.38	9.00	2135.14	1837.44
*	56420.000	190.00	.00	.00	2334.30	2939.00	2335.72	.00	2335.91	56.69	3.51	837.62	390.35
*	56420.000	190.00	.00	.00	2334.30	6751.00	2336.56	.00	2336.95	62.18	5.02	1346.02	856.17
*	56420.000	190.00	.00	.00	2334.30	8537.00	2336.89	.00	2337.36	63.42	5.54	1542.13	1071.96
	56420.000	190.00	.00	.00	2334.30	19217.00	2338.14	.00	2339.23	86.54	8.37	2295.86	2065.73
	56487.000	67.00	.00	.00	2334.97	2939.00	2336.17	.00	2336.44	98.32	4.14	709.48	296.40
	56487.000	67.00	.00	.00	2334.97	6751.00	2337.01	.00	2337.49	88.93	5.59	1208.02	715.89
	56487.000	67.00	.00	.00	2334.97	8537.00	2337.33	.00	2337.91	86.44	6.08	1404.20	918.21
	56487.000	67.00	.00	.00	2334.97	19217.00	2338.71	.00	2339.86	94.16	8.59	2237.73	1980.39

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MIDDLE NO. LAS VEGAS WAS

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	28903.000	2939.00	2119.92	.00	.00	4.82	56.27	.00
*	28903.000	6751.00	2123.31	3.39	.00	1.81	69.83	.00
	28903.000	8343.00	2125.00	1.69	.00	.00	76.60	.00
	28903.000	11017.00	2129.00	4.00	.00	.00	97.43	.00
*	29486.000	2939.00	2124.34	.00	4.42	.00	56.27	582.20

*	29486.000	6751.00	2127.75	3.41	4.44	.00	69.90	582.20
*	29486.000	8343.00	2128.90	1.15	3.90	.00	74.51	582.20
*	29486.000	11017.00	2130.52	1.62	1.52	.00	80.99	582.20
*	30067.000	2939.00	2128.76	.00	4.42	.00	56.27	582.20
*	30067.000	6751.00	2132.16	3.40	4.41	.00	69.87	582.20
*	30067.000	8343.00	2133.28	1.12	4.38	.00	74.34	582.20
*	30067.000	11017.00	2134.95	1.67	4.43	.00	81.04	582.20
*	30650.000	2939.00	2133.07	.00	4.31	.00	54.97	582.20
*	30650.000	6751.00	2136.53	3.46	4.37	.00	67.85	582.20
*	30650.000	8343.00	2137.67	1.15	4.40	.00	72.12	582.20
*	30650.000	11017.00	2139.37	1.70	4.42	.00	78.45	582.20
*	30680.000	2939.00	2133.28	.00	.22	.00	54.93	30.00
*	30680.000	6751.00	2136.74	3.45	.21	.00	67.78	30.00
*	30680.000	8343.00	2137.87	1.14	.20	.00	72.02	30.00
*	30680.000	11017.00	2139.57	1.69	.19	.00	78.32	30.00
*	30765.000	2939.00	2136.00	.00	2.71	.00	129.85	85.00
*	30765.000	6751.00	2140.81	4.82	4.08	.00	168.27	85.00
*	30765.000	8537.00	2142.37	1.55	4.49	.00	177.80	85.00
*	30765.000	19217.00	2144.21	1.84	4.64	.00	510.51	85.00
	30935.000	2939.00	2136.06	.00	.06	.00	127.63	170.00
	30935.000	6751.00	2140.86	4.80	.05	.00	165.92	170.00
	30935.000	8537.00	2142.51	1.65	.14	.00	328.78	170.00
	30935.000	19217.00	2144.29	1.78	.08	.00	501.00	170.00
	31235.000	2939.00	2136.34	.00	.29	.00	210.06	300.00
	31235.000	6751.00	2141.16	4.81	.29	.00	242.40	300.00
	31235.000	8537.00	2142.71	1.55	.20	.00	256.37	300.00
	31235.000	19217.00	2144.72	2.02	.43	.00	311.43	300.00
*	31500.000	2939.00	2136.44	.00	.09	.00	159.22	265.00
*	31500.000	6751.00	2141.17	4.74	.02	.00	222.90	265.00
*	31500.000	8537.00	2142.72	1.55	.02	.00	239.95	265.00
*	31500.000	19217.00	2144.77	2.05	.05	.00	272.96	265.00

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	SRCNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	32044.000	2939.00	2141.63	.00	5.19	.00	153.94	544.00
*	32044.000	6751.00	2143.22	1.59	2.05	.00	195.24	544.00
*	32044.000	8537.00	2143.80	.58	1.08	.00	200.79	544.00
*	32044.000	19217.00	2146.59	2.79	1.82	.00	255.02	544.00
*	33671.000	2939.00	2159.27	.00	17.64	.00	110.47	1627.00
*	33671.000	6751.00	2161.69	2.42	18.47	.00	148.42	1627.00
	33671.000	8537.00	2162.42	.73	18.62	.00	154.49	1627.00
	33671.000	19217.00	2165.51	3.09	18.92	.00	170.69	1627.00
	35645.000	2939.00	2175.70	.00	16.43	.00	155.62	1974.00
	35645.000	6751.00	2177.76	2.06	16.06	.00	200.09	1974.00
	35645.000	8537.00	2178.50	.74	16.07	.00	205.91	1974.00
	35645.000	19217.00	2182.11	3.61	16.60	.00	228.80	1974.00
	36822.000	2939.00	2185.14	.00	9.44	.00	200.92	1177.00
	36822.000	6751.00	2186.75	1.62	9.00	.00	213.29	1177.00
	36822.000	8537.00	2187.34	.58	8.84	.00	217.74	1177.00
	36822.000	19217.00	2190.04	2.70	7.93	.00	231.16	1177.00
	38410.000	2939.00	2199.01	.00	13.87	.00	242.68	1588.00
	38410.000	6751.00	2200.42	1.42	13.67	.00	260.06	1588.00
	38410.000	8537.00	2201.00	.58	13.66	.00	267.04	1588.00
	38410.000	19217.00	2203.66	2.66	13.62	.00	283.47	1588.00
	39519.000	2939.00	2208.31	.00	9.30	.00	196.55	1109.00
	39519.000	6751.00	2209.89	1.59	9.47	.00	202.28	1109.00
	39519.000	8537.00	2210.46	.57	9.46	.00	204.34	1109.00
	39519.000	19217.00	2213.00	2.54	9.34	.00	212.32	1109.00
*	40616.000	2939.00	2218.16	.00	9.85	.00	233.03	1097.00
	40616.000	6751.00	2219.65	1.49	9.75	.00	257.12	1097.00
	40616.000	8537.00	2220.22	.57	9.76	.00	259.89	1097.00
	40616.000	19217.00	2223.13	2.91	10.13	.00	274.11	1097.00
*	42138.000	2939.00	2230.95	.00	12.79	.00	299.91	1522.00
*	42138.000	6751.00	2232.33	1.38	12.68	.00	392.09	1522.00
	42138.000	8537.00	2232.75	.42	12.53	.00	395.56	1522.00
	42138.000	19217.00	2234.78	2.03	11.65	.00	414.94	1522.00
*	43231.000	2939.00	2238.79	.00	7.85	.00	198.28	1093.00
	43231.000	6751.00	2240.38	1.58	8.05	.00	248.61	1093.00
	43231.000	8537.00	2240.90	.52	8.14	.00	257.47	1093.00
	43231.000	19217.00	2243.21	2.31	8.43	.00	280.56	1093.00
*	44345.000	2939.00	2248.24	.00	9.44	.00	161.37	1114.00
	44345.000	6751.00	2250.14	1.90	9.76	.00	182.21	1114.00
	44345.000	8537.00	2250.83	.69	9.93	.00	189.93	1114.00
	44345.000	19217.00	2253.94	3.10	10.72	.00	241.75	1114.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	45725.000	2939.00	2257.83	.00	9.59	.00	263.41	1380.00
	45725.000	6751.00	2259.54	1.71	9.40	.00	378.45	1380.00
	45725.000	8537.00	2260.10	.56	9.27	.00	381.47	1380.00
	45725.000	19217.00	2262.82	2.73	8.89	.00	396.31	1380.00
	46746.000	2939.00	2263.94	.00	6.12	.00	303.35	1021.00
	46746.000	6751.00	2265.34	1.40	5.80	.00	401.99	1021.00
	46746.000	8537.00	2265.77	.43	5.67	.00	411.79	1021.00
	46746.000	19217.00	2267.80	2.03	4.98	.00	431.23	1021.00
*	48046.000	2939.00	2271.97	.00	8.03	.00	327.30	1300.00
	48046.000	6751.00	2273.31	1.34	7.97	.00	336.05	1300.00
	48046.000	8537.00	2273.81	.50	8.04	.00	338.10	1300.00
	48046.000	19217.00	2276.05	2.24	8.25	.00	347.15	1300.00
	49654.000	2939.00	2286.35	.00	14.38	.00	256.65	1608.00
	49654.000	6751.00	2287.58	1.23	14.27	.00	332.61	1608.00
	49654.000	8537.00	2287.96	.38	14.15	.00	333.46	1608.00
	49654.000	19217.00	2289.94	1.98	13.89	.00	337.88	1608.00
	50964.000	2939.00	2295.20	.00	8.84	.00	286.52	1310.00
*	50964.000	6751.00	2296.93	1.73	9.35	.00	358.16	1310.00
*	50964.000	8537.00	2297.48	.55	9.52	.00	367.91	1310.00
*	50964.000	19217.00	2299.90	2.42	9.97	.00	372.43	1310.00
	52020.000	2939.00	2301.15	.00	5.96	.00	228.14	1056.00
	52020.000	6751.00	2302.64	1.48	5.71	.00	245.52	1056.00
	52020.000	8537.00	2303.17	.53	5.69	.00	248.64	1056.00
	52020.000	19217.00	2305.61	2.44	5.71	.00	263.00	1056.00
	53183.000	2939.00	2311.06	.00	9.90	.00	347.44	1163.00
	53183.000	6751.00	2312.28	1.23	9.65	.00	452.68	1163.00
	53183.000	8537.00	2312.72	.44	9.55	.00	455.22	1163.00
	53183.000	19217.00	2314.97	2.25	9.36	.00	468.26	1163.00
*	54519.000	2939.00	2321.59	.00	10.53	.00	283.60	1336.00
	54519.000	6751.00	2322.79	1.20	10.51	.00	290.24	1336.00
	54519.000	8537.00	2323.21	.42	10.48	.00	292.55	1336.00
	54519.000	19217.00	2324.93	1.72	9.96	.00	302.10	1336.00
*	55570.000	2939.00	2329.47	.00	7.88	.00	287.11	1051.00
	55570.000	6751.00	2331.06	1.60	8.27	.00	415.39	1051.00
	55570.000	8537.00	2331.58	.52	8.38	.00	433.82	1051.00
*	55570.000	19217.00	2334.04	2.46	9.12	.00	457.03	1051.00
*	55870.000	2939.00	2330.43	.00	.96	.00	394.63	300.00
*	55870.000	6751.00	2332.18	1.76	1.12	.00	410.45	300.00
*	55870.000	8537.00	2332.77	.59	1.19	.00	428.20	300.00
*	55870.000	19217.00	2335.45	2.67	1.40	.00	504.95	300.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	56010.000	2939.00	2330.48	.00	.06	.00	463.57	140.00
*	56010.000	6751.00	2332.28	1.80	.10	.00	468.28	140.00
*	56010.000	8537.00	2332.89	.61	.11	.00	471.01	140.00
	56010.000	19217.00	2335.60	2.71	.16	.00	489.43	140.00
*	56230.000	2939.00	2333.41	.00	2.93	.00	595.85	220.00
*	56230.000	6751.00	2334.09	.68	1.81	.00	597.25	220.00
*	56230.000	8537.00	2334.35	.26	1.47	.00	597.79	220.00
*	56230.000	19217.00	2336.07	1.72	.47	.00	601.33	220.00
*	56420.000	2939.00	2335.72	.00	2.30	.00	595.68	190.00
*	56420.000	6751.00	2336.56	.84	2.47	.00	599.99	190.00
*	56420.000	8537.00	2336.89	.33	2.54	.00	601.59	190.00
	56420.000	19217.00	2338.14	1.25	2.06	.00	607.70	190.00
	56487.000	2939.00	2336.17	.00	.45	.00	594.51	67.00
	56487.000	6751.00	2337.01	.84	.45	.00	598.86	67.00
	56487.000	8537.00	2337.33	.33	.44	.00	600.46	67.00
	56487.000	19217.00	2338.71	1.38	.58	.00	607.23	67.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 28903.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 28903.000 PROFILE= 2 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 29486.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 29486.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=  29486.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  30067.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  30067.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

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 CAUTION SECNO=  30650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=  30650.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30650.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30650.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30650.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  30650.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30650.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30650.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  30680.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  3  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  4  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  30765.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  31500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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    15APR98      13:31:06                                                    PAGE   55


 WARNING SECNO=  31500.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  31500.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  31500.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  32044.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  32044.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  32044.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  32044.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  32044.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  32044.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  4  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  33671.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  33671.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  40616.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  42138.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  44345.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  48046.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  50964.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  50964.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  54519.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  55570.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55570.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  55870.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  56010.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56010.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56010.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  56230.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  56230.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
1
    15APR98      13:31:06                                                    PAGE   56
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 WARNING SECNO=   56230.000   PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   56420.000   PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   56420.000   PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   56420.000   PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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Paper Copy D

Interstate 15 to North Las Vegas
Detention Basin

10- to 100-year flood event

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1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    15APR98    TIME   13:58:02  *
 *******************************************
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 ****************************************
 *  U.S. ARMY CORPS OF ENGINEERS        *
 *  HYDROLOGIC ENGINEERING CENTER       *
 *  609 SECOND STREET, SUITE D          *
 *  DAVIS, CALIFORNIA 95616-4687        *
 *          (916) 756-1104              *
 ****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX

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    15APR98      13:58:02                                                    PAGE    1


                                                        THIS RUN EXECUTED 15APR98    13:58:02

 ****************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ****************************************



 SPLIT FLOW BEING PERFORMED


 SF


 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      3    6109     6397       -1        3
 WC      0  1924.6      133  1925.6      287  1926.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6397     6842       -1        3
 WC      0  1926.6      149  1927.6      297  1928.6      446  1929.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6842     7287       -1        3
 WC      0  1929.6      149  1930.6      297  1931.6      447  1932.6


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18472    18619       -1        3
 WC      0  2027.6       40  2026.6      147  2026.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18619    18710       -1        3
 WC      0  2026.6       71  2026.6       91  2028.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      5   18710    19020       -1        3
 WC      0  2028.6       20  2029.6      175  2031.6      265  2033.6      405  2035.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      4   19020    19215       -1        3
 WC      0  2035.6       55  2037.6      200  2039.6      270  2040.3
1
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 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1       FEMA 10-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLV WASH

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0        2                           .0033                                  1888.9

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                  -1

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150
```

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**********************************************************************
12/31   rubble at section 18436
**********************************************************************

**********************************************************************
1/5   Inserted BSI channel improvements d/s of Lone Mountain Road
**********************************************************************

**********************************************************************
1/20  Added section 187+00 and 3 points to 18436
**********************************************************************

**********************************************************************
1/30  Removed flow upstream of 187+00 simulating breakout across Azure
**********************************************************************

**********************************************************************
1/30 Removed Sunrise Development Park and replaced with Kenny dropped section
**********************************************************************

**********************************************************************
2/10 ADDED SPECIAL CULVERT AT CRAIG
**********************************************************************

**********************************************************************
Debris pile at 184+36 lowered to EL. 2020 to account for erosion and CNLV wash
debris removal plan.  Weir flow leaving the wash is represented by the
split flow cards from 184+72 to 190+20
**********************************************************************

**********************************************************************
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3/4 Revised Lone Mountain Road Crossing
**********************************************************************

**********************************************************************
Model extends to the outlet of the NLVDB
**********************************************************************



QT        3       1025       1746       2266

NC      .03        .03       .014         .1         .3

  Add xsec 1+50 from as-built plans (rectangular):
X1      150         12       1000     1035.1
X3       10
GR     1900        900       1897        910       1896       1000       1886    1000.01       1886     1017.1
GR     1896    1017.11       1896     1017.9       1886    1017.91       1886       1035       1896     1035.1
GR     1896       1060       1908       1120


X1    243.6          8       1000    1035.01       93.6       93.6       93.6
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1896.2    1017.11     1896.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01


X1    244.6          8       1000    1035.01          1          1          1
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1886.2    1017.11     1886.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01

  Duplicate 1+50 to 4+50 (beginning of transition):

X1      450          8       1000       1036      205.4      205.4      205.4                  1.0
X3       10
GR     1900        900       1897        910       1896       1000       1886       1001       1886       1035
GR     1896       1036       1896       1060       1908       1120

   Begin Transition XS 5+50 from As-Built Plans

X1      544          4       1000       1050         94         94         94
GR   1897.2       1000     1887.2       1015     1887.2       1035     1897.2       1050


X1      600          4       1000       1050         56         56         56
GR   1897.4       1000     1887.4       1015     1887.4       1035     1897.7       1050


X1      700          4       1000       1050        100        100        100
GR   1897.7       1000     1887.7       1015     1887.7       1035     1897.7       1050
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X1     1200          4       1000       1050        500        500        500
GR   1899.3       1000     1889.3       1015     1889.3       1035     1899.3       1050


X1     1700          4       1000       1050        500        500        500
GR     1901       1000       1891       1015       1891       1035       1901       1050
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```
NC     0.030      0.030      0.014      0.1        0.3

X1     2000          4       1000       1050        300        300        300
GR     1902       1000       1892       1015       1892       1035       1902       1050


NC      .014       .014       .014
X1     2200          4       1000       1050        200        200        200
GR   1902.6       1000     1892.6       1015     1892.6       1035     1902.6       1050

  Duplicate 22+20 (beginning of transition):

NH        3       .035     1296.8       .014     1346.5       .035       1460
X1     3724         13     1296.8     1346.5       1524       1524       1524
X3       10          0          0     1220.1          0          0          0          0          0
GR   1904.6        700     1904.6        745       1904        755       1904        785       1908       1190
GR     1908       1222     1907.6     1296.8     1897.6     1311.8     1897.6     1331.5     1907.6     1346.5
GR     1908       1430       1912       1450     1912.3       1460

NC      .03        .03       .014         .1         .3

X1     3823          4       1000     1043.8         99         99         99
GR   1908.5       1000       1898    1000.01       1898       1028     1908.5     1043.8

  'N'-CHANNEL DIVERSION
    SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY

X1     4020         28     1603.14     1646.95        197        197        197
X3       10          0          0     1602.66     1914.9     1730.86          0          0          0
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907     1595.27     1909.2     1603.14     1898.6     1603.2
GR   1898.6       1631     1909.1     1646.95       1909     1686.54     1912.3     1705.34       1913    1719.59
GR     1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1       1771.7       1907    1781.99
GR   1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1     1820.73       1912       2200
GR   1912.4       2480     1912.4       2510       1916       2900

  CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020

X1     4060         29       1604     1647.8         40         40         40
X3       10          0          0     1604.1          0     1720.21          0          0          0
GR   1908.2        840       1908        900       1908       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907     1595.27     1909.3       1604     1898.76     1604.1
GR   1898.7       1632     1909.3     1647.8     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
1
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GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900


NC                                        .3         .5
QT        3       1281       2183       2833

NH        3       .035        840       .014    1657.51       .035       2900
    CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115         29       1604     1643.6         55         55         55
X3       10          0          0    1603.92          0    1721.64          0          0          0
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907     1595.27     1909.3       1604     1898.8     1604.1
GR   1898.8     1643.5     1909.3     1643.6     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900


NC      .035       .035       .014         .3         .5

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     4188         17          0       52.9         73         73         73
X3        0          0          0          0          0       56.3          0          0          0
GR     1915          0     1899.4        0.1     1899.4       12.3     1899.4       13.5     1899.4       25.8
GR   1899.4         27     1899.4       39.3     1899.4       40.5     1899.4       52.8     1914.8       52.9
GR     1912         65       1912         85     1909.8        140       1912        300     1912.8        685
GR   1912.8        710       1916       1125

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL
  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125

X1     4189         18          0       52.9          1          1          1
X3       10
BT      -18          0     1914.8     1909.7        .01     1914.7     1909.7         .1     1914.8     1909.7
BT               12.3     1914.7     1909.7       12.31     1914.7     1899.4       13.5     1914.7     1899.4
BT              13.51     1914.7     1909.7        25.8     1914.7     1909.7      25.81     1914.7     1899.4
BT                 27     1914.7     1899.4       27.01     1914.6     1909.7       39.3     1914.6     1909.7
BT              39.31     1914.6     1899.4        40.5     1914.6     1899.4      40.51     1914.6     1909.7
BT               52.8     1914.6     1909.7       52.81     1914.6     1909.7       52.9     1914.6     1909.7
GR     1914.8          0     1909.7        .01     1899.4        0.1     1899.4       12.3     1899.4       12.31
GR     1899.4       13.5     1899.4       13.51     1899.4       25.8     1899.4      25.81     1899.4         27
GR     1899.4      27.01     1899.4        39.3     1899.4      39.31     1899.4       40.5     1899.4       40.51
GR     1899.4       52.8     1909.7       52.81     1914.6       52.9


X1     4246         18          0       52.9         57         57         57
X3       10
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BT      -18          0       1915      1910.2        .01       1915      1910.2         .1       1915      1910.2
BT                12.3     1914.9      1910.2      12.31     1914.9      1899.9       13.5     1914.9      1899.9
BT               13.51     1914.9      1910.2       25.8     1914.9      1910.2      25.81     1914.9      1899.9
BT                  27     1914.9      1899.9      27.01     1914.8      1910.2       39.3     1914.8      1910.2
1
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BT               39.31     1914.8      1899.9       40.5     1914.8      1899.9      40.51     1914.8      1910.2
BT                52.8     1914.8      1910.2      52.81     1914.8      1910.2       52.9     1914.8      1910.2
GR      1915         0     1910.2         .01     1899.9        0.1     1899.9       12.3     1899.9       12.31
GR    1899.9      13.5     1899.9       13.51     1899.9       25.8     1899.9      25.81     1899.9          27
GR    1899.9     27.01     1899.9        39.3     1899.9      39.31     1899.9       40.5     1899.9       40.51
GR    1899.9      52.8     1910.2       52.81     1914.8       52.9

X1      4247        10          0        52.9          1          1          1
GR      1915         0     1899.9         0.1     1899.9       12.3     1899.9       13.5     1899.9        25.8
GR    1899.9        27     1899.9        39.3     1899.9       40.5     1899.9       52.8     1914.8        52.9

NC        .03        .03        .014         .1          .3
  Left overbank topo from RR through Lone Mtn. should be extended/refined
   when additional mapping available;
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1      4360         4       1000       1057         113         113         113
GR    1911.4       1000     1900.9       1021      1900.9        1036      1911.4       1057

X1      4831         4       1000       1057         471         471         471
GR    1915.3       1000     1904.8       1021      1904.8        1036      1915.3       1057

X1      4920         4       1000       1057          89          89          89
GR      1916       1000     1905.5       1021      1905.5        1036        1916       1057

X1      5005         4       1000       1057          85          85          85
GR    1916.7       1000     1906.2       1021      1906.2        1036      1916.7       1057

X1      5105         4       1000    1035.01         100         100         100
GR    1919.2       1000     1908.2    1000.01      1908.2        1035      1919.2    1035.01

X1      5200         4       1000    1038.21          95          95          95
GR    1919.8       1000     1908.8    1000.01      1908.8      1038.2      1919.8    1038.21

X1      5500         4       1000    1048.21         300         300         300
GR    1921.8       1000     1910.8    1000.01      1910.8      1048.2      1921.8    1048.21

    CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)

X1      5852        21        1466    1522.34         352         352         352
GR    1922.5         0     1922.0         505      1924.8        1010      1923.5        1466      1912.7      1466.1
GR    1912.7   1473.66     1912.7     1474.33      1912.7      1481.66      1912.7     1482.33      1912.6     1489.66
GR    1912.6   1490.33     1912.6     1497.66      1912.6      1498.33      1912.6     1505.66      1912.6     1506.33
GR    1912.5   1513.66     1912.5     1514.33      1912.5      1521.66      1912.5     1522.33      1923.5     1522.34
GR    1926.6      2009

1
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NC        .015       .015       .015         0.3         0.5
X1      5853        21        1466    1522.34           1           1           1
X3        10
GR    1922.5         0     1922.0         505      1924.8        1010      1923.5        1466      1912.7      1466.1
GR    1912.7   1473.66     1912.7     1474.33      1912.7      1481.66      1912.7     1482.33      1912.6     1489.66
GR    1912.6   1490.33     1912.6     1497.66      1912.6      1498.33      1912.6     1505.66      1912.6     1506.33
GR    1912.5   1513.66     1912.5     1514.33      1912.5      1521.66      1912.5     1522.33      1923.5     1522.34
GR    1926.6      2009

X1      5973        21        1466    1522.34         120         120         120
X3        10
BT       -32         0     1922.5      1922.5         505        1922        1922        1010      1924.8      1924.8
BT                1466     1924.1      1924.1      1466.1      1924.1      1921.7     1473.66      1924.1      1921.7
BT               1473.66   1924.1      1913.3      1474.33     1924.1      1913.3      1474.33     1924.1      1921.7
BT               1481.66   1924.1      1921.7      1481.66     1924.1      1913.3      1482.33     1924.1      1913.3
BT               1482.33   1924.1      1921.7      1489.66     1924.1      1921.6      1489.66     1924.1      1913.2
BT               1490.33   1924.1      1913.2      1490.33     1924.1      1921.6      1497.66     1924.1      1921.6
BT               1497.66   1924.1      1913.2      1498.33     1924.1      1913.2      1498.33     1924.1      1921.6
BT               1505.66   1924.1      1921.6      1505.66     1924.1      1913.2      1506.33     1924.1      1913.2
BT               1506.33   1924.1      1921.6      1513.66     1924.1      1921.6      1513.66     1924.1      1913.1
BT               1514.33   1924.1      1913.1      1514.33     1924.1      1921.6      1522.33     1924.1      1921.5
BT               1522.34   1924.1      1924.1         2009     1926.6      1926.6
GR    1922.5         0     1922.0         505      1924.8        1010      1924.1        1466      1913.3      1466.1
GR    1913.3   1473.66     1913.3     1474.33      1913.3      1481.66      1913.3     1482.33      1913.2     1489.66
GR    1913.2   1490.33     1913.2     1497.66      1913.2      1498.33      1913.2     1505.66      1913.2     1506.33
GR    1913.1   1513.66     1913.1     1514.33      1913.1      1521.66      1913.1     1522.33      1924.1     1522.34
GR    1926.6      2009

NC        .015       .015       .015          .1          .3
X1      5974        17          0       56.34           1           1           1
GR    1923.2         0     1913.3         0.1      1913.3        7.66      1913.3        8.33      1913.3       15.66
GR    1913.3     16.33     1913.2       23.66      1913.2       24.33      1913.2       31.66      1913.2       32.33
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GR   1913.2      39.66     1913.2     40.33     1913.1     47.66     1913.1     48.33     1913.1     55.66
GR   1913.1      56.33     1923.1     56.34

NC      .03        .03       .03        .1         .3
   ************************************************************
   BSI Channel Plans
   ************************************************************

   11+27
X1      6092         13      1727     1823.2       126        126        126                  -2.4
GR      1927       1000      1926       1363      1925       1644       1925       1718      1925       1727
GR    1916.4       1745    1916.4       1805    1925.5     1823.2       1926       1984      1927       2233
GR      1928       2483      1929       2740      1930       2990

   14+05
1
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X1      6370         11      1732       1834       278        278        278                  -2.4

GR      1929       1000      1928       1328      1927       1607     1927.8       1730    1927.8       1732
GR    1917.2       1753    1917.2       1813    1927.8       1834       1928       2025      1929       2250
GR      1930       2495

   18+63

X1      6828         11      1775       1880       458        458        458                  -2.4
GR      1932       1000      1931       1310      1930       1573     1929.3       1773    1929.3       1775
GR    1918.6       1797    1918.6       1857    1930.4       1880       1931       2009      1932       2216
GR      1933       2430
   23+00

X1      7265         11      1762       1870       437        437        437                  -2.4
GR      1935       1000      1934       1313      1933       1575     1932.4       1760    1932.4       1762
GR    1920.9       1785    1920.9       1845    1933.3       1870       1934       2025      1935       2324
GR      1936       2523


NC      .03        .03       .03        .1         .3

   27+65
X1      7730          9      1830     1939.4       465        465        465                  -2.4
GR      1938       1000      1937       1264      1936       1506       1936       1574    1935.9       1653
GR    1935.9       1830    1923.9       1854    1923.9       1914     1936.6     1939.4

   33+58

X1      8323         14      2257       2369       593        593        593                  -2.4
GR      1948       1000      1946       1160      1944       1300       1942       1375      1941       1400
GR      1941       1415      1940       1455      1940       1510       1940       1555    1940.3       1577
GR    1940.3       2257    1927.6       2282    1927.6       2342     1941.3       2369

   37+08

X1      8673          4      1000     1114.0       350        350        350                  -2.4
GR    1942.3       1000    1929.8       1025    1929.8       1085     1944.3     1114.0


NC      .015       .015      .015        0.3        0.5
   LONE MOUNTAIN BRIDGE SECTION  (JUST DOWNSTREAM) WIDTHS FROM BRIDGE PLANS
   ELEVATION OF TOP OF DECK AND INVERT FROM KENNY AERIAL
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1      8754         10         0       43.4         81         81         81                  -0.5
X3        10          0         0          0          0          0          0          0         0
GR    1942.1          0    1936.8        0.1     1936.8          1     1928.4      13.67    1928.4      20.33
GR    1928.4      21.67    1928.4         29     1936.8       42.3     1936.8       43.3    1942.3       43.4
1
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X1      8755         20      1000     1043.4          1          1          1
X3        10
BT        -9       1000    1941.6     1941.6     1000.1     1941.6     1940.2    1020.33    1941.7     1940.2
BT              1020.33    1941.7     1927.9    1021.67     1941.7     1927.9    1021.67    1941.7     1940.2
BT              1043.3     1941.8     1940.4     1043.4     1941.8     1941.8       1580       1944       1944
GR    1941.6       1000    1936.3     1000.1     1936.3       1001     1927.9    1013.67    1927.9    1020.33
GR    1927.9    1021.67    1927.9       1029     1936.3     1042.3     1936.3     1043.3    1941.8     1043.4
GR      1944       1580    1945.9       1705     1946.2       1805     1946.9       1856    1947.1       1905
GR    1947.5       1955    1947.7       2005     1948.2       2055     1948.5       2105    1948.8       2155
   ************************************************************************
   STATION EQUATION USED IN MAPPING  STA 8834.5 BACK = STA 8860 FORWARD
   ************************************************************************
   EXTENDED CROSS SECTION BEGINING AT 580 ENDING 1155

X1      8860         20      1000     1043.4         79         79         79
X3        10
BT       -14       1000    1942.1     1940.6     1000.1     1942.1     1940.6       1001    1942.1     1940.6
BT              1013.67    1942.1     1940.6    1020.33     1942.2     1940.7    1020.33    1942.2     1928.4
BT              1021.67    1942.2     1928.4    1021.67     1942.2     1940.7       1029    1942.2     1940.7
BT              1042.3     1942.2     1940.7     1043.3     1942.3     1940.9     1043.3    1942.3     1940.9
BT              1043.4     1942.3     1942.3       1580       1944       1944
GR    1942.1       1000    1936.8     1000.1     1936.8       1001     1928.4    1013.67    1928.4    1020.33
GR    1928.4    1021.67    1928.4       1029     1936.8     1042.3     1936.8     1043.3    1942.3     1043.4
GR      1944       1580    1945.9       1705     1946.2       1805     1946.9       1856    1947.1       1905
GR    1947.5       1955    1947.7       2005     1948.2       2055     1948.5       2105    1948.8       2155
```

EXTENDED CROSS SECTION BEGINING AT 580 ENDING 1155

```
X1     8861       20          0       1155          1          1          1
X3       10        0          0          0          0          0          0          0          0
GR   1942.1        0     1936.8        0.1     1936.8          1     1928.4      13.67     1928.4      20.33
GR   1928.4    21.67     1928.4         29     1936.8       42.3     1936.8       43.3     1942.3       43.4
GR     1944      580     1945.9        705     1946.2        805     1946.9        856     1947.1        905
GR   1947.5      955     1947.7       1005     1948.2       1055     1948.5       1105     1948.8       1155

NH        3     .035    1804.76       .015    1954.26       .035     2930.0
X1     9120       45    1660.36    2136.88        259        259        259
X3       10          0    1661.33          0     2712.5          0          0          0
GR   1938.9     1000     1938.4    1022.44     1939.4    1050.83     1939.8    1109.61     1940.4    1185.31
GR   1941.1   1255.73     1941.4    1329.84     1941.9    1406.09     1942.3    1476.83     1942.7    1527.08
GR   1943.1   1593.17     1944.1    1622.98     1945.2    1660.36     1944.3    1668.77     1944.1    1695.47
GR   1943.4   1751.09     1943.4    1804.76     1942.6    1841.55     1941.1    1849.31     1941.2    1871.11
GR   1931.6   1888.31     1930.9    1902.34       1941    1922.71     1940.5    1934.27     1942.7    1954.26
GR   1943.1   1985.88       1944    2016.07     1944.6    2058.89     1945.1    2091.74     1945.5    2136.88
GR   1945.7   2189.84     1945.5    2239.5      1945.5    2313.35     1948.7    2328.55     1948.9    2355.38
GR   1946.9   2377.76     1948.5    2413.91     1947.4    2476.49     1948.2      2508.5    1948.8    2533.66
GR   1949.2   2564.44       1949    2623.1      1949.6    2704.24     1949.3    2783.03     1948.3       2930
1
    15APR98      13:58:02                                                                                PAGE   10

NC      .045       .045       .045        0.1        0.3
    CROSS SECTION CUT FROM KENNY TOPO 9-16-97
X1     9237       19       1900       2580        117        117        117
X3       10          0          0          0          0          0          0
GR     1944     1000     1940.9       1220     1941.9       1250       1941       1270       1944       1560
GR     1948     1900       1944       2123       1940       2140       1940       2155     1940.5       2240
GR     1944     2515       1948       2570       1950       2580       1948       2623       1948       2630
GR   1948.6     2760     1950.8       3055       1948       3195       1952       3275
    CROSS SECTION CUT FROM KENNY TOPO 9-16-97

X1     9429       24       1775       2330        192        192        192
X3       10          0          0       1573          0          0          0          0          0
GR     1948      850       1944        920       1944       1000       1948       1058     1948.4       1100
GR     1948     1200     1947.8       1270       1948       1330     1949.9       1510     1950.5       1560
GR     1948     1695       1948       1775       1944       1855     1942.1       1900     1942.3       2000
GR     1944     2280       1948       2315     1949.1       2330       1948       2350       1948       2382
GR     1949     2470     1949.9       2565     1950.3       2664       1952       2815

X1    10155       39    2117.61       2420        726        726        726
X3       10          0          0    1567.24          0          0          0          0          0
GR   1950.2     1000     1950.5     1089.5     1951.3    1173.63       1952    1264.68     1952.6    1341.06
GR     1953   1418.64       1953    1482.79     1953.7     1509.3     1954.2    1533.43     1954.2    1567.24
GR   1953.7   1645.43     1953.4     1728.2     1951.4    1742.62     1950.6    1774.96     1951.3    1799.01
GR   1953.2   1821.33     1953.3     1893.3     1952.9    1957.65     1952.3    2022.96     1952.3    2050.45
GR   1953.3   2062.52       1953    2082.16     1952.7    2105.51     1953.7    2117.61       1953    2162.78
GR   1953.1   2184.83     1952.6    2209.21     1951.7    2274.07     1948.7    2286.68     1952.9    2302.13
GR   1950.9   2322.64     1953.3    2334.66     1953.5    2396.66     1951.7    2407.52     1953.8       2420
GR   1955.1   2455.16     1955.7    2508.22     1955.8    2563.46     1956.7    2685.29

X1    10962       51    1440.93    1695.93        607        807        807
X3       10          0          0          0          0          0          0          0
GR   1963.6     1000     1963.2     1026.45     1961.4     1061.7     1958.3    1120.54     1958.3    1142.66
GR   1959.8   1170.46     1961.9    1193.68       1962    1224.14     1960.1    1235.84     1959.8    1256.52
GR   1957.3   1274.17     1956.1    1322.35     1955.8    1365.42     1959.1    1375.51     1959.1    1386.44
GR   1957.3   1392.19     1959.6    1414.44     1959.9    1440.93     1957.6      1456.6       1958    1488.58
GR   1956.9   1523.04     1958.3    1535.33     1956.7    1550.46     1958.6    1560.22     1957.9    1569.99
GR     1959   1583.95     1959.2    1604.04     1957.9    1630.23       1959    1643.16     1958.7    1682.16
GR   1959.3   1695.93     1958.8    1743.65     1958.2    1795.77     1957.4    1813.41     1955.9    1824.29
GR   1955.3   1842.84     1957.2    1851.64     1958.8    1891.67     1955.5    1902.15     1959.2    1911.85
GR   1959.3   1942.31     1954.9    1955.14     1958.7    1962.51     1959.2    2014.23     1959.5    2081.38
GR     1960   2149.42     1960.7    2223.54     1961.5    2269.13     1961.8    2309.63     1962.4    2347.97
GR   1963.2   2447.12

X1    11614       31    1060.74    1621.25        652        652        652
X3       10          0          0          0          0          0          0          0
GR   1968.5     1000     1968.5     1016.77     1965.9     1031.5     1965.5    1037.26     1966.9    1060.74
GR   1966.5   1082.27     1964.7    1108.37     1964.2    1144.42     1963.6    1165.29     1964.2    1204.22
GR     1964   1257.43     1960.3    1277.59     1961.9    1298.65     1963.6    1327.11     1963.6    1344.72
GR   1964.6   1354.9      1964.5    1388.25     1964.7    1426.54     1965.2      1464.8       1965    1516.16
GR   1965.3   1552.81       1965    1601.59     1965.5    1621.25     1964.9    1637.89     1964.6    1659.07
GR     1965      1682       1965    1710.33     1966.1       1767     1966.5    1831.92     1966.5    1883.35
GR     1968      1980
1
    15APR98      13:58:02                                                                                PAGE   11

X1    12202       39    1416.33    1531.53        588        588        588
GR   1973.5     1000     1973.9     1041.1     1972.6     1049.1     1972.3    1055.57     1973.5    1078.41
GR   1973.2   1102.18     1971.8    1117.54       1971    1136.36     1972.7    1151.28     1972.1     1159.6
GR   1972.4   1180.73     1973.1    1194.37     1972.7    1209.54     1972.8    1239.18     1972.2    1280.99
GR   1971.6   1315.18     1971.4     1359.1     1971.4    1416.33     1962.7    1437.46     1963.5    1446.89
GR   1964.3   1491.07     1967.2    1507.08     1974.3    1531.53     1971.7    1550.54     1972.2    1562.12
GR   1969.8   1576.39     1969.9    1600.21     1969.6    1662.22     1969.7    1729.13     1968.1    1735.53
GR   1969.8    1750.2     1968.1    1791.98     1969.1    1799.86     1967.7    1808.69     1969.9    1822.11
GR   1969.8   1885.59       1974    1909.53     1974.1    1930.2      1972.2    1957.33

X1    13094       34    1507.22    1754.18        892        892        892
X3       10          0          0          0          0          0          0          0          0
GR   1980.1     1000     1980.2     1028.38     1979.8    1031.96       1981    1052.72     1980.7    1076.61
```

GR	1979.6	1099.46	1978.5	1123.34	1980	1128.65	1980	1136.28	1977.8	1145.37
GR	1980.6	1153.56	1979.4	1161.62	1978.9	1198.7	1978.6	1271.71	1978.1	1318.1
GR	1978.4	1368.29	1978.3	1434.68	1978	1507.22	1964.9	1530.8	1964.7	1584.39
GR	1965.3	1602.79	1968	1610.61	1974.3	1658.31	1975.2	1678.04	1976.4	1711.3
GR	1977.6	1754.18	1976.8	1790.55	1977.8	1826.85	1978.5	1884.66	1978.4	1937.24
GR	1978.7	2013.58	1978.2	2063.28	1978	2130.51	1980	2400		
X1	14167	45	1672.71	2003.74	1073	1073	1073			
X3	10									
GR	1989.9	1000	1990.5	1040.67	1990.3	1060.84	1989.9	1069.03	1990.6	1091.31
GR	1990.4	1118.27	1988.9	1140.74	1988.5	1163.72	1988.7	1187.86	1988.4	1236.13
GR	1988.8	1269.36	1987.5	1275.64	1990.8	1283.64	1989.5	1291.56	1988.8	1321.74
GR	1988.4	1390.82	1988.6	1465.28	1988.4	1531.6	1987.8	1590.63	1987.5	1656
GR	1987.8	1672.71	1970.3	1708.36	1970.6	1765.73	1973	1781.86	1979.9	1802.41
GR	1979.9	1820.98	1983.2	1834.21	1983.4	1869.28	1983.8	1911.87	1983.5	1953.67
GR	1984.2	2003.74	1984	2066.64	1983.5	2081.1	1984	2122.85	1985.2	2166.7
GR	1985.7	2206.72	1986.2	2266.33	1985.9	2315.3	1985.9	2372.26	1984.4	2391.21
GR	1989	2407.95	1989	2413.66	1990.6	2419.39	1989	2424.37	1989.4	2456.46

SECTION 14368 CUT FROM CNLV TOPO

X1	14368	15	1540	1625	201	201	201		-2.4	
GR	1994	1000	1994	1100	1992	1300	1990	1520	1988	1540
GR	1986	1545	1985	1560	1985	1600	1986	1620	1988	1625
GR	1990	1975	1990	2025	1990	2125	1992	2290	1994	2307
X1	15114	41	1574.57	1764.17	746	746	746			
X3	10	0	0	0	0	0	0	0	0	
GR	1995.8	1000	1995.7	1016.07	1994.6	1024.33	1998.4	1031.82	1997.1	1038.62
GR	1997.5	1045.61	1997.1	1066.88	1997.7	1100.17	1997.1	1105.06	1995.7	1143.88
GR	1999.3	1154.57	1997.8	1161.14	1997.2	1212.87	1995.8	1279.05	1994.5	1342.8
GR	1993.5	1403.18	1992.7	1471.87	1992.4	1512.27	1991.9	1574.57	1990.6	1628.15
GR	1989.7	1649.09	1980.6	1683.4	1981.4	1710.99	1980.9	1747.36	1988.4	1764.17
GR	1989.7	1825.53	1989.9	1910.87	1990.3	1988.92	1990.3	2014.51	1989.6	2113.37
GR	1991.8	2134.73	1991.8	2175.51	1991.5	2213.67	1992	2272.76	1993.1	2287.01
GR	1993.1	2302.85	1991.5	2319.43	1991.7	2362.97	1991.1	2406.64	1993.4	2420.8
GR	1993.5	2469.97								

SECTION 15667 CUT FROM CNLV TOPO

1

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X1	15667	19	1505	1672	553	553	553		-2.4	
X3	10									
GR	2006	1000	2004	1010	2002	1030	2002	1040	2002	1150
GR	2000	1170	1998	1240	1996	1505	1992	1530	1992	1580
GR	1994	1660	1996	1672	1997	1950	1997	2180	1998	2315
GR	2000	2385	2000.5	2500	2002	2750	2004	2830		
X1	16546	51	1033.85	2193.69	879	879	879			
X3	10									
GR	2006.9	1000	2006.8	1010.78	2006.1	1016.3	2006.7	1024.48	2006.8	1033.85
GR	2005.8	1039.27	2006.4	1045.74	2005.4	1105.06	2005.9	1124.21	2004.8	1165.3
GR	2004.5	1207.41	2003.2	1248.7	2002.7	1303.12	2003.2	1323.23	2003.7	1363.28
GR	2003	1384.95	2002.4	1422.56	2002.9	1449.26	2002.1	1478.94	2001.6	1523.77
GR	1999.6	1542.4	1994.6	1560.28	1994.9	1595.91	1993	1611.38	1993.5	1666.94
GR	1994.8	1684.76	2001.8	1696.43	2002.6	1732.45	2002.1	1766.78	2003.9	1784.85
GR	2006.1	1817.89	2007	1842.65	2007.4	1867.41	2006.7	1892.85	2009.1	1918.63
GR	2008.6	1957.57	2008.3	2006.72	2008.7	2052.44	2009.6	2074.93	2009.6	2122.66
GR	2013.1	2156.53	2013.9	2193.69	2010.8	2246.21	2011.1	2266.5	2009.9	2285.66
GR	2011.5	2296.24	2014.4	2329.51	2009.4	2361.01	2013.7	2373.12	2009.6	2383.61
GR	2008.7	2409.39								
NC	.045	.045	.045	0.1	0.3					
X1	17058	43	1359.48	1938.16	512	512	512			
X3	10	0	0	0	0	0	0	0	0	
GR	2013	1000	2013	1073.16	2013.6	1143.99	2013.8	1197.07	2013.8	1251.55
GR	2013.8	1308.43	2013.8	1359.48	2013.3	1403.3	2012.6	1443.16	2010.6	1475.15
GR	2011.5	1499.88	2007.2	1508.86	2006.6	1524.38	2011.1	1542.91	2004.9	1561.98
GR	2006.2	1588.21	2004.6	1623.75	2006.7	1633.73	2005.4	1671.7	2005.6	1712.49
GR	2010.9	1735.99	2013	1760.7	2014.1	1799.91	2016.4	1839.49	2018	1893.93
GR	2019	1938.16	2018.8	1979.65	2017.8	2023.12	2016.8	2052.36	2016.9	2076.96
GR	2019.5	2097.45	2019.4	2117.17	2016.7	2144.75	2015.5	2171.7	2016.4	2196.52
GR	2018.6	2219.04	2017.6	2235.65	2015.1	2278.14	2016.4	2314.03	2014	2356.58
GR	2012.9	2417.09	2009.4	2453.61	2008.7	2504.6				
X1	17612	47	1599.17	2107.09	554	554	554			
X3	10									
GR	2017.5	1000	2017.9	1014.14	2019.1	1061.46	2018.6	1107.82	2018.6	1146.75
GR	2019.4	1149.73	2018	1156.88	2018.9	1169.22	2019.4	1218.1	2019.3	1281.77
GR	2019.5	1337.02	2019.2	1373.49	2020.2	1403.28	2019.5	1447.41	2020.7	1473.98
GR	2020.2	1530.55	2018.8	1547.3	2018.2	1568.04	2019.6	1578.58	2020.2	1599.17
GR	2019.8	1621.27	2015.4	1638.14	2013.6	1657.35	2014.7	1708.33	2011.3	1714.43
GR	2014.2	1726.74	2014.4	1742.41	2013.8	1761.75	2014.8	1779.7	2011	1804.57
GR	2009.2	1843.45	2009.5	1862.85	2013.9	1873.55	2016.8	1894.29	2017.7	1912.3
GR	2017.3	1950.29	2019.1	1985.62	2019.6	2028.19	2020.6	2041.68	2022	2084.98
GR	2023.6	2107.09	2022.4	2120.89	2022.4	2158.33	2024	2187.61	2025	2213.62
GR	2025.4	2259.48	2025.1	2309						

ADDED 3 POINTS TO LEFT BANK FROM KENNY TOPO 1/20

1

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```
X1    18436        44    1374.86    2012.84       824       824       824
X3       10
GR     2024       780       2024        880       2024       965    2025.8      1000    2025.9   1060.03
GR   2025.5   1101.54     2025.5    1161.04     2025.7   1213.91    2026.5   1261.85    2026.7   1291.71
GR   2027.2   1333.82     2028.2    1374.86     2027.8   1416.23    2027.8   1469.12    2027.2   1499.51
GR   2025.6   1535.68     2023.2    1577.09     2021.5   1611.73    2019.6   1648.4     2019.1   1670.38
GR   2019.3   1692.62     2021.2    1722.68     2021.8   1742.03    2022.1   1774.31    2022.2   1800.18
GR     2024   1831.25     2025.3    1850.91     2025.3   1882.76    2025.1   1914.54    2026.7   1942.83
GR   2027.8   1971.11     2028.2    2012.84     2027.5   2047.72      2028   2090.73    2028.8   2121.56
GR     2029   2161.18     2028.7    2214.59     2029.6   2257.8     2031.1   2294.58      2033    2320.6
GR   2034.6   2346.17     2034.6    2360.41     2033.6   2385.33    2030.5   2447.19

  DEBRIS REPRESENTED BY CROSS SECTIONS 18462 AND 18472
  SECTION 18462 CUT FROM CNLV TOPO

X1    18462        14        32        429        26        26        26                 -2.4
GR     2032         0      2032         32      2030        42      2028        57      2026       70
GR   2022.4       131    2022.4        194      2024       209      2024       232      2026      234
GR     2028       336      2030        341      2032       429      2034       479

  SECTION 18462 DUPLICATED 10' U/S

X1    18472        14        32        429        10        10        10                 -2.4
GR     2032         0      2032         32      2030        42      2028        57      2026       70
GR   2022.4       131    2022.4        194      2024       209      2024       232      2026      234
GR     2028       336      2030        341      2032       429      2034       479

  SECTION 18619 CUT FROM CNLV TOPO

X1    18619        25         0        397       147       147       147                 -2.4
GR     2029         0      2028         50      2026        80      2024       102      2024      128
GR     2026       180      2027        215      2027       227      2026       248      2024      264
GR     2024       342      2026        347      2028       364      2030       370      2032      397
GR     2032       418      2030        430      2028       465      2028       491      2030      555
GR     2031       590      2032        709      2034       789      2034       797      2034      894

  CUT SECTION FROM CNLV TOPO

X1    18710        23      1000       1700        91        91        91                 -2.4
GR     2031      1000      2030       1070      2030      1125      2028      1160      2026     1180
GR     2026      1210      2030       1220      2030      1240      2018      1260      2018     1310
GR     2020      1345      2022       1380      2024      1410      2026      1435      2028     1450
GR     2030      1535      2032       1580      2032      1700      2038      1735      2038     1745
GR     2034      1770      2034       1865      2036      2095

  CUT SECTION FROM CNLV TOPO

X1    19020        13      1000       1470       310       310       310                 -2.4
GR     2032      1000      2030       1050      2028      1090      2026      1110      2024     1130
GR     2022      1155      2020       1180      2020      1370      2022      1430      2030     1465
GR     2032      1470      2034       1575      2036      1610

  CUT SECTION FROM CNLV TOPO
1
   15APR98      13:58:02                                                                  PAGE   14


X1    19215        13      1000       1330       195       195       195                 -2.4
GR     2036      1000      2034       1025      2032      1038      2032      1070      2030     1089
GR     2028      1098      2028       1119      2030      1125      2032      1160      2032     1260
GR     2034      1272      2038       1300      2040      1330


X1    19802        46    1510.5    2179.13       587       587       587
X3       10
GR   2041.6      1000    2041.5    1046.48    2039.3   1081.39    2038.7   1110.52    2039.7   1154.42
GR   2040.5   1184.19    2038.7    1210.92    2034.8   1249.33    2032.9   1287.07    2031.9   1300.58
GR     2032   1315.86    2034.6    1346.74    2036.8    1373.6    2039.7   1416.99    2042.4   1448.51
GR   2044.4   1482.22    2044.4     1510.5    2043.7   1540.75    2043.7   1569.59    2040.9   1599.88
GR   2039.5   1643.73    2038.4    1703.43    2038.9   1715.29    2037.5   1725.92    2034.5   1762.3
GR   2034.3    1780.5    2032.5    1794.35      2032   1814.83    2032.2   1837.85    2032.7   1857.1
GR   2033.5   1881.06    2034.3    1914.07    2036.2   1954.17    2036.5   1979.88    2038.2   2000.14
GR   2039.5   2048.44    2040.8    2101.47    2041.2   2137.26    2041.3   2179.13    2040.3   2206.98
GR   2040.1   2282.34    2040.5    2296.63      2041   2352.88    2041.4   2379.33    2041.7   2393.79
GR   2046.5   2440.08

X1    20595        30    1175.03    1780.94       793       793       793
X3       10
GR   2053.4      1000    2050.3     1053.9    2049.5   1072.42    2048.6   1147.63    2048.5   1175.03
GR   2047.3    1213.4    2042.3    1233.31    2041.5   1252.21    2041.7   1278.91    2040.3   1292.04
GR   2040.8   1307.82    2040.3    1315.35    2041.5   1329.05    2041.5    1367.1    2039.4   1374.77
GR   2039.3   1391.01    2042.2    1402.49    2042.1   1412.56    2043.6   1428.19    2043.8   1441.31
GR   2045.9   1463.28    2045.7     1509.8      2046   1549.61    2046.9   1571.99    2046.6   1606.16
GR   2046.3   1620.17    2046.5    1666.78    2047.3   1701.91      2047    1730.5    2048.2   1780.94

X1    21291        40    1082.37    1603.93       696       696       696
X3       10
GR   2057.5      1000    2055.7    1041.47    2054.1   1052.27    2054.9   1065.72    2056.1   1082.37
GR   2055.6   1096.57    2049.8    1121.39    2050.1   1157.01    2050.9   1186.54    2050.7   1226.18
GR   2049.7   1271.29    2048.6    1312.57    2046.2   1326.33    2045.8   1342.04    2048.1   1357.87
GR   2048.9   1388.15      2049    1432.26    2045.4   1440.93    2045.4   1453.12    2046.2   1460.09
GR   2047.4   1479.88    2046.7    1508.66    2048.6   1525.56    2047.4   1541.05    2049.2   1557.32
GR   2054.2   1580.56    2055.5    1603.93    2055.3   1614.05    2050.1   1634.03    2051.5   1646.85
GR   2050.2   1662.75    2053.2    1691.04    2054.7   1703.17    2054.1   1717.68    2054.8   1740.29
GR   2054.2   1755.38    2055.3    1779.76    2056.9   1804.58    2059.6   1840.52    2058.5   1875.28

X1    22138        45    1153.02    1845.3       847       847       847
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X3       10
GR     2065       1000      2064.2    1028.21    2064.2    1044.93    2064.8    1062.86      2065    1122.17
GR   2065.1    1153.02      2063.6    1171.24      2057    1198.51    2056.9    1209.25    2055.3    1220.44
GR   2055.9       1233        2055    1254.99    2055.5    1267.43    2054.9    1288.54    2052.6    1299.22
GR     2054    1331.64      2053.4    1343.77    2054.8    1353.31    2053.5    1364.18    2055.4    1376.62
GR   2055.7    1393.52      2056.7    1440.89    2057.5    1492.61    2057.6    1551.85    2057.4    1558.95
GR   2057.5    1574.03      2059.6    1587.92    2057.9    1602.87    2058.3    1624.73    2058.9      1664
GR     2059    1681.88      2061.6     1696.4      2061    1715.37    2064.1       1752      2066    1780.08
GR   2066.5    1808.11      2066.7     1845.3    2065.3    1884.82    2064.3    1915.48    2063.9    1951.16
GR   2062.8    1987.23      2061.8    2019.52    2060.2    2043.65    2059.3    2078.64    2058.5    2091.44
1
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X1     23230         27    1139.83    1531.88       1092       1092       1092
X3        10
GR    2076.7       1000      2076.1    1016.84    2074.9    1061.89    2068.1    1081.86    2075.4    1111.27
GR    2075.5    1139.83      2074.2    1166.71    2066.5    1193.41    2065.6    1213.71    2066.8    1235.89
GR    2064.9    1255.54      2065.5    1264.15    2064.8    1280.17    2065.2    1292.98    2065.1     1311.7
GR    2063.6    1322.89      2063.2    1333.84    2064.3    1352.07    2063.1    1361.54    2064.2    1397.04
GR    2065.5    1403.83      2065.5    1425.63    2066.5    1435.79    2066.6    1449.87    2072.1    1482.47
GR      2082    1514.37      2082.3    1531.88

X1     24530         24    1057.36    1506.91       1300       1300       1300
X3        10
GR    2089.3       1000      2089.1    1057.36    2088.1       1097    2087.5    1131.87    2079.2    1157.95
GR    2079.2    1170.13      2077.3    1177.86    2078.6    1189.17       2079    1212.67    2077.7    1231.33
GR    2076.5    1287.94      2077.2     1303.9    2078.3    1319.85    2078.3    1331.35    2077.1    1340.46
GR    2076.8    1364.53      2077.8    1380.92    2077.8    1409.89    2075.6    1424.15    2075.4    1434.07
GR    2085.4    1460.45      2105.9    1487.26    2106.5    1506.91    2104.8    1528.79

X1     25616         35    1184.78    1836.38       1086       1086       1086
X3        10
GR    2101.4       1000        2101    1045.55    2099.9    1064.96    2098.8    1097.76    2100.6    1140.3
GR    2100.5    1184.78      2100.3    1232.97    2098.8    1266.02    2095.4    1298.04    2093.6    1320.41
GR    2090.3    1337.94      2088.6     1351.7    2085.1     1366.4    2085.5    1380.16      2088    1389.21
GR      2088    1401.52      2086.9    1411.19    2086.2    1423.94    2087.8    1440.11    2088.3    1475.16
GR    2089.9    1536.61      2090.5    1565.47    2089.9    1577.62    2091.1    1606.85    2095.5     1630.6
GR    2096.8     1656.2      2092.3     1681.9      2092    1698.26    2094.5    1711.86    2095.2    1722.18
GR      2098    1749.32        2098    1767.19    2099.3      1795    2100.6    1836.38    2099.8    1884.62

X1     26383         35    1170.09    1701.35       767        767        767
X3        10
GR    2113.1       1000      2111.6    1036.82    2109.6     1062.2    2108.4     1109.45    2106.8    1118.94
GR    2109.3    1139.73      2109.8    1170.09    2108.5    1193.39    2105.4    1226.56    2095.8    1254.34
GR    2096.8    1269.86      2095.3    1278.59    2094.3    1298.05    2092.4     1307.9    2091.9    1327.03
GR    2090.2    1338.57        2090    1360.32    2092.4    1367.29    2093.1    1381.56    2092.1    1414.58
GR    2091.1    1427.75      2096.3    1445.95    2101.5    1471.22    2102.6    1501.08    2101.3      1515
GR    2100.7    1570.49      2102.6    1604.17    2103.1    1638.74    2103.7    1673.36    2105.6    1701.35
GR      2106    1729.64      2104.9    1761.13    2107.4    1791.33    2107.1    1828.72    2106.3    1856.7

NC      .045       .045       .030
    SECTION CUT FROM TOPO
X1     27000          5         51        117        617        617        617
GR      2112          0       2112         51     2101.5         72     2101.5         96       2112        117
    SECTION CUT FROM TOPO

X1     27303          5         51        117        303        303        303
GR      2115          0       2115         51     2104.5         72     2104.5         96       2115        117


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*PROF 1

CCHV=     .100 CEHV=     .300
*SECNO 150.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1896.00 ELRRA=     1896.00

   150.000       3.02    1889.02    1889.02    1888.90    1890.55       1.53        .00        .00    1896.00
    1025.0         .0     1025.0         .0         .0      103.4         .0         .0         .0    1896.00
       .00        .00       9.91        .00       .000       .014       .000       .000    1886.00    1000.01
   .002986         0.         0.         0.          0          8          0        .00      34.22    1035.03


*SECNO 243.600

3265 DIVIDED FLOW

   243.600       3.43    1889.63        .00        .00    1890.81       1.18        .23        .03    1896.20
    1025.0         .0     1025.0         .0         .0      117.7         .0         .2         .1    1896.20
       .00        .00       8.71        .00       .000       .014       .000       .000    1886.20    1000.01
   .002033        94.        94.        94.          5          0          0        .00      34.19    1035.00
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*SECNO 244.600
   244.600      3.60   1889.80       .00       .00   1890.83      1.03       .00       .02   1896.20
    1025.0        .0    1025.0        .0        .0     126.0        .0        .2        .1   1896.20
       .00       .00      8.14       .00      .000      .014      .000      .000   1886.20   1000.01
   .001366        1.        1.        1.         3         0         0       .00     35.00   1035.00


*SECNO 450.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

   450.000      3.03   1890.03   1890.03       .00   1891.54      1.51       .37       .14   1897.00
    1025.0        .0    1025.0        .0        .0     104.0        .0        .8        .2   1897.00
       .01       .00      9.85       .00      .000      .014      .000      .000   1887.00   1000.70
   .002416       205.      205.      205.        20        11         0       .00     34.61   1035.30


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   544.000      3.90   1891.10   1891.10       .00   1892.71      1.61       .21       .03   1897.20
    1025.0        .0    1025.0        .0        .0     100.7        .0       1.0        .3   1897.20
       .01       .00     10.18       .00      .000      .014      .000      .000   1887.20   1009.15
   .002165        94.       94.       94.        20        11         0       .00     31.69   1040.85


*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   600.000      3.91   1891.31   1891.31       .00   1892.92      1.61       .12       .00   1897.40
    1025.0        .0    1025.0        .0        .0     100.7        .0       1.1        .4   1897.70
       .01       .00     10.18       .00      .000      .014      .000      .000   1887.40   1009.14
   .002156        56.       56.       56.         3         5         0       .00     31.55   1040.69


*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   700.000      3.90   1891.60   1891.60       .00   1893.21      1.61       .22       .00   1897.70
    1025.0        .0    1025.0        .0        .0     100.8        .0       1.4        .4   1897.70
       .02       .00     10.17       .00      .000      .014      .000      .000   1887.70   1009.15
   .002163       100.      100.      100.         2         5         0       .00     31.69   1040.85


*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1200.000      3.90   1893.20   1893.20       .00   1894.81      1.60      1.08       .00   1899.30
    1025.0        .0    1025.0        .0        .0     100.8        .0       2.5        .8   1899.30
       .03       .00     10.17       .00      .000      .014      .000      .000   1889.30   1009.15
   .002158       500.      500.      500.        20         5         0       .00     31.70   1040.85


*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1700.000      3.90   1894.90   1894.90       .00   1896.51      1.61      1.08       .00   1901.00
    1025.0        .0    1025.0        .0        .0     100.8        .0       3.7       1.2   1901.00
       .04       .00     10.17       .00      .000      .014      .000      .000   1891.00   1009.15
   .002160       500.      500.      500.        20         5         0       .00     31.70   1040.85


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 CCHV=      .100 CEHV=      .300
 *SECNO 2000.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  2000.000      3.90   1895.90   1895.90       .00   1897.51      1.61       .65       .00   1902.00
    1025.0        .0    1025.0        .0        .0     100.8        .0       4.4       1.4   1902.00
       .05       .00     10.17       .00      .000      .014      .000      .000   1892.00   1009.15
   .002160       300.      300.      300.        20         5         0       .00     31.70   1040.85
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*SECNO 2200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000      3.90   1896.50   1896.50       .00   1898.11      1.61       .43       .00   1902.60
    1025.0        .0    1025.0        .0        .0     100.8        .0       4.8       1.5   1902.60
       .06       .00     10.17       .00      .000      .014      .000      .000   1892.60   1009.15
   .002160      200.      200.      200.         4         5         0       .00     31.70   1040.85


1490 NH CARD USED
*SECNO 3724.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      3.94   1901.54   1901.54       .00   1903.14      1.61      3.28       .00   1907.60
    1025.0        .0    1025.0        .0        .0     100.8        .0       6.4       2.6   1907.60
       .10       .00     10.17       .00      .000      .014      .000      .000   1897.60   1305.90
   .002147      1524.     1524.     1524.         3         5         0       .00     31.51   1337.40


CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

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     SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  3823.000      4.55   1902.55       .00       .00   1903.35       .80       .13       .08   1908.50
    1025.0        .0    1025.0        .0        .0     142.6        .0       8.6       2.7   1908.50
       .10       .00      7.19       .00      .000      .014      .000      .000   1898.00   1000.01
   .000863       99.       99.       99.         3         0         0       .00     34.83   1034.83


*SECNO 4020.000

3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=       1  TARGET=      128.200
 ELENCL=    1914.90  ELENCR=  100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      3.96   1902.56       .00       .00   1903.64      1.08       .21       .08   1909.20
    1025.0        .0    1025.0        .0        .0     122.8        .0       9.2       2.9   1909.10
       .11       .00      8.35       .00      .000      .014      .000      .000   1898.60   1603.18
   .001344      197.      197.      197.         3         0         0       .00     33.97   1637.15


*SECNO 4060.000

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=       1  TARGET=      116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1909.30

  4060.000      3.85   1902.55       .00       .00   1903.73      1.18       .06       .03 100000.00
    1025.0        .0    1025.0        .0        .0     117.8        .0       9.3       2.9   1909.30
       .11       .00      8.70       .00      .000      .014      .000      .000   1898.70   1604.10
   .001519       40.       40.       40.         2         0         0       .00     33.65   1637.75


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3470 ENCROACHMENT STATIONS=     1603.9    1721.6  TYPE=       1  TARGET=      117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      4.06   1902.86       .00       .00   1903.85      1.00       .07       .05   1909.30
    1281.0        .0    1281.0        .0        .0     160.0        .0       9.5       2.9   1909.30
       .11       .00      8.01       .00      .000      .014      .000      .000   1898.80   1604.06
   .001127       55.       55.       55.         3         0         0       .00     39.48   1643.54


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     SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.40


3470 ENCROACHMENT STATIONS=          .0      56.3  TYPE=      1  TARGET=       56.299
  4188.000      4.10   1903.50      .00       .00   1904.05       .54       .06       .14   1915.00
    1281.0        .0    1281.0       .0        .0     216.3        .0       9.8       3.0   1914.80
       .12       .00      5.92      .00       .000      .014      .000      .000   1899.40       .07
   .000575       73.       73.       73.         2         0         0       .00     52.75     52.83


*SECNO 4189.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.60 MAX ELLC=  1909.70


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000      4.05   1903.45      .00       .00   1904.10       .64       .00       .05   1914.80
    1281.0        .0    1281.0       .0        .0     199.2        .0       9.8       3.0   1914.60
       .12       .00      6.43      .00       .000      .014      .000      .000   1899.40       .06
   .000695         1.        1.        1.         2         0         0    -14.47     52.74     52.80


*SECNO 4246.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.80 MAX ELLC=  1910.20


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1915.00 ELREA=      1914.80

  4246.000      3.49   1903.39      .00       .00   1904.26       .87       .05       .11   1915.00
    1281.0        .0    1281.0       .0        .0     171.6        .0      10.1       3.1   1914.80
       .12       .00      7.46      .00       .000      .014      .000      .000   1899.90       .07
   .001114       57.       57.       57.         3         0         0    -12.47     52.73     52.80


*SECNO 4247.000
  4247.000      3.78   1903.68      .00       .00   1904.32       .64       .00       .07   1915.00
    1281.0        .0    1281.0       .0        .0     199.5        .0      10.1       3.1   1914.80
       .12       .00      6.42      .00       .000      .014      .000      .000   1899.90       .07
   .000742         1.        1.        1.         3         0         0       .00     52.75     52.83


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4360.000      4.86   1905.76   1905.76       .00   1907.53       1.77       .13       .34   1911.40
    1281.0        .0    1281.0       .0        .0     120.0        .0      10.5       3.2   1911.40
       .12       .00     10.67      .00       .000      .014      .000      .000   1900.90   1011.29
   .002085       113.      113.      113.        20        11         0       .00     34.43   1045.71


*SECNO 4831.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4831.000      4.86   1909.66   1909.66       .00   1911.43       1.76       .98       .00   1915.30
    1281.0        .0    1281.0       .0        .0     120.2        .0      11.8       3.6   1915.30
       .13       .00     10.66      .00       .000      .014      .000      .000   1904.80   1011.28
   .002075       471.      471.      471.        20         5         0       .00     34.45   1045.72


*SECNO 4920.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4920.000      4.86   1910.36   1910.36       .00   1912.13       1.76       .18       .00   1916.00
    1281.0        .0    1281.0       .0        .0     120.2        .0      12.0       3.6   1916.00
       .13       .00     10.66      .00       .000      .014      .000      .000   1905.50   1011.28
   .002077       89.       89.       89.        20         5         0       .00     34.44   1045.72


*SECNO 5005.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5005.000      4.86   1911.06   1911.06       .00   1912.83       1.76       .18       .00   1916.70
    1281.0        .0    1281.0       .0        .0     120.2        .0      12.3       3.7   1916.70
       .14       .00     10.66      .00       .000      .014      .000      .000   1906.20   1011.28
   .002077       85.       85.       85.        20         5         0       .00     34.44   1045.72
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	3.46	1911.66	1911.66	.00	1913.40	1.73	.22	.00	1919.20
1281.0	.0	1281.0	.0	.0	121.2	.0	12.6	3.8	1919.20
.14	.00	10.57	.00	.000	.014	.000	.000	1908.20	1000.01
.002404	100.	100.	100.	20	15	0	.00	35.00	1035.00

*SECNO 5200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5200.000	3.26	1912.06	1912.06	.00	1913.70	1.65	.23	.01	1919.80
1281.0	.0	1281.0	.0	.0	124.4	.0	12.8	3.9	1919.80
.14	.00	10.30	.00	.000	.014	.000	.000	1908.80	1000.01
.002406	95.	95.	95.	2	11	0	.00	38.20	1038.20

*SECNO 5500.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5500.000	2.79	1913.59	1913.59	.00	1915.00	1.41	.72	.02	1921.80
1281.0	.0	1281.0	.0	.0	134.6	.0	13.7	4.2	1921.80
.15	.00	9.51	.00	.000	.014	.000	.000	1910.80	1000.01
.002363	300.	300.	300.	20	11	0	.00	48.20	1048.20

*SECNO 5852.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5852.000	2.63	1915.13	1915.13	.00	1916.40	1.27	.84	.01	1923.50
1281.0	.0	1281.0	.0	.0	141.5	.0	14.8	4.6	1923.50
.16	.00	9.05	.00	.000	.014	.000	.000	1912.50	1466.08
.002383	352.	352.	352.	20	11	0	.00	56.25	1522.33

CCHV= .300 CEHV= .500
*SECNO 5853.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1923.50 ELREA= 1923.50

5853.000	2.64	1915.14	1915.13	.00	1916.41	1.27	.00	.00	1923.50
1281.0	.0	1281.0	.0	.0	141.8	.0	14.8	4.6	1923.50
.16	.00	9.03	.00	.000	.015	.000	.000	1912.50	1466.08
.002716	1.	1.	1.	0	5	0	.00	56.26	1522.33

*SECNO 5973.000

3370 NORMAL BRIDGE, NRD= 32 MIN ELTRD= 1922.00 MAX ELLC= 1924.10

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1924.10 ELREA= 1924.10

5973.000	2.76	1915.86	1915.86	.00	1917.19	1.33	.43	.03	1924.10
1281.0	.0	1281.0	.0	.0	138.2	.0	15.2	4.7	1924.10
.17	.00	9.27	.00	.000	.015	.000	.000	1913.10	1466.08
.004886	120.	120.	120.	20	15	0	-10.62	56.26	1522.33

CCHV= .100 CEHV= .300
*SECNO 5974.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.07

5974.000	3.42	1916.52	.00	.00	1917.26	.74	.00	.06	1923.20
1281.0	.0	1281.0	.0	.0	186.1	.0	15.2	4.7	1923.10
.17	.00	6.88	.00	.000	.015	.000	.000	1913.10	.07
.001135	1.	1.	1.	5	0	0	.00	56.27	56.33

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 CCHV=     .100 CEHV=     .300
 *SECNO 6092.000
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .44

   6092.000      2.77    1916.77       .00        .00     1917.54       .77        .28        .01     1922.60
     1281.0        .0     1281.0        .0         .0      181.6         .0       15.8        4.9     1923.10
        .17        .00       7.05       .00       .000       .030       .000       .000    1914.00     1739.21
    .005968       126.       126.       126.          3          0          0        .00      71.32     1810.53


 *SECNO 6370.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

   6370.000      3.41    1918.21       .00        .00     1918.70       .49       1.13        .03     1925.40
     1281.0        .0     1281.0        .0         .0      227.4         .0       17.1        5.4     1925.40
        .18        .00       5.63       .00       .000       .030       .000       .000    1914.80     1746.25
    .002955       278.       278.       278.          2          0          0        .00      73.50     1819.75


 *SECNO 6828.000
   6828.000      3.38    1919.58       .00        .00     1920.08       .50       1.37        .00     1926.90
     1281.0        .0     1281.0        .0         .0      225.5         .0       19.4       6.2      1928.00
        .21        .00       5.68       .00       .000       .030       .000       .000    1916.20     1790.06
    .003038       458.       458.       458.          2          0          0        .00      73.53     1863.58


 *SECNO 7265.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

   7265.000      2.72    1921.22       .00        .00     1922.03       .81       1.86        .09     1930.00
     1281.0        .0     1281.0        .0         .0      177.8         .0       21.5        6.9     1930.90
        .22        .00       7.20       .00       .000       .030       .000       .000    1918.50     1779.57
    .006359       437.       437.       437.          2          0          0        .00      70.91     1850.48


 CCHV=     .100 CEHV=     .300
 *SECNO 7730.000
   7730.000      2.71    1924.21       .00        .00     1925.02       .82       2.99        .00     1933.50
     1281.0        .0     1281.0        .0         .0      176.4         .0       23.4        7.6     1934.20
        .24        .00       7.26       .00       .000       .030       .000       .000    1921.50     1848.61
    .006520       465.       465.       465.          1          0          0        .00      70.79     1919.39


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 8323.000
   8323.000      2.76    1927.96       .00        .00     1928.74       .78       3.71        .00     1937.90
     1281.0        .0     1281.0        .0         .0      180.8         .0       25.8        8.6     1938.90
        .26        .00       7.09       .00       .000       .030       .000       .000    1925.20     2276.56
    .006017       593.       593.       593.          2          0          0        .00      70.88     2347.44


 *SECNO 8673.000
   8673.000      2.71    1930.11       .00        .00     1930.92       .81       2.17        .01     1939.90
     1281.0        .0     1281.0        .0         .0      177.7         .0       27.2        9.2     1941.90
        .28        .00       7.21       .00       .000       .030       .000       .000    1927.40     1019.57
    .006367       350.       350.       350.          1          0          0        .00      70.86     1090.43


 CCHV=     .300 CEHV=     .500
 *SECNO 8754.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1941.60 ELREA=     1941.80

   8754.000      5.02    1932.92    1932.92       .00     1934.82       1.89        .30        .54     1941.60
     1281.0        .0     1281.0         .0         .0      116.0         .0       27.5        9.3     1941.80
        .28        .00      11.04       .00       .000       .015       .000       .000    1927.90        6.09
    .002401        81.        81.        81.         20         14          0        .00      30.86       36.95


 *SECNO 8755.000
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3370 NORMAL BRIDGE, NRD= 9 MIN ELTRD= 1941.60 MAX ELLC= 1941.80

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1941.60 ELREA= 1941.80

8755.000	5.21	1933.11	1933.11	.00	1935.04	1.93	.00	.02	1941.60
1281.0	.0	1281.0	.0	.0	114.8	.0	27.5	9.3	1941.80
.28	.00	11.16	.00	.000	.015	.000	.000	1927.90	1005.82
.003491	1.	1.	1.	3	19	0	-6.98	31.43	1037.24

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 8860.000

3370 NORMAL BRIDGE, NRD= 14 MIN ELTRD= 1942.10 MAX ELLC= 1942.30

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1942.10 ELREA= 1942.30

8860.000	5.21	1933.61	1933.61	.00	1935.54	1.93	.28	.00	1942.10
1281.0	.0	1281.0	.0	.0	114.8	.0	27.7	9.3	1942.30
.28	.00	11.16	.00	.000	.015	.000	.000	1928.40	1005.82
.003491	79.	79.	79.	3	19	0	-6.98	31.43	1037.24

*SECNO 8861.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.97

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1942.10 ELREA= 1948.80

8861.000	6.51	1934.91	1933.43	.00	1935.84	.93	.00	.30	1942.10
1281.0	.0	1281.0	.0	.0	165.4	.0	27.7	9.3	1948.80
.28	.00	7.75	.00	.000	.015	.000	.000	1928.40	3.85
.000900	1.	1.	1.	25	8	0	.00	35.46	39.31

1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1661.3 2712.5 TYPE= 1 TARGET= 1051.170

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 100000.00 ELREA= 1945.50

9120.000	5.35	1936.25	1936.25	.00	1938.07	1.82	.36	.44	100000.00
1281.0	.0	1281.0	.0	.0	118.4	.0	28.6	9.5	1945.50
.29	.00	10.82	.00	.000	.015	.000	.000	1930.90	1879.98
.002405	259.	259.	259.	20	15	0	.00	33.15	1913.13

CCHV= .100 CEHV= .300
*SECNO 9237.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1950.00

9237.000	1.73	1941.73	1941.73	.00	1942.27	.54	.68	.13	1948.00
1281.0	.0	1281.0	.0	.0	216.9	.0	29.0	9.8	1950.00
.29	.00	5.91	.00	.000	.045	.000	.000	1940.00	2132.66
.029466	117.	117.	117.	20	17	0	.00	203.73	2336.39

*SECNO 9429.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.47

3470 ENCROACHMENT STATIONS= 1573.0 2815.0 TYPE= 1 TARGET= -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1949.10

9429.000	1.99	1944.09	.00	.00	1944.19	.10	1.88	.04	1948.00
1281.0	.0	1281.0	.0	.0	502.2	.0	30.6	11.2	1949.10
.32	.00	2.55	.00	.000	.045	.000	.000	1942.10	1853.06
.004820	192.	192.	192.	4	0	0	.00	427.79	2280.85

*SECNO 10155.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1567.2 2685.3 TYPE= 1 TARGET= -1567.240

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1953.70 ELREA= 1953.80

10155.000	4.50	1953.20	1953.20	.00	1953.78	.58	7.34	.14	1953.70
1281.0	.0	1281.0	.0	.0	209.1	.0	36.5	16.5	1953.80
.35	.00	6.13	.00	.000	.045	.000	.000	1948.70	2150.03
.033231	726.	726.	726.	13	23	0	.00	202.06	2416.42

*SECNO 10962.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1959.90 ELREA= 1959.30

10962.000	2.60	1959.30	1959.13	.00	1959.37	.07	4.39	22.65	1959.90
1281.0	.0	418.8	862.2	.0	265.0	366.2	44.3	23.8	1959.30
.45	.00	1.58	2.35	.000	.045	.045	.000	1956.70	1445.00
.002138	807.	807.	807.	20	14	0	.00	592.26	2037.26

*SECNO 11614.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1966.90 ELREA= 1965.50

11614.000	4.04	1964.34	1964.34	.00	1964.90	.56	3.56	.15	1966.90
1281.0	.0	1281.0	.0	.0	213.6	.0	50.6	29.9	1965.50
.48	.00	6.00	.00	.000	.045	.000	.000	1960.30	1134.22
.034027	652.	652.	652.	20	15	0	.00	218.05	1352.27

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 12202.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.70

12202.000	5.62	1968.32	.00	.00	1968.56	.24	3.62	.03	1971.40
1281.0	.0	1278.9	2.1	.0	326.1	3.5	54.3	32.1	1974.30
.53	.00	3.92	.62	.000	.045	.045	.000	1962.70	1423.81
.002486	588.	588.	588.	4	0	0	.00	104.68	1812.47

*SECNO 13094.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	5.28	1969.98	.00	.00	1970.12	.14	1.55	.01	1978.00

1281.0	.0	1281.0	.0	.0	426.8	.0	62.0	34.2	1977.60
.61	.00	3.00	.00	.000	.045	.000	.000	1964.70	1521.67
.001286	892.	892.	892.	2	0	0	.00	103.90	1625.56

*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .26

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	2.64	1972.94	.00	.00	1973.84	.90	3.49	.23	1987.80
1281.0	.0	1281.0	.0	.0	168.5	.0	69.4	36.5	1984.20
.65	.00	7.60	.00	.000	.045	.000	.000	1970.30	1702.98
.019382	1073.	1073.	1073.	2	0	0	.00	78.50	1781.47

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
14368.000	2.31	1984.91	1984.91	.00	1985.90	.99	4.33	.03	1985.60
1281.0	.0	1281.0	.0	.0	160.2	.0	70.1	36.8	1985.60
.66	.00	8.00	.00	.000	.045	.000	.000	1982.60	1541.72
.024049	201.	201.	201.	20	11	0	.00	81.56	1623.28

*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 6.16

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1991.90 ELREA= 1988.40

15114.000	6.70	1987.30	.00	.00	1987.40	.09	1.40	.09	1991.90
1281.0	.0	1281.0	.0	.0	527.6	.0	76.0	38.4	1988.40
.74	.00	2.43	.00	.000	.045	.000	.000	1980.60	1658.16
.000635	746.	746.	746.	6	0	0	.00	103.54	1761.69

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1993.60 ELREA= 1993.60

15667.000	2.00	1991.60	1991.60	.00	1992.29	.69	1.06	.18	1993.60
1281.0	.0	1281.0	.0	.0	192.3	.0	80.6	40.0	1993.60
.76	.00	6.66	.00	.000	.045	.000	.000	1989.60	1517.51
.027308	553.	553.	553.	20	17	0	.00	142.44	1659.95

*SECNO 16546.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	3.99	1996.99	.00	.00	1997.15	.16	4.81	.05	2006.80
1281.0	.0	1281.0	.0	.0	399.9	.0	86.6	42.8	2013.90
.84	.00	3.20	.00	.000	.045	.000	.000	1993.00	1551.72
.002273	879.	879.	879.	6	0	0	.00	136.70	1688.42

```
CCHV=     .100 CEHV=     .300
*SECNO 17058.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2013.80 ELREA=      2019.00

 17058.000      2.31   2006.91   2006.91       .00   2007.52       .61      2.84       .14   2013.80
    1281.0        .0    1281.0        .0        .0     203.9        .0      90.1      44.6   2019.00
       .86       .00      6.28       .00       .000      .045      .000      .000   2004.60   1516.30
   .028984       512.      512.      512.        20        14         0       .00    171.89   1718.31


*SECNO 17612.000

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2020.20 ELREA=      2023.60

 17612.000      4.24   2013.44       .00       .00   2013.82       .37      6.27       .02   2020.20
    1281.0        .0    1281.0        .0        .0     261.7        .0      93.1      46.3   2023.60
       .89       .00      4.90       .00       .000      .045      .000      .000   2009.20   1710.59
   .005981       554.      554.      554.         5         0         0       .00     96.80   1872.44


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 18436.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .53

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2028.20 ELREA=      2028.20

 18436.000      2.63   2021.73       .00       .00   2022.36       .64      8.47       .08   2028.20
    1281.0        .0    1281.0        .0        .0     200.2        .0      97.4      48.5   2028.20
       .93       .00      6.40       .00       .000      .045      .000      .000   2019.10   1607.23
   .021630       824.      824.      824.         3         0         0       .00    132.25   1739.48


*SECNO 18462.000
 18462.000      2.37   2022.37       .00       .00   2022.81       .45       .43       .02   2029.60
    1281.0        .0    1281.0        .0        .0     239.0        .0      97.6      48.6   2029.60
       .93       .00      5.36       .00       .000      .045      .000      .000   2020.00     90.77
   .013212        26.       26.       26.         2         0         0       .00    142.00    232.77


*SECNO 18472.000
 18472.000      2.59   2022.59       .00       .00   2022.93       .35       .11       .01   2029.60
    1281.0        .0    1281.0        .0        .0     270.8        .0      97.6      48.6   2029.60
       .93       .00      4.73       .00       .000      .045      .000      .000   2020.00     87.03
   .009046        10.       10.       10.         2         0         0       .00    145.96    232.99


*SECNO 18619.000

3265 DIVIDED FLOW

 18619.000      2.25   2023.85       .00       .00   2024.05       .20      1.10       .01   2026.60
    1281.0        .0    1281.0        .0        .0     354.0        .0      98.7      49.2   2029.60
       .94       .00      3.62       .00       .000      .045      .000      .000   2021.60     76.34
   .006336       147.      147.      147.         2         0         0       .00    218.41    349.08


*SECNO 18710.000

3265 DIVIDED FLOW

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.36

 18710.000      8.49   2024.09       .00       .00   2024.11       .02       .04       .02   2028.60
    1281.0        .0    1281.0        .0        .0    1098.2        .0     100.2      49.7   2029.60
```

.96	.00	1.17	.00	.000	.045	.000	.000	2015.60	1175.09
.000157	91.	91.	91.	5	0	0	.00	228.97	1438.68

*SECNO 19020.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.87

19020.000	6.53	2024.13	.00	.00	2024.14	.01	.02	.00	2029.60
1281.0	.0	1281.0	.0	.0	1875.3	.0	110.8	51.7	2029.60
1.09	.00	.68	.00	.000	.045	.000	.000	2017.60	1104.72
.000045	310.	310.	310.	2	0	0	.00	345.09	1449.81

*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

19215.000	3.65	2029.25	2029.25	.00	2030.34	1.09	.03	.32	2033.60
1281.0	.0	1281.0	.0	.0	152.9	.0	115.3	52.7	2037.60
1.10	.00	8.38	.00	.000	.045	.000	.000	2025.60	1073.35
.027650	195.	195.	195.	20	14	0	.00	80.47	1153.82

*SECNO 19802.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.54

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2044.40 ELREA= 2041.30

19802.000	3.44	2035.44	.00	.00	2035.62	.18	5.19	.09	2044.40
1281.0	.0	1281.0	.0	.0	373.7	.0	118.9	54.5	2041.30
1.14	.00	3.43	.00	.000	.045	.000	.000	2032.00	1750.85
.004300	587.	587.	587.	3	0	0	.00	187.36	1938.21

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 20595.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2048.50 ELREA= 2048.20

20595.000	2.99	2042.29	2042.29	.00	2042.85	.56	6.96	.11	2048.50
1281.0	.0	1281.0	.0	.0	212.8	.0	124.2	57.8	2048.20
1.18	.00	6.02	.00	.000	.045	.000	.000	2039.30	1233.65
.026928	793.	793.	793.	5	10	0	.00	180.85	1414.50

*SECNO 21291.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.39

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2056.10 ELREA= 2055.50

21291.000	3.85	2049.25	.00	.00	2049.40	.14	6.51	.04	2056.10
1281.0	.0	1281.0	.0	.0	421.7	.0	129.3	61.4	2055.50
1.25	.00	3.04	.00	.000	.045	.000	.000	2045.40	1287.83
.004698	696.	696.	696.	5	0	0	.00	269.77	1557.60

*SECNO 22138.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .52

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2065.10 ELREA= 2066.70

22138.000	3.37	2055.97	.00	.00	2056.39	.42	6.91	.08	2065.10
1281.0	.0	1281.0	.0	.0	247.2	.0	135.8	65.9	2066.70
1.29	.00	5.18	.00	.000	.045	.000	.000	2052.60	1215.71
.017536	847.	847.	847.	4	0	0	.00	190.89	1406.60

*SECNO 23230.000

3265 DIVIDED FLOW

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.74

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	3.35	2066.45	.00	.00	2066.64	.18	10.22	.02	2075.50
1281.0	.0	1281.0	.0	.0	371.5	.0	143.5	71.2	2082.30
1.38	.00	3.45	.00	.000	.045	.000	.000	2063.10	1194.34
.005810	1092.	1092.	1092.	2	0	0	.00	231.21	1435.37

*SECNO 24530.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2089.10 ELREA= 2106.50

24530.000	3.04	2078.44	2078.20	.00	2078.79	.35	12.10	.05	2089.10
1281.0	.0	1281.0	.0	.0	270.3	.0	153.1	78.2	2106.50
1.45	.00	4.74	.00	.000	.045	.000	.000	2075.40	1173.25
.017275	1300.	1300.	1300.	13	9	0	.00	235.71	1442.07

*SECNO 25616.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.62

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2100.50 ELREA= 2100.60

25616.000	4.41	2089.51	.00	.00	2089.76	.25	10.96	.01	2100.50
1281.0	.0	1281.0	.0	.0	322.0	.0	160.5	83.3	2100.60
1.53	.00	3.98	.00	.000	.045	.000	.000	2085.10	1344.31
.006608	1086.	1086.	1086.	4	0	0	.00	177.42	1521.74

*SECNO 26383.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2109.80 ELREA= 2105.60

26383.000	4.12	2094.12	.00	.00	2094.39	.27	4.62	.01	2109.80
1281.0	.0	1281.0	.0	.0	308.9	.0	166.1	86.1	2105.60
1.58	.00	4.15	.00	.000	.045	.000	.000	2090.00	1298.93
.005522	767.	767.	767.	3	0	0	.00	139.43	1438.36

*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27000.000	3.97	2105.47	2105.47	.00	2107.05	1.59	4.39	.40	2112.00
1281.0	.0	1281.0	.0	.0	126.6	.0	169.1	87.4	2112.00
1.60	.00	10.12	.00	.000	.030	.000	.000	2101.50	64.07
.009498	617.	617.	617.	20	8	0	.00	39.86	103.93

*SECNO 27303.000

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27303.000	3.95	2108.45	2108.45	.00	2110.05	1.60	2.90	.00	2115.00
1281.0	.0	1281.0	.0	.0	126.1	.0	170.0	87.7	2115.00
1.61	.00	10.16	.00	.000	.030	.000	.000	2104.50	64.10
.009614	303.	303.	303.	2	5	0	.00	39.81	103.90

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TW LEFT BANK WEIR FLOW TOWARD PREHNER ROAD

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	1916.860	1918.292	6109.000	6397.000

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TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  1918.292   1919.630   6397.000   6842.000


TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  1919.630   1921.362   6842.000   7287.000


TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  2022.585   2023.848  18472.000  18619.000


TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  2023.848   2024.091  18619.000  18710.000


TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  2024.091   2024.130  18710.000  19020.000


TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00        .00          2  2024.130   2029.247  19020.000  19215.000

T1      FEMA 50-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      LNLV WASH WITH DIVERSION

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0         3                             .0033                             1890.1

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

        2                   -1


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 150.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

   150.000      4.31    1890.31    1890.31    1890.10    1892.49       2.18        .00        .00    1896.00
    1746.0         .0     1746.0         .0         .0      147.5         .0         .0         .0    1896.00
       .00        .00      11.84        .00       .000       .014       .000       .000    1886.00    1000.01
   .003054         0.         0.         0.          0          8          0        .00      34.24    1035.04


*SECNO 243.600

3265 DIVIDED FLOW

   243.600      4.85    1891.05        .00        .00    1892.77       1.73        .24        .04    1896.20
    1746.0         .0     1746.0         .0         .0      165.5         .0         .3         .1    1896.20
       .00        .00      10.55        .00       .000       .014       .000       .000    1886.20    1000.01
   .002193        94.        94.        94.          6          0          0        .00      34.20    1035.00


*SECNO 244.600
   244.600      5.13    1891.33        .00        .00    1892.80       1.47        .00        .03    1896.20
    1746.0         .0     1746.0         .0         .0      179.4         .0         .3         .1    1896.20
       .00        .00       9.73        .00       .000       .014       .000       .000    1886.20    1000.00
   .001339         1.         1.         1.          3          0          0        .00      35.00    1035.01


*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
450.000	4.32	1891.32	1891.32	.00	1893.46	2.14	.35	.20	1897.00
1746.0	.0	1746.0	.0	.0	148.8	.0	1.1	.2	1897.00
.01	.00	11.73	.00	.000	.014	.000	.000	1887.00	1000.57
.002311	205.	205.	205.	4	11	0	.00	34.86	1035.43

*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

544.000	5.35	1892.55	1892.55	.00	1894.66	2.11	.20	.00	1897.20
1746.0	.0	1746.0	.0	.0	149.9	.0	1.4	.3	1897.20
.01	.00	11.65	.00	.000	.014	.000	.000	1887.20	1006.98
.002020	94.	94.	94.	20	11	0	.00	36.05	1043.02

*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

600.000	5.37	1892.77	1892.77	.00	1894.87	2.11	.11	.00	1897.40
1746.0	.0	1746.0	.0	.0	149.9	.0	1.6	.4	1897.70
.01	.00	11.65	.00	.000	.014	.000	.000	1887.40	1006.95
.002012	56.	56.	56.	3	5	0	.00	35.86	1042.81

*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

700.000	5.35	1893.05	1893.05	.00	1895.16	2.11	.20	.00	1897.70
1746.0	.0	1746.0	.0	.0	150.0	.0	2.0	.4	1897.70
.01	.00	11.64	.00	.000	.014	.000	.000	1887.70	1006.97
.002017	100.	100.	100.	3	5	0	.00	36.05	1043.03

*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1200.000	5.35	1894.65	1894.65	.00	1896.76	2.10	1.01	.00	1899.30
1746.0	.0	1746.0	.0	.0	150.1	.0	3.7	.9	1899.30
.03	.00	11.63	.00	.000	.014	.000	.000	1889.30	1006.97
.002013	500.	500.	500.	20	5	0	.00	36.06	1043.03

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1700.000	5.35	1896.35	1896.35	.00	1898.46	2.10	1.01	.00	1901.00
1746.0	.0	1746.0	.0	.0	150.1	.0	5.4	1.3	1901.00
.04	.00	11.63	.00	.000	.014	.000	.000	1891.00	1006.97
.002013	500.	500.	500.	20	5	0	.00	36.06	1043.03

CCHV= .100 CEHV= .300
*SECNO 2000.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2000.000	5.35	1897.35	1897.35	.00	1899.46	2.10	.60	.00	1902.00
1746.0	.0	1746.0	.0	.0	150.1	.0	6.5	1.5	1902.00
.04	.00	11.63	.00	.000	.014	.000	.000	1892.00	1006.97
.002013	300.	300.	300.	20	5	0	.00	36.06	1043.03

*SECNO 2200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2200.000	5.35	1897.95	1897.95	.00	1900.06	2.10	.40	.00	1902.60
1746.0	.0	1746.0	.0	.0	150.1	.0	7.1	1.7	1902.60
.05	.00	11.63	.00	.000	.014	.000	.000	1892.60	1006.97
.002013	200.	200.	200.	20	5	0	.00	36.06	1043.03

1490 NH CARD USED
*SECNO 3724.000

```
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=      1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      5.40   1903.00   1903.00      .00   1905.10      2.10      3.06      .00   1907.60
    1746.0        .0    1746.0        .0        .0     150.1        .0      12.4       2.9   1907.60
       .09       .00     11.63       .00      .000      .014      .000      .000   1897.60   1303.70
   .002003     1524.     1524.     1524.        20         5         0       .00     35.90   1339.60


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47

  3823.000      6.14   1904.14       .00       .00   1905.32      1.18       .13       .09   1908.50
    1746.0        .0    1746.0        .0        .0     200.3        .0      12.8       3.0   1908.50
       .09       .00      8.72       .00      .000      .014      .000      .000   1898.00   1000.00
   .000927       99.       99.       99.         4         0         0       .00     37.24   1037.24


*SECNO 4020.000

3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=      1  TARGET=     128.200
 ELENCL=   1914.90  ELENCR=  100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      5.54   1904.14       .00       .00   1905.63      1.49       .21       .09   1909.20
    1746.0        .0    1746.0        .0        .0     178.3        .0      13.6       3.2   1909.10
       .09       .00      9.79       .00      .000      .014      .000      .000   1898.60   1603.17
   .001299       197.      197.      197.         3         0         0       .00     36.34   1639.51


*SECNO 4060.000

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=      1  TARGET=     116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1909.30

  4060.000      5.42   1904.12       .00       .00   1905.72      1.59       .05       .03 100000.00
    1746.0        .0    1746.0        .0        .0     172.5        .0      13.8       3.2   1909.30
       .10       .00     10.12       .00      .000      .014      .000      .000   1898.70   1604.10
   .001428        40.       40.       40.         2         0         0       .00     35.99   1640.09


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     1603.9    1721.6  TYPE=      1  TARGET=     117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      5.37   1904.17       .00       .00   1905.82      1.65       .08       .03   1909.30
    2183.0        .0    2183.0        .0        .0     212.0        .0      14.0       3.3   1909.30
       .10       .00     10.30       .00      .000      .014      .000      .000   1898.80   1604.05
   .001377        55.       55.       55.         2         0         0       .00     39.50   1643.55


CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65


3470 ENCROACHMENT STATIONS=         .0      56.3  TYPE=      1  TARGET=      56.299
  4188.000      6.01   1905.41       .00       .00   1906.15       .74       .06       .27   1915.00
    2183.0        .0    2183.0        .0        .0     317.1        .0      14.5       3.4   1914.80
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       .10        .00       6.88        .00       .000       .014       .000       .000   1899.40        .06
   .000505         73.        73.        73.          3          0          0        .00     52.78      52.84


*SECNO 4189.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.60 MAX ELLC=  1909.70

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000       5.95   1905.35        .00        .00   1906.22        .86        .00        .06   1914.80
    2183.0         .0    2183.0         .0         .0     292.5         .0       14.5        3.4   1914.60
       .10        .00       7.46        .00       .000       .014       .000       .000   1899.40        .05
   .000612         1.         1.         1.          2          0          0     -21.24     52.76      52.81


*SECNO 4246.000
1
   15APR98       13:58:02                                                                          PAGE    43

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.80 MAX ELLC=  1910.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1915.00 ELREA=      1914.80

  4246.000       5.40   1905.30        .00        .00   1906.35       1.05        .04        .09   1915.00
    2183.0         .0    2183.0         .0         .0     265.8         .0       14.9        3.4   1914.80
       .10        .00       8.21        .00       .000       .014       .000       .000   1899.90        .05
   .000822         57.        57.        57.          2          0          0     -19.30     52.75      52.81


*SECNO 4247.000
  4247.000       5.70   1905.60        .00        .00   1906.42        .82        .00        .07   1915.00
    2183.0         .0    2183.0         .0         .0     301.0         .0       14.9        3.4   1914.80
       .10        .00       7.25        .00       .000       .014       .000       .000   1899.90        .06
   .000594         1.         1.         1.          2          0          0        .00     52.78      52.84


CCHV=      .100 CEHV=      .300
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4360.000       6.50   1907.40   1907.40        .00   1909.63       2.23        .11        .42   1911.40
    2183.0         .0    2183.0         .0         .0     182.1         .0       15.5        3.5   1911.40
       .10        .00      11.99        .00       .000       .014       .000       .000   1900.90   1007.99
   .001923        113.       113.       113.         20          8          0        .00     41.01   1049.01


*SECNO 4831.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4831.000       6.49   1911.29   1911.29        .00   1913.53       2.25        .91        .00   1915.30
    2183.0         .0    2183.0         .0         .0     181.5         .0       17.5        4.0   1915.30
       .12        .00      12.03        .00       .000       .014       .000       .000   1904.80   1008.02
   .001941        471.       471.       471.         20          5          0        .00     40.95   1048.98


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 4920.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   4920.000       6.49   1911.99   1911.99        .00   1914.23       2.24        .17        .00   1916.00
     2183.0         .0    2183.0         .0         .0     181.7         .0       17.8        4.1   1916.00
        .12        .00      12.02        .00       .000       .014       .000       .000   1905.50   1008.02
    .001936         89.        89.        89.         20          5          0        .00     40.97   1048.98


 *SECNO 5005.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   5005.000       6.49   1912.69   1912.69        .00   1914.93       2.24        .16        .00   1916.70
     2183.0         .0    2183.0         .0         .0     181.6         .0       18.2        4.2   1916.70
        .12        .00      12.02        .00       .000       .014       .000       .000   1906.20   1008.02
    .001939         85.        85.        85.         20          5          0        .00     40.96   1048.98
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*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000      4.93   1913.13   1913.13      .00   1915.62      2.49       .21       .07   1919.20
    2183.0        .0     2183.0        .0        .0    172.5        .0      18.6       4.2   1919.20
       .12       .00      12.66       .00      .000     .014      .000      .000   1908.20   1000.01
   .002360       100.      100.      100.        20       15         0       .00     35.00   1035.00


*SECNO 5200.000

3301 HV CHANGED MORE THAN HVINS

  5200.000      5.14   1913.94       .00       .00   1915.86      1.93       .19       .06   1919.80
    2183.0        .0     2183.0        .0        .0    196.0        .0      19.0       4.3   1919.80
       .12       .00      11.14       .00      .000     .014      .000      .000   1908.80   1000.01
   .001708        95.       95.       95.         3        0         0       .00     38.20   1038.20


*SECNO 5500.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3720 CRITICAL DEPTH ASSUMED
  5500.000      3.98   1914.78   1914.78       .00   1916.79      2.01       .58       .03   1921.80
    2183.0        .0     2183.0        .0        .0    191.8        .0      20.3       4.6   1921.80
       .13       .00      11.38       .00      .000     .014      .000      .000   1910.80   1000.01
   .002235       300.      300.      300.        20       15         0       .00     48.20   1048.20


*SECNO 5852.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5852.000      3.70   1916.20   1916.20       .00   1918.02      1.81       .78       .02   1923.50
    2183.0        .0     2183.0        .0        .0    201.9        .0      21.9       5.0   1923.50
       .14       .00      10.81       .00      .000     .014      .000      .000   1912.50   1466.07
   .002215       352.      352.      352.        20       11         0       .00     56.27   1522.33


CCHV=      .300 CEHV=      .500
*SECNO 5853.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1923.50 ELREA=      1923.50

  5853.000      3.71   1916.21   1916.21       .00   1918.02      1.81       .00       .00   1923.50
    2183.0        .0     2183.0        .0        .0    202.3        .0      21.9       5.0   1923.50
       .14       .00      10.79       .00      .000     .015      .000      .000   1912.50   1466.07
   .002527         1.        1.        1.         0        5         0       .00     56.27   1522.33


*SECNO 5973.000

3370 NORMAL BRIDGE, NRD=  32 MIN ELTRD=  1922.00 MAX ELLC=  1924.10

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1924.10 ELREA=      1924.10

  5973.000      3.89   1916.99   1916.99       .00   1918.89      1.91       .43       .05   1924.10
    2183.0        .0     2183.0        .0        .0    197.0        .0      22.5       5.2   1924.10
       .14       .00      11.08       .00      .000     .015      .000      .000   1913.10   1466.07
   .005404       120.      120.      120.        20       19         0    -15.15     56.27   1522.33


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 5974.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.25

  5974.000      4.83   1917.93       .00       .00   1918.98      1.05       .00       .09   1923.20
    2183.0        .0     2183.0        .0        .0    265.5        .0      22.5       5.2   1923.10
       .14       .00       8.22       .00      .000     .015      .000      .000   1913.10       .05
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   .001070        1.        1.        1.        5         0         0       .00     56.28     56.33


CCHV=      .100 CEHV=      .300
*SECNO 6092.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .56

  6092.000      4.44   1918.44       .00       .00   1919.23       .78       .22       .03   1922.60
    2183.0        .0    2183.0        .0        .0     307.0        .0      23.3       5.4   1923.10
       .15       .00      7.11       .00      .000      .030      .000      .000   1914.00   1735.70
   .003442      126.      126.      126.         3         0         0       .00     78.19   1813.89


*SECNO 6370.000
  6370.000      4.60   1919.40       .00       .00   1920.14       .73       .90       .01   1925.40
    2183.0        .0    2183.0        .0        .0     318.2        .0      25.3       5.9   1925.40
       .16       .00      6.86       .00      .000      .030      .000      .000   1914.80   1743.88
   .003066      278.      278.      278.         2         0         0       .00     78.24   1822.12


*SECNO 6828.000
  6828.000      4.61   1920.81       .00       .00   1921.54       .73      1.40       .00   1926.90
    2183.0        .0    2183.0        .0        .0     318.8        .0      28.7       6.7   1928.00
       .18       .00      6.85       .00      .000      .030      .000      .000   1916.20   1787.53
   .003057      458.      458.      458.         0         0         0       .00     78.44   1865.98


*SECNO 7265.000
  7265.000      3.83   1922.33       .00       .00   1923.43      1.10      1.78       .11   1930.00
    2183.0        .0    2183.0        .0        .0     259.8        .0      31.6       7.5   1930.90
       .19       .00      8.40       .00      .000      .030      .000      .000   1918.50   1777.33
   .005709      437.      437.      437.         2         0         0       .00     75.41   1852.74

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 7730.000
  7730.000      3.64   1925.14       .00       .00   1926.37      1.24      2.90       .04   1933.50
    2183.0        .0    2183.0        .0        .0     244.8        .0      34.3       8.3   1934.20
       .21       .00      8.92       .00      .000      .030      .000      .000   1921.50   1846.72
   .006849      465.      465.      465.         2         0         0       .00     74.55   1921.28


*SECNO 8323.000
  8323.000      3.81   1929.01       .00       .00   1930.13      1.12      3.74       .01   1937.90
    2183.0        .0    2183.0        .0        .0     257.5        .0      37.7       9.3   1938.90
       .23       .00      8.48       .00      .000      .030      .000      .000   1925.20   2274.49
   .005839      593.      593.      593.         2         0         0       .00     75.03   2349.52


*SECNO 8673.000
  8673.000      3.71   1931.11       .00       .00   1932.29      1.18      2.14       .02   1939.90
    2183.0        .0    2183.0        .0        .0     249.9        .0      39.7       9.9   1941.90
       .24       .00      8.73       .00      .000      .030      .000      .000   1927.40   1017.58
   .006421      350.      350.      350.         2         0         0       .00     74.83   1092.42


CCHV=      .300 CEHV=      .500
*SECNO 8754.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8754.000      6.77   1934.67   1934.67       .00   1937.10      2.43       .29       .62   1941.60
    2183.0        .0    2183.0        .0        .0     174.6        .0      40.1      10.0   1941.80
       .24       .00     12.50       .00      .000      .015      .000      .000   1927.90      3.46
   .002251      81.       81.       81.        20        14         0       .00     36.26     39.72


*SECNO 8755.000

3370 NORMAL BRIDGE, NRD=    9 MIN ELTRD=  1941.60 MAX ELLC=  1941.80

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


7185 MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8755.000      7.00   1934.90   1934.90       .00   1937.35      2.46       .00       .02   1941.60
    2183.0        .0    2183.0        .0        .0     173.6        .0      40.1      10.0   1941.80
       .24       .00     12.58       .00      .000      .015      .000      .000   1927.90   1003.12
   .003378        1.        1.        1.         3        12         0     -9.38     36.96   1040.08


*SECNO 8860.000

3370 NORMAL BRIDGE, NRD=  14 MIN ELTRD=  1942.10 MAX ELLC=  1942.30

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1942.30

  8860.000      7.00   1935.40   1935.40       .00   1937.85      2.46       .27       .00   1942.10
    2183.0        .0    2183.0        .0        .0     173.6        .0      40.4      10.1   1942.30
       .24       .00     12.58       .00      .000      .015      .000      .000   1928.40   1003.12
   .003378       79.       79.       79.         3        12         0     -9.38     36.96   1040.08


*SECNO 8861.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.93

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1948.80

  8861.000      8.62   1937.02   1935.18       .00   1938.23      1.21       .00       .37   1942.10
    2183.0        .0    2183.0        .0        .0     247.1        .0      40.4      10.1   1948.80
       .24       .00      8.83       .00      .000      .015      .000      .000   1928.40       .10
   .000909        1.        1.        1.        23         8         0       .00     43.21     43.30


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1661.3    2712.5  TYPE=      1  TARGET=      1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     100000.00 ELREA=      1945.50

  9120.000      7.02   1937.92   1937.92       .00   1940.23      2.31       .35       .55 100000.00
    2183.0        .0    2183.0        .0        .0     179.0        .0      41.7      10.3   1945.50
       .25       .00     12.19       .00      .000      .015      .000      .000   1930.90   1876.99
   .002248       259.      259.      259.        20        15         0       .00     39.51   1916.50


CCHV=      .100 CEHV=      .300
*SECNO 9237.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

  9237.000      2.23   1942.23   1942.23       .00   1942.91       .68       .64       .16   1948.00
    2183.0        .0    2183.0        .0        .0     329.0        .0      42.4      10.7   1950.00
       .25       .00      6.63       .00      .000      .045      .000      .000   1940.00   2130.54
   .027302       117.      117.      117.        20        17         0       .00     245.11   2375.65


*SECNO 9429.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.45

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 1573.0 2815.0 TYPE= 1 TARGET= -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1949.10

9429.000	2.48	1944.58	.00	.00	1944.73	.15	1.76	.05	1948.00
2183.0	.0	2183.0	.0	.0	712.5	.0	44.7	12.2	1949.10
.27	.00	3.06	.00	.000	.045	.000	.000	1942.10	1843.38
.004552	192.	192.	192.	4	0	0	.00	441.70	2285.08

*SECNO 10155.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1567.2 2685.3 TYPE= 1 TARGET= -1567.240

10155.000	5.11	1953.81	1953.81	.00	1953.91	.10	2.97	.00	1953.70
2183.0	1324.9	858.1	.0	499.5	372.6	.0	57.9	22.5	1953.80
.35	2.65	2.30	.02	.045	.045	.000	.000	1948.70	1627.98
.003707	726.	726.	726.	20	23	0	.00	792.33	2420.31

*SECNO 10962.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1959.90 ELREA= 1959.30

10962.000	2.61	1959.31	1959.31	.00	1959.51	.20	3.77	.03	1959.90
2183.0	.0	716.8	1466.2	.0	267.6	369.8	71.9	35.4	1959.30
.41	.00	2.68	3.96	.000	.045	.045	.000	1956.70	1444.93
.006064	807.	807.	807.	13	20	0	.00	594.65	2039.58

*SECNO 11614.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1966.90 ELREA= 1965.50

11614.000	4.96	1965.26	1964.88	.00	1965.54	.28	6.00	.02	1966.90
2183.0	.0	2183.0	.0	.0	517.8	.0	80.5	43.5	1965.50
.46	.00	4.22	.00	.000	.045	.000	.000	1960.30	1100.24
.015600	652.	652.	652.	13	15	0	.00	500.49	1611.85

*SECNO 12202.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.03

12202.000	6.44	1969.14	.00	.00	1969.57	.43	3.99	.05	1971.40
2183.0	.0	2130.0	53.0	.0	399.6	37.3	86.9	48.0	1974.30
.49	.00	5.33	1.42	.000	.045	.045	.000	1962.70	1421.82
.003771	588.	588.	588.	4	0	0	.00	156.15	1817.48

*SECNO 13094.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.57

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	6.71	1971.41	.00	.00	1971.63	.22	2.04	.02	1978.00
2183.0	.0	2183.0	.0	.0	586.0	.0	97.4	50.8	1977.60
.55	.00	3.73	.00	.000	.045	.000	.000	1964.70	1519.08
.001532	892.	892.	892.	2	0	0	.00	117.38	1636.45

*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .38

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	4.10	1974.40	.00	.00	1975.29	.89	3.46	.20	1987.80
2183.0	.0	2183.0	.0	.0	288.6	.0	108.2	53.3	1984.20
.59	.00	7.56	.00	.000	.045	.000	.000	1970.30	1700.01
.010662	1073.	1073.	1073.	3	0	0	.00	86.03	1786.03

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14368.000	3.33	1985.93	1985.93	.00	1987.14	1.21	2.71	.10	1985.60
2183.0	.7	2169.9	12.4	.5	245.4	9.4	109.4	53.8	1985.60
.60	1.31	8.84	1.32	.045	.045	.045	.000	1982.60	1536.72
.017664	201.	201.	201.	20	8	0	.00	145.75	1682.46

*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1991.90 ELREA= 1988.40

15114.000	8.18	1988.78	.00	.00	1988.94	.16	1.70	.11	1991.90
2183.0	.0	2181.9	1.1	.0	687.6	3.4	117.6	56.2	1988.40
.66	.00	3.17	.32	.000	.045	.045	.000	1980.60	1652.56
.000844	746.	746.	746.	6	0	0	.00	129.51	1782.07

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1993.60 ELREA= 1993.60

15667.000	2.59	1992.19	1992.19	.00	1993.14	.95	1.33	.24	1993.60
2183.0	.0	2183.0	.0	.0	279.2	.0	123.7	57.9	1993.60
.68	.00	7.82	.00	.000	.045	.000	.000	1989.60	1513.79
.024491	553.	553.	553.	20	17	0	.00	149.77	1663.56

*SECNO 16546.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.12

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	5.02	1998.02	.00	.00	1998.27	.25	5.06	.07	2006.80
2183.0	.0	2183.0	.0	.0	543.5	.0	132.0	60.9	2013.90
.75	.00	4.02	.00	.000	.045	.000	.000	1993.00	1548.04
.002509	879.	879.	879.	6	8	0	.00	142.10	1690.13

CCHV= .100 CEHV= .300
*SECNO 17058.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	2.85	2007.45	2007.45	.00	2008.27	.81	2.98	.17	2013.80
2183.0	.0	2183.0	.0	.0	301.5	.0	137.0	62.8	2019.00
.76	.00	7.24	.00	.000	.045	.000	.000	2004.60	1508.33
.025467	512.	512.	512.	20	11	0	.00	186.13	1720.70

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 17612.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.88

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2020.20 ELREA= 2023.60

17612.000	5.62	2014.82	.00	.00	2015.14	.32	6.82	.05	2020.20
2183.0	.0	2183.0	.0	.0	484.4	.0	142.0	65.5	2023.60
.80	.00	4.51	.00	.000	.045	.000	.000	2009.20	1644.30
.007236	554.	554.	554.	6	0	0	.00	235.84	1880.15

*SECNO 18436.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2028.20 ELREA= 2028.20

18436.000	3.62	2022.72	.00	.00	2023.21	.49	8.02	.05	2028.20
2183.0	.0	2183.0	.0	.0	388.4	.0	150.2	69.8	2028.20
.84	.00	5.62	.00	.000	.045	.000	.000	2019.10	1586.73
.013797	824.	824.	824.	4	0	0	.00	222.55	1809.28

*SECNO 18462.000

18462.000	2.95	2022.95	.00	.00	2023.66	.71	.38	.06	2029.60
2183.0	.0	2183.0	.0	.0	323.6	.0	150.4	70.0	2029.60
.84	.00	6.75	.00	.000	.045	.000	.000	2020.00	81.04
.015377	26.	26.	26.	3	0	0	.00	152.31	233.35

*SECNO 18472.000

18472.000	3.26	2023.26	.00	.00	2023.80	.54	.12	.02	2029.60
2183.0	.0	2183.0	.0	.0	371.4	.0	150.5	70.0	2029.60
.84	.00	5.88	.00	.000	.045	.000	.000	2020.00	75.81
.010194	10.	10.	10.	3	0	0	.00	157.85	233.66

*SECNO 18619.000

18619.000	3.09	2024.69	.00	.00	2024.92	.23	1.09	.03	2026.60
2183.0	.0	2183.0	.0	.0	567.2	.0	152.1	70.7	2029.60
.85	.00	3.85	.00	.000	.045	.000	.000	2021.60	63.69
.005638	147.	147.	147.	2	0	0	.00	292.55	356.24

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 18710.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.45

18710.000	9.36	2024.96	.00	.00	2025.01	.04	.07	.02	2028.60
2183.0	.0	2183.0	.0	.0	1306.2	.0	154.1	71.3	2029.60
.87	.00	1.67	.00	.000	.045	.000	.000	2015.60	1166.36
.000284	91.	91.	91.	4	0	0	.00	247.88	1445.23

*SECNO 19020.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.87

19020.000	7.44	2025.04	.00	.00	2025.05	.02	.04	.00	2029.60
2183.0	.0	2183.0	.0	.0	2194.1	.0	166.5	73.5	2029.60
.95	.00	.99	.00	.000	.045	.000	.000	2017.60	1095.65
.000081	310.	310.	310.	2	0	0	.00	358.13	1453.78

*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

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3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 19215.000      4.66   2030.26   2030.26       .00   2030.93       .67       .06       .20   2033.60
    2183.0        .0    2183.0        .0        .0     331.4        .0     172.2      74.8   2037.60
       .96       .00      6.59       .00       .000      .045      .000      .000   2025.60   1033.73
    .024592     195.      195.      195.        20        16         0       .00    230.20   1263.94


*SECNO 19802.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.25


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2044.40 ELREA=      2041.30

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 19802.000      4.18   2036.18       .00       .00   2036.45       .27      5.48       .04   2044.40
    2183.0        .0    2183.0        .0        .0     520.3        .0     177.9      77.8   2041.30
      1.00       .00      4.20       .00       .000      .045      .000      .000   2032.00   1741.94
    .004877     587.      587.      587.         5         0         0       .00    211.78   1953.72


*SECNO 20595.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .49


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2048.50 ELREA=      2048.20

 20595.000      3.58   2042.88       .00       .00   2043.59       .71      7.01       .13   2048.50
    2183.0        .0    2183.0        .0        .0     323.4        .0     185.6      81.4   2048.20
      1.03       .00      6.75       .00       .000      .045      .000      .000   2039.30   1230.99
    .020662     793.      793.      793.         3         0         0       .00    189.72   1420.71


*SECNO 21291.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.99


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2056.10 ELREA=      2055.50

 21291.000      4.45   2049.85       .00       .00   2050.06       .21      6.42       .05   2056.10
    2183.0        .0    2183.0        .0        .0     589.1        .0     192.9      85.4   2055.50
      1.09       .00      3.71       .00       .000      .045      .000      .000   2045.40   1121.17
    .005206     696.      696.      696.         5         0         0       .00    302.23   1560.35


*SECNO 22138.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .59


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2065.10 ELREA=      2066.70

 22138.000      4.02   2056.62       .00       .00   2057.13       .51      6.98       .09   2065.10
    2183.0        .0    2183.0        .0        .0     381.8        .0     202.3      90.5   2066.70
      1.13       .00      5.72       .00       .000      .045      .000      .000   2052.60   1211.19
    .014968     847.      847.      847.         4         0         0       .00    225.99   1437.19


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 23230.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.53


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2075.50 ELREA=      2082.30

 23230.000      3.96   2067.06       .00       .00   2067.33       .27     10.17       .02   2075.50
    2183.0        .0    2183.0        .0        .0     522.9        .0     213.7      96.6   2082.30
      1.20       .00      4.17       .00       .000      .045      .000      .000   2063.10   1191.48
    .006353    1092.     1092.     1092.         4         0         0       .00    261.09   1452.57


*SECNO 24530.000
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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2089.10 ELREA=      2106.50

 24530.000      3.60   2079.00       .00       .00   2079.43       .43     12.06       .05   2089.10
    2183.0        .0    2183.0        .0        .0     413.3        .0     227.6     104.6   2106.50
      1.27       .00      5.28       .00      .000      .045      .000      .000   2075.40   1170.94
   .014791     1300.     1300.     1300.         4         0         0       .00    272.63   1443.57


*SECNO 25616.000

3265 DIVIDED FLOW


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2100.50 ELREA=      2100.60

 25616.000      5.18   2090.28       .00       .00   2090.60       .33     11.16       .01   2100.50
    2183.0        .0    2183.0        .0        .0     475.1        .0     238.7     110.9   2100.60
      1.33       .00      4.59       .00      .000      .045      .000      .000   2085.10   1338.12
   .007554     1086.     1086.     1086.         4         0         0       .00    233.47   1586.81


*SECNO 26383.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2109.80 ELREA=      2105.60

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    SECNO      DEPTH      CWSEL      CRIWS      WSELX         EG         HV         HL       OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 26383.000      5.10   2095.10       .00       .00   2095.46       .36      4.84       .01   2109.80
    2183.0        .0    2183.0        .0        .0     452.7        .0     246.9     114.3   2105.60
      1.38       .00      4.82       .00      .000      .045      .000      .000   2090.00   1282.49
   .005357      767.      767.      767.         2         0         0       .00    159.26   1441.75


*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27000.000      5.40   2106.90   2106.90       .00   2109.00      2.09      4.20       .52   2112.00
    2183.0        .0    2183.0        .0        .0     188.1        .0     251.4     115.8   2112.00
      1.39       .00     11.60       .00      .000      .030      .000      .000   2101.50     61.19
   .008921      617.      617.      617.        20         8         0       .00     45.62    106.81


*SECNO 27303.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27303.000      5.41   2109.91   2109.91       .00   2112.00      2.08      2.70       .00   2115.00
    2183.0        .0    2183.0        .0        .0     188.5        .0     252.7     116.1   2115.00
      1.40       .00     11.58       .00      .000      .030      .000      .000   2104.50     61.18
   .008879      303.      303.      303.         2         5         0       .00     45.65    106.82


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  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00       .00       .00          .00          2  1918.502   1919.488   6109.000   6397.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00       .00       .00          .00          2  1919.488   1920.859   6397.000   6842.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00       .00       .00          .00          2  1920.859   1922.467   6842.000   7287.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00       .00       .00          .00          2  2023.262   2024.689  18472.000  18619.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00       .00       .00          .00          2  2024.689   2024.963  18619.000  18710.000
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 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
      .00         .00        .00        .00        .00         .00          2  2024.963   2025.037  18710.000  19020.000


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
      .00         .00        .00        .00        .00         .00          2  2025.037   2030.256  19020.000  19215.000

T1       FEMA 100-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       LNLV WASH WITH DIVERSION

J1  ICHECK    INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0          4                            .0033                                     1890.9

J2  NPROF     IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       3                    -1

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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*PROF 3

CCHV=      .100 CEHV=      .300
*SECNO 150.000

3265 DIVIDED FLOW

3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

   150.000      5.13   1891.13   1891.13   1890.90   1893.72      2.59       .00       .00   1896.00
    2266.0        .0    2266.0        .0        .0     175.4        .0        .0        .0   1896.00
       .00       .00     12.92       .00      .000      .014      .000      .000   1886.00   1000.00
   .003132        0.        0.        0.         0         8         0       .00     34.25   1035.05


*SECNO 243.600

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

   243.600      5.76   1891.96       .00       .00   1894.02      2.06       .25       .05   1896.20
    2266.0        .0    2266.0        .0        .0     196.6        .0        .4        .1   1896.20
       .00       .00     11.53       .00      .000      .014      .000      .000   1886.20   1000.00
   .002274       94.       94.       94.         6         0         0       .00     34.20   1035.01


*SECNO 244.600
   244.600      6.10   1892.30       .00       .00   1894.05      1.75       .00       .03   1896.20
    2266.0        .0    2266.0        .0        .0     213.4        .0        .4        .1   1896.20
       .00       .00     10.62       .00      .000      .014      .000      .000   1886.20   1000.00
   .001338        1.        1.        1.         3         0         0       .00     35.00   1035.01


*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
    15APR98       13:58:02                                                                                    PAGE    61

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

   450.000      5.14   1892.14   1892.14       .00   1894.67      2.54       .35       .24   1897.00
    2266.0        .0    2266.0        .0        .0     177.3        .0       1.3        .2   1897.00
       .01       .00     12.78       .00      .000      .014      .000      .000   1887.00   1000.49
   .002282       205.      205.      205.         4        11         0       .00     35.03   1035.51


*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
   544.000      6.22   1893.42   1893.42       .00   1895.82      2.39       .20       .01   1897.20
    2266.0        .0    2266.0        .0        .0     182.5        .0       1.7        .3   1897.20
       .01       .00     12.42       .00      .000      .014      .000      .000   1887.20   1005.67
   .001956       94.       94.       94.        20        11         0       .00     38.67   1044.33


*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   600.000      6.24   1893.64   1893.64       .00   1896.04      2.39       .11       .00   1897.40
    2266.0        .0    2266.0        .0        .0     182.5        .0       1.9        .4   1897.70
       .01       .00     12.41       .00      .000      .014      .000      .000   1887.40   1005.63
   .001946       56.       56.       56.         3         5         0       .00     38.46   1044.09


*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   700.000      6.23   1893.93   1893.93       .00   1896.32      2.39       .19       .00   1897.70
    2266.0        .0    2266.0        .0        .0     182.7        .0       2.4        .5   1897.70
       .01       .00     12.41       .00      .000      .014      .000      .000   1887.70   1005.66
   .001952      100.      100.      100.         5         5         0       .00     38.68   1044.34


*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1200.000      6.23   1895.53   1895.53       .00   1897.92      2.39       .97       .00   1899.30
    2266.0        .0    2266.0        .0        .0     182.8        .0       4.5        .9   1899.30
       .02       .00     12.40       .00      .000      .014      .000      .000   1889.30   1005.66
   .001948      500.      500.      500.        20         5         0       .00     38.69   1044.34


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   15APR98      13:58:02                                                                    PAGE   62

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1700.000      6.23   1897.23   1897.23       .00   1899.62      2.39       .97       .00   1901.00
    2266.0        .0    2266.0        .0        .0     182.8        .0       6.6       1.3   1901.00
       .03       .00     12.40       .00      .000      .014      .000      .000   1891.00   1005.66
   .001949      500.      500.      500.        20         5         0       .00     38.68   1044.34


CCHV=      .100 CEHV=      .300
*SECNO 2000.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2000.000      6.23   1898.23   1898.23       .00   1900.62      2.39       .58       .00   1902.00
    2266.0        .0    2266.0        .0        .0     182.8        .0       7.8       1.6   1902.00
       .04       .00     12.40       .00      .000      .014      .000      .000   1892.00   1005.66
   .001948      300.      300.      300.        20         5         0       .00     38.69   1044.34


*SECNO 2200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000      6.23   1898.83   1898.83       .00   1901.22      2.39       .39       .00   1902.60
    2266.0        .0    2266.0        .0        .0     182.8        .0       8.7       1.8   1902.60
       .05       .00     12.40       .00      .000      .014      .000      .000   1892.60   1005.66
   .001948      200.      200.      200.        20         5         0       .00     38.69   1044.34


1490 NH CARD USED
*SECNO 3724.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLBA=      1907.60 ELRBA=      1907.60

  3724.000      6.28   1903.88   1903.88       .00   1906.26      2.39      2.96       .00   1907.60
    2266.0        .0    2266.0        .0        .0     182.8        .0      15.1       3.1   1907.60
       .08       .00     12.39       .00      .000      .014      .000      .000   1897.60   1302.38
   .001939     1524.     1524.     1524.        20         5         0       .00     38.54   1340.92


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
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     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS

   3823.000       7.04    1905.04        .00        .00    1906.49       1.45        .13        .09    1908.50
     2266.0         .0     2266.0         .0         .0     234.3         .0       15.5        3.2    1908.50
        .08        .00       9.67        .00        .000      .014       .000       .000    1898.00    1000.00
    .000996        99.       99.         99.          4          0          0        .00      38.59    1038.59


*SECNO 4020.000

3470 ENCROACHMENT STATIONS=      1602.7    1730.9  TYPE=       1  TARGET=       128.200
 ELENCL=    1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.20 ELREA=       1909.10

   4020.000       6.43    1905.03        .00        .00    1906.82       1.79        .23        .10    1909.20
     2266.0         .0     2266.0         .0         .0     211.2         .0       16.5        3.4    1909.10
        .09        .00      10.73        .00        .000      .014       .000       .000    1898.60    1603.16
    .001339       197.      197.        197.          3          0          0        .00      37.68    1640.85


*SECNO 4060.000

3470 ENCROACHMENT STATIONS=      1604.1    1720.2  TYPE=       1  TARGET=       116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     100000.00 ELREA=       1909.30

   4060.000       6.31    1905.01        .00        .00    1906.91       1.90        .06        .03 100000.00
     2266.0         .0     2266.0         .0         .0     204.8         .0       16.7        3.4    1909.30
        .09        .00      11.06        .00        .000      .014       .000       .000    1898.70    1604.10
    .001460        40.       40.         40.          2          0          0        .00      37.30    1641.40


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000

3470 ENCROACHMENT STATIONS=      1603.9    1721.6  TYPE=       1  TARGET=       117.720
1
    15APR98       13:58:02                                                                          PAGE    64

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.30 ELREA=       1909.30

   4115.000       6.20    1905.00        .00        .00    1907.08       2.08        .08        .09    1909.30
     2833.0         .0     2833.0         .0         .0     244.6         .0       17.0        3.5    1909.30
        .09        .00      11.58        .00        .000      .014       .000       .000    1898.80    1604.04
    .001503        55.       55.         55.          2          0          0        .00      39.52    1643.56


CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS                    ,


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.77


3470 ENCROACHMENT STATIONS=           .0      56.3  TYPE=       1  TARGET=        56.299
   4188.000       7.25    1906.65        .00        .00    1907.51        .85        .06        .37    1915.00
     2833.0         .0     2833.0         .0         .0     382.3         .0       17.5        3.6    1914.80
        .09        .00       7.41        .00        .000      .014       .000       .000    1899.40        .05
    .000480        73.       73.         73.          3          0          0        .00      52.79      52.85


*SECNO 4189.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.60 MAX ELLC=  1909.70


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1914.80 ELREA=       1914.60

   4189.000       7.18    1906.58        .00        .00    1907.58       1.00        .00        .07    1914.80
     2833.0         .0     2833.0         .0         .0     353.1         .0       17.5        3.6    1914.60
        .09        .00       8.02        .00        .000      .014       .000       .000    1899.40        .04
    .000580         1.        1.          1.          2          0          0     -25.64      52.77      52.81


*SECNO 4246.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.80 MAX ELLC=  1910.20

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	6.63	1906.53	.00	.00	1907.70	1.17	.04	.09	1915.00
2833.0	.0	2833.0	.0	.0	326.4	.0	18.0	3.6	1914.80
.09	.00	8.68	.00	.000	.014	.000	.000	1899.90	.04
.000736	57.	57.	57.	2	0	0	-23.70	52.76	52.81

*SECNO 4247.000

4247.000	6.95	1906.85	.00	.00	1907.78	.93	.00	.07	1915.00
2833.0	.0	2833.0	.0	.0	367.0	.0	18.0	3.6	1914.80
.10	.00	7.72	.00	.000	.014	.000	.000	1899.90	.05
.000543	1.	1.	1.	2	0	0	.00	52.79	52.85

CCHV= .100 CEHV= .300
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4360.000	7.44	1908.34	1908.34	.00	1910.86	2.52	.10	.48	1911.40
2833.0	.0	2833.0	.0	.0	222.3	.0	18.8	3.8	1911.40
.10	.00	12.75	.00	.000	.014	.000	.000	1900.90	1006.12
.001882	113.	113.	113.	20	8	0	.00	44.76	1050.88

*SECNO 4831.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4831.000	7.45	1912.25	1912.25	.00	1914.76	2.51	.88	.00	1915.30
2833.0	.0	2833.0	.0	.0	222.7	.0	21.2	4.2	1915.30
.11	.00	12.72	.00	.000	.014	.000	.000	1904.80	1006.10
.001873	471.	471.	471.	20	5	0	.00	44.79	1050.90

*SECNO 4920.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3720 CRITICAL DEPTH ASSUMED

4920.000	7.45	1912.95	1912.95	.00	1915.46	2.52	.17	.00	1916.00
2833.0	.0	2833.0	.0	.0	222.6	.0	21.6	4.3	1916.00
.11	.00	12.73	.00	.000	.014	.000	.000	1905.50	1006.11
.001875	89.	89.	89.	20	5	0	.00	44.78	1050.89

*SECNO 5005.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5005.000	7.45	1913.65	1913.65	.00	1916.16	2.52	.16	.00	1916.70
2833.0	.0	2833.0	.0	.0	222.6	.0	22.1	4.4	1916.70
.11	.00	12.73	.00	.000	.014	.000	.000	1906.20	1006.11
.001875	85.	85.	85.	20	5	0	.00	44.78	1050.89

*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	5.86	1914.06	1914.06	.00	1917.02	2.96	.21	.13	1919.20
2833.0	.0	2833.0	.0	.0	205.1	.0	22.5	4.5	1919.20
.11	.00	13.81	.00	.000	.014	.000	.000	1908.20	1000.00
.002355	100.	100.	100.	20	15	0	.00	35.00	1035.01

*SECNO 5200.000

3301 HV CHANGED MORE THAN HVINS

5200.000	6.39	1915.19	.00	.00	1917.29	2.10	.18	.09	1919.80
2833.0	.0	2833.0	.0	.0	243.9	.0	23.0	4.6	1919.80
.12	.00	11.62	.00	.000	.014	.000	.000	1908.80	1000.00
.001485	95.	95.	95.	4	0	0	.00	38.20	1038.21

*SECNO 5500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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  5500.000      4.74   1915.54   1915.54       .00   1917.93      2.39       .53       .09   1921.80
    2833.0        .0    2833.0        .0        .0    228.4        .0      24.7       4.9   1921.80
       .12       .00     12.40       .00      .000     .014      .000      .000   1910.80   1000.01
   .002179       300.      300.      300.         4       15         0       .00     48.20   1048.20


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    15APR98      13:58:02                                                                      PAGE    67

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 5852.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5852.000      4.38   1916.88   1916.88       .00   1919.04      2.16       .76       .02   1923.50
    2833.0        .0    2833.0        .0        .0    240.2        .0      26.6       5.3   1923.50
       .13       .00     11.79       .00      .000     .014      .000      .000   1912.50   1466.06
   .002151       352.      352.      352.        20       11         0       .00     56.27   1522.33


CCHV=      .300 CEHV=      .500
*SECNO 5853.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1923.50 ELREA=      1923.50

  5853.000      4.40   1916.90   1916.89       .00   1919.05      2.15       .00       .00   1923.50
    2833.0        .0    2833.0        .0        .0    240.8        .0      26.6       5.3   1923.50
       .13       .00     11.77       .00      .000     .015      .000      .000   1912.50   1466.06
   .002453         1.        1.        1.         0        5         0       .00     56.27   1522.33


*SECNO 5973.000

3370 NORMAL BRIDGE, NRD=  32 MIN ELTRD=  1922.00 MAX ELLC=  1924.10

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1924.10 ELREA=      1924.10

  5973.000      4.60   1917.70   1917.70       .00   1919.97      2.27       .43       .06   1924.10
    2833.0        .0    2833.0        .0        .0    234.4        .0      27.2       5.5   1924.10
       .13       .00     12.09       .00      .000     .015      .000      .000   1913.10   1466.06
   .005761       120.      120.      120.        20       15         0    -18.02     56.27   1522.33


CCHV=      .100 CEHV=      .300
*SECNO 5974.000

3301 HV CHANGED MORE THAN HVINS

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    15APR98      13:58:02                                                                      PAGE    68

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.35

  5974.000      5.72   1918.82       .00       .00   1920.07      1.25       .00       .10   1923.20
    2833.0        .0    2833.0        .0        .0    315.9        .0      27.2       5.5   1923.10
       .13       .00      8.97       .00      .000     .015      .000      .000   1913.10       .04
   .001046         1.        1.        1.         5        0         0       .00     56.29     56.34


CCHV=      .100 CEHV=      .300
*SECNO 6092.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62

  6092.000      5.51   1919.51       .00       .00   1920.32       .81       .20       .04   1922.60
    2833.0        .0    2833.0        .0        .0    393.2        .0      28.2       5.7   1923.10
       .14       .00      7.21       .00      .000     .030      .000      .000   1914.00   1733.46
   .002751       126.      126.      126.         2        0         0       .00     82.58   1816.03


*SECNO 6370.000
  6370.000      5.47   1920.27       .00       .00   1921.10       .83       .78       .01   1925.40
    2833.0        .0    2833.0        .0        .0    387.9        .0      30.7       6.2   1925.40
       .15       .00      7.30       .00      .000     .030      .000      .000   1914.80   1742.15
   .002841       278.      278.      278.         2        0         0       .00     81.69   1823.85


*SECNO 6828.000
  6828.000      5.39   1921.59       .00       .00   1922.45       .86      1.34       .01   1926.90
    2833.0        .0    2833.0        .0        .0    381.6        .0      34.8       7.1   1928.00
       .17       .00      7.42       .00      .000     .030      .000      .000   1916.20   1785.92
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    .002993      458.      458.      458.         2         0         0       .00     81.59   1867.51


*SECNO 7265.000
  7265.000      4.52   1923.02       .00       .00   1924.29      1.27      1.72       .12   1930.00
    2833.0         .0    2833.0        .0        .0     313.2        .0      38.3       7.9   1930.90
       .18        .00      9.04       .00      .000      .030      .000      .000   1918.50   1775.93
    .005432      437.      437.      437.         2         0         0       .00     78.21   1854.14


CCHV=      .100 CEHV=      .300
1
    15APR98      13:58:02                                                                        PAGE    69

     SECNO     DEPTH     CWSEL     CRIWS     WSELK      EG        HV        HL       OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB       ACH       AROB      VOL      TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL        XNCH      XNR       WTN      ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL     IDC       ICONT     CORAR    TOPWID    ENDST


*SECNO 7730.000
  7730.000      4.22   1925.72       .00       .00   1927.21      1.50      2.85       .07   1933.50
    2833.0         .0    2833.0        .0        .0     288.4        .0      41.5       8.7   1934.20
       .19        .00      9.82       .00      .000      .030      .000      .000   1921.50   1845.57
    .006976      465.      465.      465.         2         0         0       .00     76.86   1922.43


*SECNO 8323.000
  8323.000      4.46   1929.66       .00       .00   1930.98      1.33      3.75       .02   1937.90
    2833.0         .0    2833.0        .0        .0     306.7        .0      45.5       9.7   1938.90
       .21        .00      9.24       .00      .000      .030      .000      .000   1925.20   2273.22
    .005768      593.      593.      593.         2         0         0       .00     77.56   2350.79


*SECNO 8673.000
  8673.000      4.32   1931.72       .00       .00   1933.14      1.42      2.13       .03   1939.90
    2833.0         .0    2833.0        .0        .0     296.5        .0      48.0      10.4   1941.90
       .22        .00      9.55       .00      .000      .030      .000      .000   1927.40   1016.36
    .006410      350.      350.      350.         2         0         0       .00     77.28   1093.64


CCHV=      .300 CEHV=      .500
*SECNO 8754.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8754.000      7.79   1935.69   1935.69       .00   1938.43      2.74       .28       .66   1941.60
    2833.0         .0    2833.0        .0        .0     213.1        .0      48.4      10.5   1941.80
       .22        .00     13.29       .00      .000      .015      .000      .000   1927.90      1.93
    .002198       81.       81.       81.        20        14         0       .00     39.40     41.33


*SECNO 8755.000

3370 NORMAL BRIDGE, NRD=   9 MIN ELTRD=  1941.60 MAX ELLC=  1941.80

7185 MINIMUM SPECIFIC ENERGY
1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK      EG        HV        HL       OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB       ACH       AROB      VOL      TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL        XNCH      XNR       WTN      ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL     IDC       ICONT     CORAR    TOPWID    ENDST


3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8755.000      8.03   1935.93   1935.93       .00   1938.70      2.77       .00       .01   1941.60
    2833.0         .0    2833.0        .0        .0     212.0        .0      48.4      10.5   1941.80
       .22        .00     13.36       .00      .000      .015      .000      .000   1927.90   1001.56
    .003351        1.        1.        1.         3        15         0    -10.76     40.16   1041.71


*SECNO 8860.000

3370 NORMAL BRIDGE, NRD=  14 MIN ELTRD=  1942.10 MAX ELLC=  1942.30

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1942.30

  8860.000      8.03   1936.43   1936.43       .00   1939.20      2.77       .26       .00   1942.10
    2833.0         .0    2833.0        .0        .0     212.0        .0      48.8      10.5   1942.30
       .22        .00     13.36       .00      .000      .015      .000      .000   1928.40   1001.56
    .003351       79.       79.       79.         3        15         0    -10.76     40.16   1041.71
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*SECNO 8861.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.97

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1948.80

  8861.000      9.83   1938.23   1936.22       .00   1939.62      1.39       .00       .42   1942.10
    2833.0        .0    2833.0        .0         .0    299.6         .0      48.8      10.5   1948.80
       .22       .00      9.45       .00       .000      .015      .000      .000   1928.40       .07
   .000860        1.        1.        1.         25         8         0       .00     43.25     43.33


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1661.3    2712.5  TYPE=      1  TARGET=     1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1945.50

  9120.000      8.04   1938.94   1938.94       .00   1941.48      2.55       .33       .58 100000.00
    2833.0        .0    2833.0        .0         .0    221.1         .0      50.4      10.8   1945.50
       .23       .00     12.81       .00       .000      .015      .000      .000   1930.90   1875.17
   .002132       259.      259.      259.         20        12         0       .00     43.38   1918.55


CCHV=      .100 CEHV=      .300
*SECNO 9237.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

  9237.000      2.52   1942.52   1942.52       .00   1943.28       .76       .60       .18   1948.00
    2833.0        .0    2833.0        .0         .0    403.8         .0      51.2      11.2   1950.00
       .23       .00      7.02       .00       .000      .045      .000      .000   1940.00   2129.30
   .026322       117.      117.      117.         20        17         0       .00    269.20   2398.50


*SECNO 9429.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.43

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     1573.0    2815.0  TYPE=      1  TARGET=    -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1949.10

  9429.000      2.78   1944.88       .00       .00   1945.06       .17      1.72       .06   1948.00
    2833.0        .0    2833.0        .0         .0    845.2         .0      54.0      12.8   1949.10
       .25       .00      3.35       .00       .000      .045      .000      .000   1942.10   1837.43
   .004451       192.      192.      192.         3         0         0       .00    450.25   2287.69


*SECNO 10155.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1567.2    2685.3  TYPE=      1  TARGET=    -1567.240

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1953.70 ELREA=      1953.80
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 10155.000      5.04   1953.74   1953.74       .00   1953.93       .19      4.11       .00   1953.70
    2833.0    1728.3    1104.7        .0     465.5     351.4        .0      67.8      23.1   1953.80
       .31      3.71      3.14       .00      .045      .045      .000      .000   1948.70   1638.98
   .007461      726.      726.      726.        20        26         0       .00    780.67   2419.65


*SECNO 10962.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1959.90 ELREA=      1959.30

 10962.000      2.79   1959.49   1959.36       .00   1959.73       .24      5.78       .01   1959.90
    2833.0        .0     987.1    1845.9        .0     312.6     434.9      82.3      36.2   1959.30
       .37       .00      3.16      4.24       .000      .045      .045      .000   1956.70   1443.71
   .006892      807.      807.      807.        18        13         0       .00    635.92   2079.63


*SECNO 11614.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1966.90 ELREA=      1965.50

 11614.000      5.20   1965.50   1965.16       .00   1965.80       .30      6.16       .06   1966.90
    2833.0        .0    2833.0        .0        .0     640.8        .0      92.7      44.9   1965.50
       .41       .00      4.42       .00       .000      .045      .000      .000   1960.30   1096.79
   .013739      652.      652.      652.        29        18         0       .00    524.42   1621.21


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 12202.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

 12202.000      6.90   1969.60       .00       .00   1970.15       .55      4.27       .07   1971.40
    2833.0        .0    2691.7     141.3        .0     441.8      70.7     100.5      49.6   1974.30
       .43       .00      6.09      2.00       .000      .045      .045      .000   1962.70   1420.72
   .004484      588.      588.      588.         3         0         0       .00    178.39   1820.24


*SECNO 13094.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.63


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1978.00 ELREA=      1977.60

 13094.000      7.52   1972.22       .00       .00   1972.49       .27      2.31       .03   1978.00
    2833.0        .0    2833.0        .0        .0     682.9        .0     112.7      52.7   1977.60
       .49       .00      4.15       .00       .000      .045      .000      .000   1964.70   1517.64
   .001684      892.      892.      892.         2         0         0       .00    124.88   1642.51


*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .44

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1987.80 ELREA=      1984.20

 14167.000      4.96   1975.26       .00       .00   1976.20       .94      3.51       .20   1987.80
    2833.0        .0    2833.0        .0        .0     364.0        .0     125.6      55.4   1984.20
       .53       .00      7.78       .00       .000      .045      .000      .000   1970.30   1698.27
   .008877     1073.     1073.     1073.         3         0         0       .00     90.31   1788.58


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 14368.000      4.14   1986.74   1986.74       .00   1987.67       .93      1.96       .00   1985.60
    2833.0      15.1    2552.5     265.4       6.5     314.1     113.1      127.5      56.3   1985.60
       .54      2.34      8.13      2.35      .045      .045      .045      .000   1982.60   1528.63
   .010735      201.      201.      201.        20        11         0       .00    295.29   1823.93
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*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.17

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1991.90 ELREA= 1988.40

15114.000	8.76	1989.36	.00	.00	1989.58	.22	1.84	.07	1991.90
2833.0	.0	2818.5	14.5	.0	753.4	21.9	137.8	60.1	1988.40
.60	.00	3.74	.66	.000	.045	.045	.000	1980.60	1650.36
.001066	746.	746.	746.	5	0	0	.00	159.25	1809.62

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1993.60 ELREA= 1993.60

15667.000	2.96	1992.56	1992.56	.00	1993.67	1.11	1.60	.27	1993.60
2833.0	.0	2833.0	.0	.0	335.6	.0	144.9	62.1	1993.60
.61	.00	8.44	.00	.000	.045	.000	.000	1989.60	1511.47
.023256	553.	553.	553.	20	22	0	.00	154.31	1665.79

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 16546.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.96

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	5.64	1998.64	.00	.00	1998.95	.31	5.20	.08	2006.80
2833.0	.0	2833.0	.0	.0	631.4	.0	154.6	65.2	2013.90
.67	.00	4.49	.00	.000	.045	.000	.000	1993.00	1545.85
.002646	879.	879.	879.	5	0	0	.00	145.30	1691.15

CCHV= .100 CEHV= .300
*SECNO 17058.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	3.17	2007.77	2007.77	.00	2008.72	.96	3.06	.19	2013.80
2833.0	.0	2833.0	.0	.0	360.9	.0	160.4	67.1	2019.00
.69	.00	7.85	.00	.000	.045	.000	.000	2004.60	1507.67
.024305	512.	512.	512.	20	11	0	.00	190.46	1722.10

*SECNO 17612.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.82

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2020.20 ELREA= 2023.60

17612.000	5.98	2015.18	.00	.00	2015.56	.38	6.78	.06	2020.20

2833.0	.0	2833.0	.0	.0	569.7	.0	166.4	69.9	2023.60
.72	.00	4.97	.00	.000	.045	.000	.000	2009.20	1640.50
.007353	554.	554.	554.	5	0	0	.00	242.20	1882.70

*SECNO 18436.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2028.20 ELREA= 2028.20

18436.000	3.98	2023.08	.00	.00	2023.65	.57	8.03	.06	2028.20
2833.0	.0	2833.0	.0	.0	467.3	.0	176.2	74.4	2028.20
.76	.00	6.06	.00	.000	.045	.000	.000	2019.10	1579.71
.013532	824.	824.	824.	4	0	0	.00	235.51	1815.22

*SECNO 18462.000

18462.000	3.23	2023.23	.00	.00	2024.16	.93	.40	.11	2029.60
2833.0	.0	2833.0	.0	.0	366.1	.0	176.4	74.5	2029.60
.76	.00	7.74	.00	.000	.045	.000	.000	2020.00	76.38
.017922	26.	26.	26.	2	0	0	.00	157.24	233.62

*SECNO 18472.000

18472.000	3.68	2023.68	.00	.00	2024.33	.64	.14	.03	2029.60
2833.0	.0	2833.0	.0	.0	440.2	.0	176.5	74.6	2029.60
.76	.00	6.44	.00	.000	.045	.000	.000	2020.00	69.47
.010657	10.	10.	10.	4	0	0	.00	168.71	238.18

*SECNO 18619.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

18619.000	3.54	2025.14	.00	.00	2025.39	.25	1.03	.04	2026.60
2833.0	.0	2833.0	.0	.0	700.8	.0	178.4	75.4	2029.60
.77	.00	4.04	.00	.000	.045	.000	.000	2021.60	56.96
.004919	147.	147.	147.	2	0	0	.00	303.09	360.06

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 18710.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.61

18710.000	9.83	2025.43	.00	.00	2025.49	.06	.08	.02	2028.60
2833.0	.0	2833.0	.0	.0	1424.9	.0	180.7	75.9	2029.60
.78	.00	1.99	.00	.000	.045	.000	.000	2015.60	1161.67
.000378	91.	91.	91.	4	0	0	.00	258.05	1448.75

*SECNO 19020.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.87

19020.000	7.93	2025.53	.00	.00	2025.56	.02	.06	.00	2029.60
2833.0	.0	2833.0	.0	.0	2373.7	.0	194.2	78.2	2029.60
.85	.00	1.19	.00	.000	.045	.000	.000	2017.60	1090.69
.000108	310.	310.	310.	2	0	0	.00	365.26	1455.95

*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

19215.000	4.86	2030.46	2030.46	.00	2031.33	.87	.07	.26	2033.60
2833.0	.0	2833.0	.0	.0	377.5	.0	200.3	79.5	2037.60
.86	.00	7.50	.00	.000	.045	.000	.000	2025.60	1032.44
.027213	195.	195.	195.	20	14	0	.00	232.70	1265.13

*SECNO 19802.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.37

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2044.40 ELREA= 2041.30

19802.000	4.72	2036.72	.00	.00	2037.02	.30	5.63	.06	2044.40
2833.0	.0	2833.0	.0	.0	648.3	.0	207.2	82.7	2041.30
.90	.00	4.37	.00	.000	.045	.000	.000	2032.00	1735.30
.004852	587.	587.	587.	2	0	0	.00	247.27	1982.58

*SECNO 20595.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .50

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2048.50 ELREA= 2048.20

20595.000	3.91	2043.21	.00	.00	2044.04	.83	6.86	.16	2048.50
2833.0	.0	2833.0	.0	.0	388.0	.0	216.7	86.8	2048.20
.93	.00	7.30	.00	.000	.045	.000	.000	2039.30	1229.65
.019604	793.	793.	793.	3	0	0	.00	194.57	1424.22

*SECNO 21291.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.92

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2056.10 ELREA= 2055.50

21291.000	4.88	2050.28	.00	.00	2050.51	.23	6.41	.06	2056.10
2833.0	.0	2833.0	.0	.0	735.0	.0	225.7	91.2	2055.50
.98	.00	3.85	.00	.000	.045	.000	.000	2045.40	1119.31
.005330	696.	696.	696.	5	0	0	.00	362.00	1562.36

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 22138.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2065.10 ELREA= 2066.70

22138.000	4.44	2057.04	.00	.00	2057.58	.54	6.97	.09	2065.10
2833.0	.0	2833.0	.0	.0	481.1	.0	237.5	97.3	2066.70
1.02	.00	5.89	.00	.000	.045	.000	.000	2052.60	1198.37
.014347	847.	847.	847.	3	0	0	.00	264.04	1462.42

*SECNO 23230.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.49

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	4.29	2067.39	.00	.00	2067.73	.33	10.13	.02	2075.50
2833.0	.0	2833.0	.0	.0	610.6	.0	251.2	103.9	2082.30
1.08	.00	4.64	.00	.000	.045	.000	.000	2063.10	1190.32
.006485	1092.	1092.	1092.	4	0	0	.00	264.23	1454.55

*SECNO 24530.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .67

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2089.10 ELREA= 2106.50

24530.000	3.91	2079.31	.00	.00	2079.81	.50	12.04	.05	2089.10
2833.0	.0	2833.0	.0	.0	498.3	.0	267.7	112.1	2106.50
1.15	.00	5.69	.00	.000	.045	.000	.000	2075.40	1157.61
.014285	1300.	1300.	1300.	3	0	0	.00	286.77	1444.38

*SECNO 25616.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2100.50 ELREA= 2100.60

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
25616.000	5.57	2090.67	.00	.00	2091.05	.38	11.22	.01	2100.50
2833.0	.0	2833.0	.0	.0	574.3	.0	281.1	119.0	2100.60
1.21	.00	4.93	.00	.000	.045	.000	.000	2085.10	1335.96
.007822	1086.	1086.	1086.	4	0	0	.00	260.51	1596.46

*SECNO 26383.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLRA= 2109.80 ELREA= 2105.60

26383.000	5.61	2095.61	.00	.00	2096.04	.43	4.97	.02	2109.80
2833.0	.0	2833.0	.0	.0	535.9	.0	290.9	122.7	2105.60
1.25	.00	5.29	.00	.000	.045	.000	.000	2090.00	1276.80
.005465	767.	767.	767.	2	0	0	.00	166.73	1443.53

*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27000.000	6.29	2107.79	2107.79	.00	2110.14	2.36	4.16	.58	2112.00
2833.0	.0	2833.0	.0	.0	230.0	.0	296.3	124.2	2112.00
1.26	.00	12.32	.00	.000	.030	.000	.000	2101.50	59.42
.008538	617.	617.	617.	20	8	0	.00	49.16	108.58

*SECNO 27303.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27303.000	6.28	2110.78	2110.78	.00	2113.14	2.36	2.59	.00	2115.00
2833.0	.0	2833.0	.0	.0	229.6	.0	297.9	124.6	2115.00
1.27	.00	12.34	.00	.000	.030	.000	.000	2104.50	59.44
.008586	303.	303.	303.	2	5	0	.00	49.12	108.56

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TW LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	1919.560	1920.352	6109.000	6397.000

TW LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	1920.352	1921.636	6397.000	6842.000

TW LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	1921.636	1923.151	6842.000	7287.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2023.683	2025.137	18472.000	18619.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2025.137	2025.433	18619.000	18710.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2025.433	2025.533	18710.000	19020.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2025.533	2030.456	19020.000	19215.000

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THIS RUN EXECUTED 15APR98 13:58:07

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 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	150.000	.00	.00	.00	1886.00	1025.00	1889.02	1889.02	1890.55	29.86	9.91	103.40	187.58
*	150.000	.00	.00	.00	1886.00	1746.00	1890.31	1890.31	1892.49	30.54	11.84	147.47	315.97
*	150.000	.00	.00	.00	1886.00	2266.00	1891.13	1891.13	1893.72	33.32	12.92	175.39	404.90
	243.600	93.60	.00	.00	1886.20	1025.00	1889.63	.00	1890.81	20.33	8.71	117.69	227.31
	243.600	93.60	.00	.00	1886.20	1746.00	1891.05	.00	1892.77	21.93	10.55	165.54	372.88
	243.600	93.60	.00	.00	1886.20	2266.00	1891.96	.00	1894.02	22.74	11.53	196.55	475.23
	244.600	1.00	.00	.00	1886.20	1025.00	1889.80	.00	1890.83	13.66	8.14	126.00	277.35
	244.600	1.00	.00	.00	1886.20	1746.00	1891.33	.00	1892.80	13.39	9.73	179.43	477.19
	244.600	1.00	.00	.00	1886.20	2266.00	1892.30	.00	1894.05	13.38	10.62	213.38	619.40
*	450.000	205.40	.00	.00	1887.00	1025.00	1890.03	1890.03	1891.54	24.16	9.85	104.04	208.55
*	450.000	205.40	.00	.00	1887.00	1746.00	1891.32	1891.32	1893.46	23.11	11.73	148.82	363.19
*	450.000	205.40	.00	.00	1887.00	2266.00	1892.14	1892.14	1894.67	22.82	12.78	177.34	474.39
*	544.000	94.00	.00	.00	1887.20	1025.00	1891.10	1891.10	1892.71	21.65	10.18	100.72	220.28
*	544.000	94.00	.00	.00	1887.20	1746.00	1892.55	1892.55	1894.66	20.20	11.65	149.88	388.47
*	544.000	94.00	.00	.00	1887.20	2266.00	1893.42	1893.42	1895.82	19.56	12.42	182.50	512.32
*	600.000	56.00	.00	.00	1887.40	1025.00	1891.31	1891.31	1892.92	21.56	10.18	100.72	220.74
*	600.000	56.00	.00	.00	1887.40	1746.00	1892.77	1892.77	1894.87	20.12	11.65	149.86	389.26
*	600.000	56.00	.00	.00	1887.40	2266.00	1893.64	1893.64	1896.04	19.46	12.41	182.53	513.65
*	700.000	100.00	.00	.00	1887.70	1025.00	1891.60	1891.60	1893.21	21.63	10.17	100.75	220.41
*	700.000	100.00	.00	.00	1887.70	1746.00	1893.05	1893.05	1895.16	20.17	11.64	149.95	388.73
*	700.000	100.00	.00	.00	1887.70	2266.00	1893.93	1893.93	1896.32	19.52	12.41	182.65	512.93
*	1200.000	500.00	.00	.00	1889.30	1025.00	1893.20	1893.20	1894.81	21.58	10.17	100.82	220.63
*	1200.000	500.00	.00	.00	1889.30	1746.00	1894.65	1894.65	1896.76	20.13	11.63	150.08	389.18
*	1200.000	500.00	.00	.00	1889.30	2266.00	1895.53	1895.53	1897.92	19.48	12.40	182.77	513.40

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1700.000	500.00	.00	.00	1891.00	1025.00	1894.90	1894.90	1896.51	21.60	10.17	100.80	220.54
*	1700.000	500.00	.00	.00	1891.00	1746.00	1896.35	1896.35	1898.46	20.13	11.63	150.08	389.18
*	1700.000	500.00	.00	.00	1891.00	2266.00	1897.23	1897.23	1899.62	19.49	12.40	182.75	513.32
*	2000.000	300.00	.00	.00	1892.00	1025.00	1895.90	1895.90	1897.51	21.60	10.17	100.80	220.54
*	2000.000	300.00	.00	.00	1892.00	1746.00	1897.35	1897.35	1899.46	20.13	11.63	150.08	389.18
*	2000.000	300.00	.00	.00	1892.00	2266.00	1898.23	1898.23	1900.62	19.48	12.40	182.79	513.45
*	2200.000	200.00	.00	.00	1892.60	1025.00	1896.50	1896.50	1898.11	21.60	10.17	100.80	220.54
*	2200.000	200.00	.00	.00	1892.60	1746.00	1897.95	1897.95	1900.06	20.13	11.63	150.08	389.18
*	2200.000	200.00	.00	.00	1892.60	2266.00	1898.83	1898.83	1901.22	19.48	12.40	182.79	513.45
*	3724.000	1524.00	.00	.00	1897.60	1025.00	1901.54	1901.54	1903.14	21.47	10.17	100.79	221.23
*	3724.000	1524.00	.00	.00	1897.60	1746.00	1903.00	1903.00	1905.10	20.03	11.63	150.08	390.10
*	3724.000	1524.00	.00	.00	1897.60	2266.00	1903.88	1903.88	1906.26	19.39	12.39	182.83	514.62
*	3823.000	99.00	.00	.00	1898.00	1025.00	1902.55	.00	1903.35	8.63	7.19	142.57	348.89
*	3823.000	99.00	.00	.00	1898.00	1746.00	1904.14	.00	1905.32	9.27	8.72	200.34	573.55
	3823.000	99.00	.00	.00	1898.00	2266.00	1905.04	.00	1906.49	9.96	9.67	234.27	718.09
	4020.000	197.00	.00	.00	1898.60	1025.00	1902.56	.00	1903.64	13.44	8.35	122.81	279.55
	4020.000	197.00	.00	.00	1898.60	1746.00	1904.14	.00	1905.63	12.99	9.79	178.31	484.52
	4020.000	197.00	.00	.00	1898.60	2266.00	1905.03	.00	1906.82	13.39	10.73	211.23	619.21
	4060.000	40.00	.00	.00	1898.70	1025.00	1902.55	.00	1903.73	15.19	8.70	117.79	262.99
	4060.000	40.00	.00	.00	1898.70	1746.00	1904.12	.00	1905.72	14.28	10.12	172.46	462.07
	4060.000	40.00	.00	.00	1898.70	2266.00	1905.01	.00	1906.91	14.60	11.06	204.81	592.96
*	4115.000	55.00	.00	.00	1898.80	1281.00	1902.86	.00	1903.85	11.27	8.01	160.02	381.62
	4115.000	55.00	.00	.00	1898.80	2183.00	1904.17	.00	1905.82	13.77	10.30	211.97	588.24
	4115.000	55.00	.00	.00	1898.80	2833.00	1905.00	.00	1907.08	15.03	11.58	244.58	730.71
*	4188.000	73.00	.00	.00	1899.40	1281.00	1903.50	.00	1904.05	5.75	5.92	216.27	534.32
*	4188.000	73.00	.00	.00	1899.40	2183.00	1905.41	.00	1906.15	5.05	6.88	317.10	970.95
*	4188.000	73.00	.00	.00	1899.40	2833.00	1906.65	.00	1907.51	4.80	7.41	382.34	1293.47
	4189.000	1.00	1914.60	1909.70	1899.40	1281.00	1903.45	.00	1904.10	6.95	6.43	199.24	485.75
	4189.000	1.00	1914.60	1909.70	1899.40	2183.00	1905.35	.00	1906.22	6.12	7.46	292.54	882.75
	4189.000	1.00	1914.60	1909.70	1899.40	2833.00	1906.58	.00	1907.58	5.80	8.02	353.09	1176.44
	4246.000	57.00	1914.80	1910.20	1899.90	1281.00	1903.39	.00	1904.26	11.14	7.46	171.61	383.80
	4246.000	57.00	1914.80	1910.20	1899.90	2183.00	1905.30	.00	1906.35	8.22	8.21	265.77	761.36
	4246.000	57.00	1914.80	1910.20	1899.90	2833.00	1906.53	.00	1907.70	7.36	8.68	326.40	1043.93

	4247.000	1.00	.00	.00	1899.90	1281.00	1903.68	.00	1904.32	7.42	6.42	199.48	470.27
	4247.000	1.00	.00	.00	1899.90	2183.00	1905.60	.00	1906.42	5.94	7.25	301.01	895.86
	4247.000	1.00	.00	.00	1899.90	2833.00	1906.85	.00	1907.78	5.43	7.72	367.01	1215.23
*	4360.000	113.00	.00	.00	1900.90	1281.00	1905.76	1905.76	1907.53	20.85	10.67	120.01	280.56
*	4360.000	113.00	.00	.00	1900.90	2183.00	1907.40	1907.40	1909.63	19.23	11.99	182.13	497.76
*	4360.000	113.00	.00	.00	1900.90	2833.00	1908.34	1908.34	1910.86	18.82	12.75	222.28	653.06

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4831.000	471.00	.00	.00	1904.80	1281.00	1909.66	1909.66	1911.43	20.75	10.66	120.21	281.20
*	4831.000	471.00	.00	.00	1904.80	2183.00	1911.29	1911.29	1913.53	19.41	12.03	181.53	495.53
*	4831.000	471.00	.00	.00	1904.80	2833.00	1912.25	1912.25	1914.76	18.73	12.72	222.67	654.61
*	4920.000	89.00	.00	.00	1905.50	1281.00	1910.36	1910.36	1912.13	20.77	10.66	120.18	281.11
*	4920.000	89.00	.00	.00	1905.50	2183.00	1911.99	1911.99	1914.23	19.36	12.02	181.67	496.08
*	4920.000	89.00	.00	.00	1905.50	2833.00	1912.95	1912.95	1915.46	18.75	12.73	222.56	654.20
*	5005.000	85.00	.00	.00	1906.20	1281.00	1911.06	1911.06	1912.83	20.77	10.66	120.17	281.07
*	5005.000	85.00	.00	.00	1906.20	2183.00	1912.69	1912.69	1914.93	19.39	12.02	181.59	495.78
*	5005.000	85.00	.00	.00	1906.20	2833.00	1913.65	1913.65	1916.16	18.75	12.73	222.56	654.20
*	5105.000	100.00	.00	.00	1908.20	1281.00	1911.66	1911.66	1913.40	24.04	10.57	121.25	261.26
*	5105.000	100.00	.00	.00	1908.20	2183.00	1913.13	1913.13	1915.62	23.60	12.66	172.46	449.34
*	5105.000	100.00	.00	.00	1908.20	2833.00	1914.06	1914.06	1917.02	23.55	13.81	205.11	583.83
*	5200.000	95.00	.00	.00	1908.80	1281.00	1912.06	1912.06	1913.70	24.06	10.30	124.37	261.15
	5200.000	95.00	.00	.00	1908.80	2183.00	1913.94	.00	1915.86	17.08	11.14	195.99	528.17
	5200.000	95.00	.00	.00	1908.80	2833.00	1915.19	.00	1917.29	14.85	11.62	243.86	735.09
*	5500.000	300.00	.00	.00	1910.80	1281.00	1913.59	1913.59	1915.00	23.63	9.51	134.65	263.53
*	5500.000	300.00	.00	.00	1910.80	2183.00	1914.78	1914.78	1916.79	22.35	11.38	191.79	461.74
*	5500.000	300.00	.00	.00	1910.80	2833.00	1915.54	1915.54	1917.93	21.79	12.40	228.42	606.96
*	5852.000	352.00	.00	.00	1912.50	1281.00	1915.13	1915.13	1916.40	23.83	9.05	141.52	262.42
*	5852.000	352.00	.00	.00	1912.50	2183.00	1916.20	1916.20	1918.02	22.15	10.81	201.93	463.82
*	5852.000	352.00	.00	.00	1912.50	2833.00	1916.88	1916.88	1919.04	21.51	11.79	240.24	610.85
	5853.000	1.00	.00	.00	1912.50	1281.00	1915.14	1915.13	1916.41	27.16	9.03	141.83	245.78
	5853.000	1.00	.00	.00	1912.50	2183.00	1916.21	1916.21	1918.02	25.27	10.79	202.32	434.24
	5853.000	1.00	.00	.00	1912.50	2833.00	1916.90	1916.89	1919.05	24.53	11.77	240.76	572.06
*	5973.000	120.00	1922.00	1924.10	1913.10	1281.00	1915.86	1915.86	1917.19	48.86	9.27	138.21	183.27
*	5973.000	120.00	1922.00	1924.10	1913.10	2183.00	1916.99	1916.99	1918.89	54.04	11.08	197.04	296.95
*	5973.000	120.00	1922.00	1924.10	1913.10	2833.00	1917.70	1917.70	1919.97	57.61	12.09	234.40	373.26
*	5974.000	1.00	.00	.00	1913.10	1281.00	1916.52	.00	1917.26	11.35	6.88	186.14	380.20
*	5974.000	1.00	.00	.00	1913.10	2183.00	1917.93	.00	1918.98	10.70	8.22	265.53	667.49
*	5974.000	1.00	.00	.00	1913.10	2833.00	1918.82	.00	1920.07	10.46	8.97	315.93	875.86
*	6092.000	126.00	.00	.00	1914.00	1281.00	1916.77	.00	1917.54	59.68	7.05	181.64	165.82
*	6092.000	126.00	.00	.00	1914.00	2183.00	1918.44	.00	1919.23	34.42	7.11	307.04	372.07
*	6092.000	126.00	.00	.00	1914.00	2833.00	1919.51	.00	1920.32	27.51	7.21	393.19	540.18
*	6370.000	278.00	.00	.00	1914.80	1281.00	1918.21	.00	1918.70	29.55	5.63	227.36	235.65
	6370.000	278.00	.00	.00	1914.80	2183.00	1919.40	.00	1920.14	30.66	6.86	318.18	394.23
	6370.000	278.00	.00	.00	1914.80	2833.00	1920.27	.00	1921.10	28.41	7.30	387.86	531.50
	6828.000	458.00	.00	.00	1916.20	1281.00	1919.58	.00	1920.08	30.38	5.68	225.47	232.40
	6828.000	458.00	.00	.00	1916.20	2183.00	1920.81	.00	1921.54	30.57	6.85	318.77	394.84
	6828.000	458.00	.00	.00	1916.20	2833.00	1921.59	.00	1922.45	29.93	7.42	381.55	517.85

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	7265.000	437.00	.00	.00	1918.50	1281.00	1921.22	.00	1922.03	63.59	7.20	177.81	160.65
	7265.000	437.00	.00	.00	1918.50	2183.00	1922.33	.00	1923.43	57.09	8.40	259.78	288.92
	7265.000	437.00	.00	.00	1918.50	2833.00	1923.02	.00	1924.29	54.32	9.04	313.25	384.40
	7730.000	465.00	.00	.00	1921.50	1281.00	1924.21	.00	1925.02	65.20	7.26	176.35	158.64
	7730.000	465.00	.00	.00	1921.50	2183.00	1925.14	.00	1926.37	68.49	8.92	244.75	263.77
	7730.000	465.00	.00	.00	1921.50	2833.00	1925.72	.00	1927.21	69.76	9.82	288.43	339.19
	8323.000	593.00	.00	.00	1925.20	1281.00	1927.96	.00	1928.74	60.17	7.09	180.79	165.14
	8323.000	593.00	.00	.00	1925.20	2183.00	1929.01	.00	1930.13	58.39	8.48	257.54	285.67
	8323.000	593.00	.00	.00	1925.20	2833.00	1929.66	.00	1930.98	57.68	9.24	306.66	373.01
	8673.000	350.00	.00	.00	1927.40	1281.00	1930.11	.00	1930.92	63.67	7.21	177.70	160.54
	8673.000	350.00	.00	.00	1927.40	2183.00	1931.11	.00	1932.29	64.21	8.73	249.94	272.42
	8673.000	350.00	.00	.00	1927.40	2833.00	1931.72	.00	1933.14	64.10	9.55	296.55	353.85
*	8754.000	81.00	.00	.00	1927.90	1281.00	1932.92	1932.92	1934.82	24.01	11.04	116.03	261.45
*	8754.000	81.00	.00	.00	1927.90	2183.00	1934.67	1934.67	1937.10	22.51	12.50	174.62	460.12
*	8754.000	81.00	.00	.00	1927.90	2833.00	1935.69	1935.69	1938.43	21.98	13.29	213.09	604.27
*	8755.000	1.00	1941.60	1941.80	1927.90	1281.00	1933.11	1933.11	1935.04	34.91	11.16	114.76	216.81
*	8755.000	1.00	1941.60	1941.80	1927.90	2183.00	1934.90	1934.90	1937.35	33.78	12.58	173.55	375.62
*	8755.000	1.00	1941.60	1941.80	1927.90	2833.00	1935.93	1935.93	1938.70	33.51	13.36	212.03	489.42
*	8860.000	79.00	1942.10	1942.30	1928.40	1281.00	1933.61	1933.61	1935.54	34.91	11.16	114.76	216.81
*	8860.000	79.00	1942.10	1942.30	1928.40	2183.00	1935.40	1935.40	1937.85	33.78	12.58	173.55	375.62

*	8860.000	79.00	1942.10	1942.30	1928.40	2833.00	1936.43	1936.43	1939.20	33.51	13.36	212.03	489.42
*	8861.000	1.00	.00	.00	1928.40	1281.00	1934.91	1933.43	1935.84	9.00	7.75	165.38	427.01
*	8861.000	1.00	.00	.00	1928.40	2183.00	1937.02	1935.18	1938.23	9.09	8.83	247.13	724.07
*	8861.000	1.00	.00	.00	1928.40	2833.00	1938.23	1936.22	1939.62	8.60	9.45	299.63	966.27
*	9120.000	259.00	.00	.00	1930.90	1281.00	1936.25	1936.25	1938.07	24.05	10.82	118.40	261.19
*	9120.000	259.00	.00	.00	1930.90	2183.00	1937.92	1937.92	1940.23	22.48	12.19	179.04	460.40
*	9120.000	259.00	.00	.00	1930.90	2833.00	1938.94	1938.94	1941.48	21.32	12.81	221.14	613.53
*	9237.000	117.00	.00	.00	1940.00	1281.00	1941.73	1941.73	1942.27	294.66	5.91	216.89	74.63
*	9237.000	117.00	.00	.00	1940.00	2183.00	1942.23	1942.23	1942.91	273.02	6.63	329.02	132.12
*	9237.000	117.00	.00	.00	1940.00	2833.00	1942.52	1942.52	1943.28	263.22	7.02	403.83	174.62
*	9429.000	192.00	.00	.00	1942.10	1281.00	1944.09	.00	1944.19	48.20	2.55	502.17	184.52
*	9429.000	192.00	.00	.00	1942.10	2183.00	1944.58	.00	1944.73	45.52	3.06	712.49	323.57
*	9429.000	192.00	.00	.00	1942.10	2833.00	1944.88	.00	1945.06	44.51	3.35	845.16	424.62
*	10155.000	726.00	.00	.00	1948.70	1281.00	1953.20	1953.20	1953.78	332.31	6.13	209.05	70.27
*	10155.000	726.00	.00	.00	1948.70	2183.00	1953.81	1953.81	1953.91	37.07	2.30	872.11	358.54
*	10155.000	726.00	.00	.00	1948.70	2833.00	1953.74	1953.74	1953.93	74.61	3.14	816.82	327.98
*	10962.000	807.00	.00	.00	1956.70	1281.00	1959.30	1959.13	1959.37	21.38	1.58	631.22	277.05
*	10962.000	807.00	.00	.00	1956.70	2183.00	1959.31	1959.31	1959.51	60.64	2.68	637.38	280.33
	10962.000	807.00	.00	.00	1956.70	2833.00	1959.49	1959.36	1959.73	68.92	3.16	747.49	341.25

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	11614.000	652.00	.00	.00	1960.30	1281.00	1964.34	1964.34	1964.90	340.27	6.00	213.56	69.44
*	11614.000	652.00	.00	.00	1960.30	2183.00	1965.26	1964.88	1965.54	156.00	4.22	517.79	174.78
*	11614.000	652.00	.00	.00	1960.30	2833.00	1965.50	1965.16	1965.80	137.39	4.42	640.82	241.70
*	12202.000	588.00	.00	.00	1962.70	1281.00	1968.32	.00	1968.56	24.86	3.92	329.54	256.94
*	12202.000	588.00	.00	.00	1962.70	2183.00	1969.14	.00	1969.57	37.71	5.33	436.89	355.47
*	12202.000	588.00	.00	.00	1962.70	2833.00	1969.60	.00	1970.15	44.84	6.09	512.52	423.08
	13094.000	892.00	.00	.00	1964.70	1281.00	1969.38	.00	1970.12	12.86	3.00	426.79	357.16
*	13094.000	892.00	.00	.00	1964.70	2183.00	1971.41	.00	1971.63	15.32	3.73	585.96	557.74
*	13094.000	892.00	.00	.00	1964.70	2833.00	1972.22	.00	1972.49	16.84	4.15	682.86	690.29
*	14167.000	1073.00	.00	.00	1970.30	1281.00	1972.94	.00	1973.84	193.82	7.60	168.54	92.01
*	14167.000	1073.00	.00	.00	1970.30	2183.00	1974.40	.00	1975.29	106.62	7.56	288.64	211.42
*	14167.000	1073.00	.00	.00	1970.30	2833.00	1975.26	.00	1976.20	88.77	7.78	364.00	300.69
*	14368.000	201.00	.00	.00	1982.60	1281.00	1984.91	1984.91	1985.90	240.49	8.00	160.21	82.60
*	14368.000	201.00	.00	.00	1982.60	2183.00	1985.93	1985.93	1987.14	176.64	8.84	255.39	164.25
*	14368.000	201.00	.00	.00	1982.60	2833.00	1986.74	1986.74	1987.67	107.35	8.13	433.64	273.43
*	15114.000	746.00	.00	.00	1980.60	1281.00	1987.30	.00	1987.40	6.35	2.43	527.56	508.53
*	15114.000	746.00	.00	.00	1980.60	2183.00	1988.78	.00	1988.94	8.44	3.17	691.02	752.57
*	15114.000	746.00	.00	.00	1980.60	2833.00	1989.36	.00	1989.58	10.66	3.74	775.28	867.76
*	15667.000	553.00	.00	.00	1989.60	1281.00	1991.60	1991.60	1992.29	273.08	6.66	192.33	77.52
*	15667.000	553.00	.00	.00	1989.60	2183.00	1992.19	1992.19	1993.14	244.91	7.82	279.21	139.49
*	15667.000	553.00	.00	.00	1989.60	2833.00	1992.56	1992.56	1993.67	232.56	8.44	335.62	185.77
*	16546.000	879.00	.00	.00	1993.00	1281.00	1996.99	.00	1997.15	22.73	3.20	399.92	268.71
*	16546.000	879.00	.00	.00	1993.00	2183.00	1998.02	.00	1998.27	25.09	4.02	543.50	435.85
*	16546.000	879.00	.00	.00	1993.00	2833.00	1998.64	.00	1998.95	26.46	4.49	631.38	550.73
*	17058.000	512.00	.00	.00	2004.60	1281.00	2006.91	2006.91	2007.52	289.84	6.28	203.95	75.24
*	17058.000	512.00	.00	.00	2004.60	2183.00	2007.45	2007.45	2008.27	254.67	7.24	301.50	136.79
*	17058.000	512.00	.00	.00	2004.60	2833.00	2007.77	2007.77	2008.72	243.05	7.85	360.95	181.72
*	17612.000	554.00	.00	.00	2009.20	1281.00	2013.44	.00	2013.82	59.81	4.90	261.68	165.64
*	17612.000	554.00	.00	.00	2009.20	2183.00	2014.82	.00	2015.14	72.36	4.51	484.45	256.63
*	17612.000	554.00	.00	.00	2009.20	2833.00	2015.18	.00	2015.56	73.53	4.97	569.73	330.38
*	18436.000	824.00	.00	.00	2019.10	1281.00	2021.73	.00	2022.36	216.30	6.40	200.19	87.10
	18436.000	824.00	.00	.00	2019.10	2183.00	2022.72	.00	2023.21	137.97	5.62	388.43	185.85
	18436.000	824.00	.00	.00	2019.10	2833.00	2023.08	.00	2023.65	135.32	6.06	467.30	243.54
	18462.000	26.00	.00	.00	2020.00	1281.00	2022.37	.00	2022.81	132.12	5.36	239.03	111.45
	18462.000	26.00	.00	.00	2020.00	2183.00	2022.95	.00	2023.66	153.77	6.75	323.60	176.04
	18462.000	26.00	.00	.00	2020.00	2833.00	2023.23	.00	2024.16	179.22	7.74	366.11	211.62
	18472.000	10.00	.00	.00	2020.00	1281.00	2022.59	.00	2022.93	90.46	4.73	270.82	134.69
	18472.000	10.00	.00	.00	2020.00	2183.00	2023.26	.00	2023.80	101.94	5.88	371.44	216.21
	18472.000	10.00	.00	.00	2020.00	2833.00	2023.68	.00	2024.33	106.57	6.44	440.22	274.43

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	18619.000	147.00	.00	.00	2021.60	1281.00	2023.85	.00	2024.05	63.36	3.62	353.95	160.94
	18619.000	147.00	.00	.00	2021.60	2183.00	2024.69	.00	2024.92	56.38	3.85	567.23	290.74
*	18619.000	147.00	.00	.00	2021.60	2833.00	2025.14	.00	2025.39	49.19	4.04	700.80	403.93
*	18710.000	91.00	.00	.00	2015.60	1281.00	2024.09	.00	2024.11	1.57	1.17	1098.17	1023.16
*	18710.000	91.00	.00	.00	2015.60	2183.00	2024.96	.00	2025.01	2.84	1.67	1306.18	1294.82
*	18710.000	91.00	.00	.00	2015.60	2833.00	2025.43	.00	2025.49	3.78	1.99	1424.94	1456.80
*	19020.000	310.00	.00	.00	2017.60	1281.00	2024.13	.00	2024.14	.45	.68	1875.31	1911.17

*	19020.000	310.00	.00	.00	2017.60	2183.00	2025.04	.00	2025.05	.81	.99	2194.09	2421.64
*	19020.000	310.00	.00	.00	2017.60	2833.00	2025.53	.00	2025.56	1.08	1.19	2373.66	2724.51
*	19215.000	195.00	.00	.00	2025.60	1281.00	2029.25	2029.25	2030.34	276.50	8.38	152.91	77.04
*	19215.000	195.00	.00	.00	2025.60	2183.00	2030.26	2030.26	2030.93	245.92	6.59	331.41	139.20
*	19215.000	195.00	.00	.00	2025.60	2833.00	2030.46	2030.46	2031.33	272.13	7.50	377.54	171.73
*	19802.000	587.00	.00	.00	2032.00	1281.00	2035.44	.00	2035.62	43.00	3.43	373.65	195.35
*	19802.000	587.00	.00	.00	2032.00	2183.00	2036.18	.00	2036.45	48.77	4.20	520.33	312.60
*	19802.000	587.00	.00	.00	2032.00	2833.00	2036.72	.00	2037.02	48.52	4.37	648.29	406.72
*	20595.000	793.00	.00	.00	2039.30	1281.00	2042.29	2042.29	2042.85	269.28	6.02	212.76	78.06
*	20595.000	793.00	.00	.00	2039.30	2183.00	2042.88	.00	2043.59	206.62	6.75	323.35	151.87
*	20595.000	793.00	.00	.00	2039.30	2833.00	2043.21	.00	2044.04	196.04	7.30	388.02	202.34
*	21291.000	696.00	.00	.00	2045.40	1281.00	2049.25	.00	2049.40	46.98	3.04	421.71	186.90
*	21291.000	696.00	.00	.00	2045.40	2183.00	2049.85	.00	2050.06	52.06	3.71	589.14	302.56
*	21291.000	696.00	.00	.00	2045.40	2833.00	2050.28	.00	2050.51	53.30	3.85	735.02	388.03
*	22138.000	847.00	.00	.00	2052.60	1281.00	2055.97	.00	2056.39	175.36	5.18	247.19	96.73
*	22138.000	847.00	.00	.00	2052.60	2183.00	2056.62	.00	2057.13	149.68	5.72	381.79	178.43
*	22138.000	847.00	.00	.00	2052.60	2833.00	2057.04	.00	2057.58	143.47	5.89	481.09	236.52
*	23230.000	1092.00	.00	.00	2063.10	1281.00	2066.45	.00	2066.64	58.10	3.45	371.54	168.05
*	23230.000	1092.00	.00	.00	2063.10	2183.00	2067.06	.00	2067.33	63.53	4.17	522.92	273.88
*	23230.000	1092.00	.00	.00	2063.10	2833.00	2067.39	.00	2067.73	64.85	4.64	610.64	351.79
*	24530.000	1300.00	.00	.00	2075.40	1281.00	2078.44	2078.20	2078.79	172.75	4.74	270.27	97.46
*	24530.000	1300.00	.00	.00	2075.40	2183.00	2079.00	.00	2079.43	147.91	5.28	413.26	179.50
*	24530.000	1300.00	.00	.00	2075.40	2833.00	2079.31	.00	2079.81	142.85	5.69	498.28	237.03
*	25616.000	1086.00	.00	.00	2085.10	1281.00	2089.51	.00	2089.76	66.08	3.98	321.96	157.59
	25616.000	1086.00	.00	.00	2085.10	2183.00	2090.28	.00	2090.60	75.54	4.59	475.09	251.17
	25616.000	1086.00	.00	.00	2085.10	2833.00	2090.67	.00	2091.05	78.22	4.93	574.29	320.32
	26383.000	767.00	.00	.00	2090.00	1281.00	2094.12	.00	2094.39	55.22	4.15	308.90	172.38
	26383.000	767.00	.00	.00	2090.00	2183.00	2095.10	.00	2095.46	53.57	4.82	452.68	298.27
	26383.000	767.00	.00	.00	2090.00	2833.00	2095.61	.00	2096.04	54.65	5.29	535.91	383.21
*	27000.000	617.00	.00	.00	2101.50	1281.00	2105.47	2105.47	2107.05	94.98	10.12	126.62	131.44
*	27000.000	617.00	.00	.00	2101.50	2183.00	2106.90	2106.90	2109.00	89.21	11.60	188.14	231.13
*	27000.000	617.00	.00	.00	2101.50	2833.00	2107.79	2107.79	2110.14	85.38	12.32	230.04	306.59

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	27303.000	303.00	.00	.00	2104.50	1281.00	2108.45	2108.45	2110.05	96.14	10.16	126.08	130.64
*	27303.000	303.00	.00	.00	2104.50	2183.00	2109.91	2109.91	2112.00	88.79	11.58	188.45	231.67
*	27303.000	303.00	.00	.00	2104.50	2833.00	2110.78	2110.78	2113.14	85.86	12.34	229.59	305.74

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LNLV WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	150.000	1025.00	1889.02	.00	.00	.12	34.22	.00
*	150.000	1746.00	1890.31	1.29	.00	.21	34.24	.00
*	150.000	2266.00	1891.13	.82	.00	.23	34.25	.00
	243.600	1025.00	1889.63	.00	.61	.00	34.19	93.60
	243.600	1746.00	1891.05	1.41	.73	.00	34.20	93.60
	243.600	2266.00	1891.96	.91	.83	.00	34.20	93.60
	244.600	1025.00	1889.80	.00	.17	.00	35.00	1.00
	244.600	1746.00	1891.33	1.53	.28	.00	35.00	1.00
	244.600	2266.00	1892.30	.97	.35	.00	35.00	1.00
*	450.000	1025.00	1890.03	.00	.23	.00	34.61	205.40
*	450.000	1746.00	1891.32	1.29	-.01	.00	34.86	205.40
*	450.000	2266.00	1892.14	.82	-.16	.00	35.03	205.40
*	544.000	1025.00	1891.10	.00	1.06	.00	31.69	94.00
*	544.000	1746.00	1892.55	1.45	1.23	.00	36.05	94.00
*	544.000	2266.00	1893.42	.87	1.28	.00	38.67	94.00
*	600.000	1025.00	1891.31	.00	.21	.00	31.55	56.00
*	600.000	1746.00	1692.77	1.46	.22	.00	35.86	56.00
*	600.000	2266.00	1893.64	.88	.22	.00	38.46	56.00
*	700.000	1025.00	1891.60	.00	.29	.00	31.69	100.00
*	700.000	1746.00	1893.05	1.45	.29	.00	36.05	100.00
*	700.000	2266.00	1893.93	.88	.28	.00	38.68	100.00
*	1200.000	1025.00	1893.20	.00	1.60	.00	31.70	500.00
*	1200.000	1746.00	1894.65	1.45	1.60	.00	36.06	500.00
*	1200.000	2266.00	1895.53	.87	1.60	.00	38.69	500.00
*	1700.000	1025.00	1894.90	.00	1.70	.00	31.70	500.00
*	1700.000	1746.00	1896.35	1.45	1.70	.00	36.06	500.00
*	1700.000	2266.00	1897.23	.87	1.70	.00	38.68	500.00

*	2000.000	1025.00	1895.90	.00	1.00	.00	31.70	300.00
*	2000.000	1746.00	1897.35	1.45	1.00	.00	36.06	300.00
*	2000.000	2266.00	1898.23	.88	1.00	.00	38.69	300.00
*	2200.000	1025.00	1896.50	.00	.60	.00	31.70	200.00
*	2200.000	1746.00	1897.95	1.45	.60	.00	36.06	200.00
*	2200.000	2266.00	1898.83	.88	.60	.00	38.69	200.00
*	3724.000	1025.00	1901.54	.00	5.04	.00	31.51	1524.00
*	3724.000	1746.00	1903.00	1.46	5.04	.00	35.90	1524.00
*	3724.000	2266.00	1903.88	.88	5.05	.00	38.54	1524.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	3823.000	1025.00	1902.55	.00	1.01	.00	34.83	99.00
*	3823.000	1746.00	1904.14	1.60	1.14	.00	37.24	99.00
	3823.000	2266.00	1905.04	.90	1.16	.00	38.59	99.00
	4020.000	1025.00	1902.56	.00	.01	.00	33.97	197.00
	4020.000	1746.00	1904.14	1.58	.00	.00	36.34	197.00
	4020.000	2266.00	1905.03	.89	-.01	.00	37.68	197.00
	4060.000	1025.00	1902.55	.00	-.01	.00	33.65	40.00
	4060.000	1746.00	1904.12	1.57	-.02	.00	35.99	40.00
	4060.000	2266.00	1905.01	.88	-.02	.00	37.30	40.00
*	4115.000	1281.00	1902.86	.00	.31	.00	39.48	55.00
	4115.000	2183.00	1904.17	1.31	.05	.00	39.50	55.00
	4115.000	2833.00	1905.00	.82	-.01	.00	39.52	55.00
*	4188.000	1281.00	1903.50	.00	.64	.00	52.75	73.00
*	4188.000	2183.00	1905.41	1.91	1.24	.00	52.78	73.00
*	4188.000	2833.00	1906.65	1.24	1.66	.00	52.79	73.00
	4189.000	1281.00	1903.45	.00	-.05	.00	52.74	1.00
	4189.000	2183.00	1905.35	1.90	-.06	.00	52.76	1.00
	4189.000	2833.00	1906.58	1.23	-.07	.00	52.77	1.00
	4246.000	1281.00	1903.39	.00	-.06	.00	52.73	57.00
	4246.000	2183.00	1905.30	1.91	-.05	.00	52.75	57.00
	4246.000	2833.00	1906.53	1.23	-.05	.00	52.76	57.00
	4247.000	1281.00	1903.68	.00	.29	.00	52.75	1.00
	4247.000	2183.00	1905.60	1.92	.30	.00	52.78	1.00
	4247.000	2833.00	1906.85	1.25	.32	.00	52.79	1.00
*	4360.000	1281.00	1905.76	.00	2.07	.00	34.43	113.00
*	4360.000	2183.00	1907.40	1.65	1.80	.00	41.01	113.00
*	4360.000	2833.00	1908.34	.94	1.49	.00	44.76	113.00
*	4831.000	1281.00	1909.66	.00	3.91	.00	34.45	471.00
*	4831.000	2183.00	1911.29	1.63	3.89	.00	40.95	471.00
*	4831.000	2833.00	1912.25	.96	3.91	.00	44.79	471.00
*	4920.000	1281.00	1910.36	.00	.70	.00	34.44	89.00
*	4920.000	2183.00	1911.99	1.63	.70	.00	40.97	89.00
*	4920.000	2833.00	1912.95	.95	.70	.00	44.78	89.00
*	5005.000	1281.00	1911.06	.00	.70	.00	34.44	85.00
*	5005.000	2183.00	1912.69	1.63	.70	.00	40.96	85.00
*	5005.000	2833.00	1913.65	.96	.70	.00	44.78	85.00
*	5105.000	1281.00	1911.66	.00	.60	.00	35.00	100.00
*	5105.000	2183.00	1913.13	1.46	.44	.00	35.00	100.00
*	5105.000	2833.00	1914.06	.93	.42	.00	35.00	100.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	5200.000	1281.00	1912.06	.00	.39	.00	38.20	95.00
	5200.000	2183.00	1913.94	1.88	.81	.00	38.20	95.00
	5200.000	2833.00	1915.19	1.25	1.13	.00	38.20	95.00
*	5500.000	1281.00	1913.59	.00	1.54	.00	48.20	300.00
*	5500.000	2183.00	1914.78	1.19	.84	.00	48.20	300.00
*	5500.000	2833.00	1915.54	.76	.35	.00	48.20	300.00
*	5852.000	1281.00	1915.13	.00	1.54	.00	56.25	352.00
*	5852.000	2183.00	1916.20	1.07	1.42	.00	56.27	352.00
*	5852.000	2833.00	1916.88	.68	1.34	.00	56.27	352.00
	5853.000	1281.00	1915.14	.00	.01	.00	56.26	1.00
	5853.000	2183.00	1916.21	1.08	.01	.00	56.27	1.00
	5853.000	2833.00	1916.90	.68	.01	.00	56.27	1.00
*	5973.000	1281.00	1915.86	.00	.72	.00	56.26	120.00
*	5973.000	2183.00	1916.99	1.13	.77	.00	56.27	120.00
*	5973.000	2833.00	1917.70	.72	.80	.00	56.27	120.00
*	5974.000	1281.00	1916.52	.00	.66	.00	56.27	1.00
*	5974.000	2183.00	1917.93	1.41	.94	.00	56.28	1.00

*	5974.000	2833.00	1918.82	.89	1.12	.00	56.29	1.00
*	6092.000	1281.00	1916.77	.00	.25	.00	71.32	126.00
*	6092.000	2183.00	1918.44	1.67	.51	.00	78.19	126.00
*	6092.000	2833.00	1919.51	1.07	.69	.00	82.58	126.00
*	6370.000	1281.00	1918.21	.00	1.44	.00	73.50	278.00
	6370.000	2183.00	1919.40	1.19	.96	.00	78.24	278.00
	6370.000	2833.00	1920.27	.87	.76	.00	81.69	278.00
	6828.000	1281.00	1919.58	.00	1.37	.00	73.53	458.00
	6828.000	2183.00	1920.81	1.23	1.41	.00	78.44	458.00
	6828.000	2833.00	1921.59	.78	1.32	.00	81.59	458.00
*	7265.000	1281.00	1921.22	.00	1.64	.00	70.91	437.00
	7265.000	2183.00	1922.33	1.11	1.52	.00	75.41	437.00
	7265.000	2833.00	1923.02	.69	1.43	.00	78.21	437.00
	7730.000	1281.00	1924.21	.00	2.98	.00	70.79	465.00
	7730.000	2183.00	1925.14	.93	2.80	.00	74.55	465.00
	7730.000	2833.00	1925.72	.58	2.69	.00	76.86	465.00
	8323.000	1281.00	1927.96	.00	3.76	.00	70.88	593.00
	8323.000	2183.00	1929.01	1.05	3.88	.00	75.03	593.00
	8323.000	2833.00	1929.66	.64	3.94	.00	77.56	593.00
	8673.000	1281.00	1930.11	.00	2.15	.00	70.86	350.00
	8673.000	2183.00	1931.11	1.00	2.09	.00	74.83	350.00
	8673.000	2833.00	1931.72	.61	2.06	.00	77.28	350.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	8754.000	1281.00	1932.92	.00	2.81	.00	30.86	81.00
*	8754.000	2183.00	1934.67	1.75	3.56	.00	36.26	81.00
*	8754.000	2833.00	1935.69	1.02	3.97	.00	39.40	81.00
*	8755.000	1281.00	1933.11	.00	.18	.00	31.43	1.00
*	8755.000	2183.00	1934.90	1.79	.23	.00	36.96	1.00
*	8755.000	2833.00	1935.93	1.03	.24	.00	40.16	1.00
*	8860.000	1281.00	1933.61	.00	.50	.00	31.43	79.00
*	8860.000	2183.00	1935.40	1.79	.50	.00	36.96	79.00
*	8860.000	2833.00	1936.43	1.03	.50	.00	40.16	79.00
*	8861.000	1281.00	1934.91	.00	1.31	.00	35.46	1.00
*	8861.000	2183.00	1937.02	2.10	1.62	.00	43.21	1.00
*	8861.000	2833.00	1938.23	1.21	1.80	.00	43.25	1.00
*	9120.000	1281.00	1936.25	.00	1.34	.00	33.15	259.00
*	9120.000	2183.00	1937.92	1.67	.90	.00	39.51	259.00
*	9120.000	2833.00	1938.94	1.02	.70	.00	43.38	259.00
*	9237.000	1281.00	1941.73	.00	5.48	.00	203.73	117.00
*	9237.000	2183.00	1942.23	.50	4.31	.00	245.11	117.00
*	9237.000	2833.00	1942.52	.29	3.58	.00	269.20	117.00
*	9429.000	1281.00	1944.09	.00	2.36	.00	427.79	192.00
*	9429.000	2183.00	1944.58	.49	2.35	.00	441.70	192.00
*	9429.000	2833.00	1944.88	.30	2.37	.00	450.25	192.00
*	10155.000	1281.00	1953.20	.00	9.11	.00	202.06	726.00
*	10155.000	2183.00	1953.81	.61	9.23	.00	792.33	726.00
*	10155.000	2833.00	1953.74	-.07	8.86	.00	780.67	726.00
*	10962.000	1281.00	1959.30	.00	6.11	.00	592.26	807.00
*	10962.000	2183.00	1959.31	.01	5.50	.00	594.65	807.00
	10962.000	2833.00	1959.49	.18	5.75	.00	635.92	807.00
*	11614.000	1281.00	1964.34	.00	5.04	.00	218.05	652.00
*	11614.000	2183.00	1965.26	.92	5.95	.00	500.49	652.00
*	11614.000	2833.00	1965.50	.24	6.01	.00	524.42	652.00
*	12202.000	1281.00	1968.32	.00	3.98	.00	104.68	588.00
*	12202.000	2183.00	1969.14	.82	3.88	.00	156.15	588.00
*	12202.000	2833.00	1969.60	.46	4.10	.00	178.39	588.00
	13094.000	1281.00	1969.98	.00	1.66	.00	103.90	892.00
*	13094.000	2183.00	1971.41	1.44	2.28	.00	117.38	892.00
*	13094.000	2833.00	1972.22	.80	2.62	.00	124.88	892.00
*	14167.000	1281.00	1972.94	.00	2.96	.00	78.50	1073.00
*	14167.000	2183.00	1974.40	1.46	2.99	.00	86.03	1073.00
*	14167.000	2833.00	1975.26	.85	3.04	.00	90.31	1073.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	14368.000	1281.00	1984.91	.00	11.97	.00	81.56	201.00
*	14368.000	2183.00	1985.93	1.02	11.53	.00	145.75	201.00
*	14368.000	2833.00	1986.74	.81	11.48	.00	295.29	201.00
*	15114.000	1281.00	1987.30	.00	2.39	.00	103.54	746.00

*	15114.000	2183.00	1988.78	1.47	2.85	.00	129.51	746.00
*	15114.000	2833.00	1989.36	.58	2.63	.00	159.25	746.00
*	15667.000	1281.00	1991.60	.00	4.29	.00	142.44	553.00
*	15667.000	2183.00	1992.19	.59	3.41	.00	149.77	553.00
*	15667.000	2833.00	1992.56	.37	3.20	.00	154.31	553.00
*	16546.000	1281.00	1996.99	.00	5.40	.00	136.70	879.00
*	16546.000	2183.00	1998.02	1.03	5.83	.00	142.10	879.00
*	16546.000	2833.00	1998.64	.62	6.08	.00	145.30	879.00
*	17058.000	1281.00	2006.91	.00	9.92	.00	171.89	512.00
*	17058.000	2183.00	2007.45	.54	9.43	.00	186.13	512.00
*	17058.000	2833.00	2007.77	.32	9.13	.00	190.46	512.00
*	17612.000	1281.00	2013.44	.00	6.53	.00	96.80	554.00
*	17612.000	2183.00	2014.82	1.38	7.37	.00	235.84	554.00
*	17612.000	2833.00	2015.18	.36	7.41	.00	242.20	554.00
*	18436.000	1281.00	2021.73	.00	8.28	.00	132.25	824.00
	18436.000	2183.00	2022.72	1.00	7.90	.00	222.55	824.00
	18436.000	2833.00	2023.08	.36	7.90	.00	235.51	824.00
	18462.000	1281.00	2022.37	.00	.64	.00	142.00	26.00
	18462.000	2183.00	2022.95	.58	.23	.00	152.31	26.00
	18462.000	2833.00	2023.23	.28	.15	.00	157.24	26.00
	18472.000	1281.00	2022.59	.00	.22	.00	145.96	10.00
	18472.000	2183.00	2023.26	.68	.31	.00	157.85	10.00
	18472.000	2833.00	2023.68	.42	.45	.00	168.71	10.00
	18619.000	1281.00	2023.85	.00	1.26	.00	218.41	147.00
	18619.000	2183.00	2024.69	.84	1.43	.00	292.55	147.00
*	18619.000	2833.00	2025.14	.45	1.45	.00	303.09	147.00
*	18710.000	1281.00	2024.09	.00	.24	.00	228.97	91.00
*	18710.000	2183.00	2024.96	.87	.27	.00	247.88	91.00
*	18710.000	2833.00	2025.43	.47	.30	.00	258.05	91.00
*	19020.000	1281.00	2024.13	.00	.04	.00	345.09	310.00
*	19020.000	2183.00	2025.04	.91	.07	.00	358.13	310.00
*	19020.000	2833.00	2025.53	.50	.10	.00	365.26	310.00
*	19215.000	1281.00	2029.25	.00	5.12	.00	80.47	195.00
*	19215.000	2183.00	2030.26	1.01	5.22	.00	230.20	195.00
*	19215.000	2833.00	2030.46	.20	4.92	.00	232.70	195.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	19802.000	1281.00	2035.44	.00	6.19	.00	187.36	587.00
*	19802.000	2183.00	2036.18	.74	5.92	.00	211.78	587.00
*	19802.000	2833.00	2036.72	.54	6.27	.00	247.27	587.00
*	20595.000	1281.00	2042.29	.00	6.85	.00	180.85	793.00
*	20595.000	2183.00	2042.88	.60	6.70	.00	189.72	793.00
*	20595.000	2833.00	2043.21	.33	6.49	.00	194.57	793.00
*	21291.000	1281.00	2049.25	.00	6.97	.00	269.77	696.00
*	21291.000	2183.00	2049.85	.60	6.97	.00	302.23	696.00
*	21291.000	2833.00	2050.28	.43	7.07	.00	362.00	696.00
*	22138.000	1281.00	2055.97	.00	6.72	.00	190.89	847.00
*	22138.000	2183.00	2056.62	.65	6.77	.00	225.99	847.00
*	22138.000	2833.00	2057.04	.42	6.76	.00	264.04	847.00
*	23230.000	1281.00	2066.45	.00	10.48	.00	231.21	1092.00
*	23230.000	2183.00	2067.06	.61	10.44	.00	261.09	1092.00
*	23230.000	2833.00	2067.39	.33	10.35	.00	264.23	1092.00
*	24530.000	1281.00	2078.44	.00	11.99	.00	235.71	1300.00
*	24530.000	2183.00	2079.00	.56	11.94	.00	272.63	1300.00
*	24530.000	2833.00	2079.31	.31	11.92	.00	286.77	1300.00
*	25616.000	1281.00	2089.51	.00	11.07	.00	177.42	1086.00
	25616.000	2183.00	2090.28	.76	11.28	.00	233.47	1086.00
	25616.000	2833.00	2090.67	.39	11.36	.00	260.51	1086.00
	26383.000	1281.00	2094.12	.00	4.61	.00	139.43	767.00
	26383.000	2183.00	2095.10	.98	4.82	.00	159.26	767.00
	26383.000	2833.00	2095.61	.51	4.94	.00	166.73	767.00
*	27000.000	1281.00	2105.47	.00	11.34	.00	39.86	617.00
*	27000.000	2183.00	2106.90	1.44	11.81	.00	45.62	617.00
*	27000.000	2833.00	2107.79	.88	12.18	.00	49.16	617.00
*	27303.000	1281.00	2108.45	.00	2.99	.00	39.81	303.00
*	27303.000	2183.00	2109.91	1.46	3.01	.00	45.65	303.00
*	27303.000	2833.00	2110.78	.87	2.99	.00	49.12	303.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

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 CAUTION SECNO=   8860.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   8860.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   8860.000  PROFILE=  3  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   8861.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   8861.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
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 CAUTION SECNO=   8861.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   8861.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=   8861.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   8861.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   9120.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9120.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9120.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9120.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9120.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9120.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9120.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9120.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9120.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   9237.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9237.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9237.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9237.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9237.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9237.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9237.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9237.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9237.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   9429.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   9429.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   9429.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=  10155.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  10155.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10155.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  10155.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  10155.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10155.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  10155.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  10962.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=  10962.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  10962.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10962.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=  11614.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  11614.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  11614.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=  11614.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  11614.000  PROFILE=  3  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=  11614.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  12202.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12202.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12202.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=  13094.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  13094.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  14167.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  14167.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 CAUTION SECNO=  14368.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  14368.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  14368.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  15114.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  15114.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  15114.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=  15667.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  15667.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  15667.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  15667.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  15667.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

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 WARNING SECNO=  16546.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 CAUTION SECNO=  17058.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  17058.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  17058.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  17058.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  17058.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  17058.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  17058.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=  17612.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  17612.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18436.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18619.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18710.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=  18710.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  18710.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  19020.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 CAUTION SECNO=  19215.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  19215.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  19215.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  19215.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  19215.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  19802.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  19802.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 CAUTION SECNO=  20595.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=  20595.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  21291.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  22138.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  23230.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  23230.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  23230.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  24530.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  24530.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  24530.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  25616.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  27000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  27000.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=  27000.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27000.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  27000.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27000.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27000.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
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 CAUTION SECNO=  27303.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27303.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27303.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  3  MINIMUM SPECIFIC ENERGY
```

Paper Copy E
Craig Road to North Las Vegas
Detention Basin

500-year flood event

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15APR98    TIME   13:58:53 *
 *****************************************
```

```
**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X     X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX  XXXXX              XXXXXXX
```

```
1
   15APR98      13:58:53                                                    PAGE    1


                                                    THIS RUN EXECUTED 15APR98    13:58:53

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 SPLIT FLOW BEING PERFORMED

 SF


 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      3     6109     6397       -1        3
 WC      0  1924.6      133  1925.6      287  1926.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4     6397     6842       -1        3
 WC      0  1926.6      149  1927.6      297  1928.6      446  1929.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4     6842     7287       -1        3
 WC      0  1929.6      149  1930.6      297  1931.6      447  1932.6


 TW       Weir flow due to rubble and constriction at excavation Losee/Asure
 WS      3    18472    18619       -1        3
 WC      0  2027.6       40  2026.6      147  2026.6

 TW       Weir flow due to rubble and constriction at excavation Losee/Asure
 WS      3    18619    18710       -1        3
 WC      0  2026.6       71  2026.6       91  2028.6

 TW       Weir flow due to rubble and constriction at excavation Losee/Asure
 WS      5    18710    19020       -1        3
 WC      0  2028.6       20  2029.6      175  2031.6      265  2033.6      405  2035.6

 TW       Weir flow due to rubble and constriction at excavation Losee/Asure
 WS      4    19020    19215       -1        3
 WC      0  2035.6       55  2037.6      200  2039.6      270  2040.3


 TW   Weir flow from right bank of NLVDB outlet channel
 WS      2    27000    27303    23230        3
 WC      0     2112      303     2115
1
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 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1       FEMA 500-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLV WASH WITH DIVERSION

 J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2                                                                  1925.7

 J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                   -1
```

```
J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150

  ********************************************************************************
  12/31   rubble at section 18436
  ********************************************************************************

  ********************************************************************************
  1/5   Inserted BSI channel improvements d/s of Lone Mountain Road
  ********************************************************************************

  ********************************************************************************
  1/20  Added section 187+00 and 3 points to 18436
  ********************************************************************************

  ********************************************************************************
  1/30  Removed flow upstream of 187+00 simulating breakout across Azure
  ********************************************************************************

  ********************************************************************************
  1/30 Removed Sunrise Development Park and replaced with Kenny dropped section
  ********************************************************************************

  ********************************************************************************
  2/10 ADDED SPECIAL CULVERT AT CRAIG
  ********************************************************************************

  ********************************************************************************
  Debris pile at 184+36 lowered to EL. 2020 to account for erosion and CNLV wash
  debris removal plan.  Weir flow leaving the wash is represented by the
  split flow cards from 184+72 to 190+20
  ********************************************************************************

  ********************************************************************************
  3/4 Revised Lone Mountain Road Crossing
  ********************************************************************************
1
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  ********************************************************************************
  Model bypasses the NLVDB and extends to the upstream teminus at the Div Weir
  ********************************************************************************


QT        1       8988
NC      .03        .03        .03         .3         .5

    CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     5852         18       1609    1665.10
X3       10
GR   1924.6        420     1924.6        421     1923.6        635     1923.6        768     1924.6        990
GR   1925.6       1247     1925.6       1355     1924.6       1562     1924.6       1609     1913.2     1609.1
GR   1913.2       1665     1924.6     1665.1     1924.6       1706     1925.6       1944     1926.3       2048
GR   1927.4       2427     1927.6       2490     1927.6       2927


X1     5973         18       1609    1665.1        120        120        120
X3       10
X5        1     1925.7
BT      -18        420     1924.6                   421     1924.6                   635     1923.6
BT                 768     1923.6                   990     1924.6                  1247     1925.6
BT                1355     1925.6                  1562     1924.6                  1609     1924.6
BT              1609.1     1924.6                  1665     1924.6                1665.1     1924.6
BT                1706     1924.6                  1944     1925.6                  2048     1926.3
BT                2427     1927.4                  2490     1927.6                  2927     1927.6
GR   1924.6        420     1924.6        421     1923.6        635     1923.6        768     1924.6        990
GR   1925.6       1247     1925.6       1355     1924.6       1562     1924.6       1609     1913.2     1609.1
GR   1913.2       1665     1924.6     1665.1     1924.6       1706     1925.6       1944     1926.3       2048
GR   1927.4       2427     1927.6       2490     1927.6       2927


NC      .03        .03        .03         .1         .3
  ***************************************************************
  BSI Channel Plans
  ***************************************************************

   11+27
X1     6092         13       1727     1823.2        127        127        127                  -2.4
GR     1927       1000       1926       1363       1925       1644       1925       1718       1925       1727
GR   1916.4       1745     1916.4       1805     1925.5     1823.2       1926       1984       1927       2233
GR     1928       2483       1929       2740       1930       2990

   14+05

X1     6370         11       1732       1834        278        278        278                  -2.4
GR     1929       1000       1928       1328       1927       1607     1927.8       1730     1927.8       1732
GR   1917.2       1753     1917.2       1813     1927.8       1834       1928       2025       1929       2250
GR     1930       2495

   18+63
1
    15APR98      13:58:53                                                  PAGE    4
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```
X1      6828         11       1775       1880        458        458        458                  -2.4
GR      1932       1000       1931       1310       1930       1573     1929.3       1773     1929.3       1775
GR    1918.6       1797     1918.6       1857     1930.4       1880       1931       2009       1932       2216
GR      1933       2430
   23+00

X1      7265         11       1762       1870        437        437        437                  -2.4
GR      1935       1000       1934       1313       1933       1575     1932.4       1760     1932.4       1762
GR    1920.9       1785     1920.9       1845     1933.3       1870       1934       2025       1935       2324
GR      1936       2523


NC       .03        .03        .03         .1         .3

   27+65
X1      7730          9       1830     1939.4        465        465        465                  -2.4
GR      1938       1000       1937       1264       1936       1506       1936       1574     1935.9       1653
GR    1935.9       1830     1923.9       1854     1923.9       1914     1936.6     1939.4

   33+58

X1      8323         14       2257       2369        593        593        593                  -2.4
GR      1948       1000       1946       1160       1944       1300       1942       1375       1941       1400
GR      1941       1415       1940       1455       1940       1510       1940       1555     1940.3       1577
GR    1940.3       2257     1927.6       2282     1927.6       2342     1941.3       2369

   Lone Mountain Road profile from BSI grading plans
   Assumes Lone mountain bridge is blocked
   SECTION 8794 FROM PROFILE OF LONE MOUNTAIN ROAD FROM BSI MAPPING
   38+28

X1      8794         12       1070       1735        470        470        470                  -2.4
GR      1950       1000       1948       1070       1946       1195       1944       1260     1945.3       1408
GR      1945       1444     1945.2       1501     1945.5       1599     1945.9       1698       1946       1735
GR      1947       1764       1948       1790

  ********************************************************************************
  STATION EQUATION USED IN MAPPING STA 8834.5 BACK = STA 8860 FORWARD
  ********************************************************************************

NC       .035       .035       .035         .1         .3

NH          3       .035     1804.76       .015     1954.26       .035     2930.0
X1       9120         45     1660.36    2136.88        301        301        301
X3         10                     0    1661.33          0     2712.5          0          0          0
GR    1938.9       1000     1938.4    1022.44     1939.4    1050.83     1939.8    1109.61     1940.4    1185.31
GR    1941.1    1255.73     1941.4    1329.84     1941.9    1406.09     1942.3    1476.83     1942.7    1527.08
GR    1943.1    1593.17     1944.1    1622.98     1945.2    1660.36     1944.3    1668.77     1944.1    1695.47
GR    1943.4    1751.09     1943.4    1804.76     1942.6    1841.55     1941.1    1849.31     1941.2    1871.11
GR    1931.6    1888.31     1930.9    1902.34       1941    1922.71     1940.5    1934.27     1942.7    1954.26
GR    1943.1    1985.88       1944    2016.07     1944.6    2058.89     1945.1    2091.74     1945.5    2136.88
GR    1945.7    2189.84     1945.5    2239.5      1945.5    2313.35     1948.7    2328.55     1948.9    2355.38
GR    1946.9    2377.76     1948.5    2413.91     1947.4    2476.49     1948.2     2508.5     1948.8    2533.66
1
   15APR98      13:58:53                                                                                 PAGE    5


GR    1949.2    2564.44       1949    2623.1      1949.6    2704.24     1949.3    2783.03     1948.3       2930

NC       .045       .045       .045         0.1        0.3
   CROSS SECTION CUT FROM KENNY TOPO 9-16-97
X1       9237         19       1900       2580        117        117        117
X3         10          0          0                     0                  0          0          0
GR       1944       1000     1940.9       1220     1941.9       1250       1941       1270       1944       1560
GR       1948       1900       1944       2123       1940       2140       1940       2155     1940.5       2240
GR       1944       2515       1948       2570       1950       2580       1948       2623       1948       2630
GR     1948.6       2760     1950.8       3055       1948       3195       1952       3275
   CROSS SECTION CUT FROM KENNY TOPO 9-16-97

X1       9429         24       1775       2330        192        192        192
X3         10          0          0       1573          0          0          0          0          0
GR       1948        850       1944        920       1944       1000       1948       1058     1948.4       1100
GR       1948       1200     1947.8       1270       1948       1330     1949.9       1510     1950.5       1560
GR       1948       1695       1948       1775       1944       1855     1942.1       1900     1942.3       2000
GR       1944       2280       1948       2315     1949.1       2330       1948       2350       1948       2382
GR       1949       2470     1949.9       2565     1950.3       2664       1952       2815


X1      10155         39     2117.61       2420        726        726        726
X3         10          0          0     1567.24          0          0          0          0          0
GR     1950.2       1000     1950.5       1089.5     1951.3    1173.63       1952     1264.68     1952.6    1341.06
GR       1953    1418.64       1953    1482.79     1953.7     1509.3     1954.2     1533.43     1954.2    1567.24
GR     1953.7    1645.43     1953.4    1728.2      1951.4    1742.62     1950.6     1774.96     1951.3    1799.01
GR     1953.2    1821.33     1953.3    1893.3      1952.9    1957.65     1952.3    2022.96      1952.3    2050.45
GR     1953.3    2062.52       1953    2082.16     1952.7    2105.51     1953.7    2117.61        1953    2162.78
GR     1953.1    2184.83     1952.6    2209.21     1951.7    2274.07     1948.7    2286.68     1952.9    2302.13
GR     1950.9    2322.64     1953.3    2334.66     1953.5    2396.66     1951.7    2407.52     1953.8       2420
GR     1955.1    2455.16     1955.7    2508.22     1955.8    2563.46     1956.7    2685.29

X1      10962         51    1440.93    1695.93        807        807        807
X3         10          0          0                     0                  0          0          0
GR     1963.6       1000     1963.2    1026.45     1961.4     1061.7     1958.3    1120.54     1958.3    1142.66
GR     1959.8    1170.46     1961.9    1193.68       1962    1224.14     1960.1    1235.84     1959.8    1256.52
GR     1957.3    1274.17     1956.1    1322.35     1955.8    1365.42     1959.1    1375.51     1959.1    1386.44
GR     1957.3    1392.19     1959.6    1414.44     1959.9    1440.93     1957.6     1456.6       1958    1488.58
GR     1956.9    1523.04     1958.3    1535.33     1956.7    1550.46     1958.6    1560.22     1957.9    1569.99
GR       1959    1583.95     1959.2    1604.04     1957.9    1630.23       1959    1643.16     1958.7    1682.16
GR     1959.3    1695.93     1958.8    1743.65     1958.2    1795.77     1957.4    1813.41     1955.9    1824.29
GR     1955.3    1842.84     1957.2    1851.64     1958.8    1891.67     1955.5    1902.15     1959.2    1911.85
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GR   1959.3    1942.31     1954.9     1955.14     1958.7     1962.51     1959.2     2014.23     1959.5     2081.38
GR     1960    2149.42     1960.7     2223.54     1961.5     2269.13     1961.8     2309.63     1962.4     2347.97
GR   1963.2    2447.12

X1    11614         31    1060.74    1621.25         652         652         652
X3       10          0          0                      0           0           0          0          0
GR   1968.5       1000     1968.5    1016.77     1965.9      1031.5     1965.5     1037.26     1966.9     1060.74
GR   1966.5    1082.27     1964.7    1108.37     1964.2     1144.42     1963.6     1165.29     1964.2     1204.22
GR     1964    1257.43     1960.3    1277.59     1961.9     1298.65     1963.6     1327.11     1963.6     1344.72
GR   1964.6    1354.9      1964.5    1388.25     1964.7     1426.54     1965.2      1464.8       1965     1516.16
GR   1965.3    1552.81        1965    1601.59     1965.5     1621.25     1964.9     1637.89     1964.6     1659.07
GR     1965       1682        1965    1710.33     1966.1        1767     1966.5     1831.92     1966.5     1883.35
1
    15APR98      13:58:53                                                                                  PAGE     6


GR     1968       1980

X1    12202         39    1416.33    1531.53         588         588         588
X3
GR   1973.5       1000     1973.9     1041.1     1972.6      1049.1     1972.3     1055.57     1973.5     1078.41
GR   1973.2    1102.18     1971.8    1117.54       1971     1136.36     1972.7     1151.28     1972.1     1159.6
GR   1972.4    1180.73     1973.1    1194.37     1972.7     1209.54     1972.8     1239.18     1972.2     1280.99
GR   1971.6    1315.18     1971.4     1359.1     1971.4     1416.33     1962.7     1437.46     1963.5     1446.89
GR   1964.3    1491.07     1967.2    1507.08     1974.3     1531.53     1971.7     1550.54     1972.2     1562.12
GR   1969.8    1576.39     1969.9    1600.21     1969.6     1662.22     1969.7     1729.13     1968.1     1735.53
GR   1969.8       1750     1968.1    1791.98     1969.1     1799.86     1967.7     1808.69     1969.9     1822.11
GR   1969.8    1885.59        1974    1909.53     1974.1     1930.2      1972.2     1957.33

X1    13094         34    1507.22    1754.18         892         892         892
X3       10          0          0          0           0           0           0          0          0
GR   1980.1       1000     1980.2    1028.38     1979.8      1031.96     1981       1052.72     1980.7     1076.61
GR   1979.6    1099.46     1978.5    1123.34       1980     1128.65     1980       1136.28     1977.8     1145.37
GR   1980.6    1153.56     1979.4    1161.62     1978.9      1198.7     1978.6     1271.71     1978.1     1318.1
GR   1978.4    1368.29     1978.3    1434.68       1978     1507.22     1964.9      1530.8     1964.7     1554.39
GR   1965.3    1602.79        1968    1610.61     1974.3     1658.31     1975.2     1678.04     1976.4     1711.3
GR   1977.6    1754.18     1976.8    1790.55     1977.8     1826.85     1978.5     1884.66     1978.4     1937.24
GR   1978.7    2013.58     1978.2    2063.28       1978     2130.51       1980        2400

X1    14167         45    1672.71    2003.74         1073        1073        1073
X3       10
GR   1989.9       1000     1990.5    1040.67     1990.3      1060.84     1989.9     1069.03     1990.6     1091.31
GR   1990.4    1118.27     1988.9    1140.74     1988.5      1163.72     1988.7     1187.86     1988.4     1236.13
GR   1988.8    1269.36     1987.5    1275.64     1990.8      1283.64     1989.5     1291.56     1988.6     1321.74
GR   1988.4    1390.82     1988.6    1465.28     1988.4      1531.6      1987.8     1590.63     1987.5       1656
GR   1987.8    1672.71     1970.3    1708.36     1970.6      1765.73       1973     1781.86     1979.9     1802.41
GR   1979.9    1820.98     1983.2    1834.21     1983.4      1869.28     1983.8     1911.87     1983.5     1953.67
GR   1984.2    2003.74        1984    2066.64     1983.5      2081.1         1984     2122.85     1985.2     2166.7
GR   1985.7    2206.72     1986.2    2266.33     1985.9      2315.3      1985.9     2372.26     1984.4     2391.21
GR     1989    2407.95        1989    2413.66     1990.6      2419.39        1989     2424.37     1989.4     2456.46
  SECTION 14368 CUT FROM CNLV TOPO

X1    14368         15        1540       1625         201         201         201                    -2.4
GR     1994       1000        1994       1100        1992        1300        1990       1520        1988       1540
GR     1986       1545        1985       1560        1985        1600        1986       1620        1988       1625
GR     1990       1975        1990       2025        1990        2125        1992       2290        1994       2307


X1    15114         41    1574.57    1764.17         746         746         746
X3       10          0          0          0           0           0           0          0          0
GR   1995.8       1000     1995.7    1016.07     1994.6      1024.33     1998.4     1031.82     1997.1     1038.62
GR   1997.5    1045.61     1997.1    1066.88     1997.7      1100.17     1997.1     1105.06     1995.7     1143.88
GR   1999.3    1154.57     1997.8    1161.14     1997.2      1212.87     1995.8     1279.05     1994.5     1342.8
GR   1993.5    1403.18     1992.7    1471.87     1992.4      1512.27     1991.9     1574.57     1990.6     1628.15
GR   1989.7    1649.09     1980.6     1683.4     1981.4      1710.99     1980.9     1747.36     1988.4     1764.17
GR   1989.7    1825.53     1989.9    1910.87     1990.3      1988.92     1990.3     2014.51     1989.6     2113.37
GR   1991.8    2134.73     1991.8    2175.51     1991.5      2213.67       1992     2272.76     1993.1     2287.01
GR   1993.1    2302.85     1991.5    2319.43     1991.7      2362.97     1991.1     2406.64     1993.4      2420.8
GR   1993.5    2469.97

1
    15APR98      13:58:53                                                                                  PAGE     7


  SECTION 15667 CUT FROM CNLV TOPO

X1    15667         19        1505       1672         553         553         553                    -2.4
X3       10
GR     2006       1000        2004       1010        2002        1030        2002       1040        2002       1150
GR     2000       1170        1998       1240        1998        1505        1992       1530        1992       1580
GR     1994       1660        1996       1672        1997        1950        1997       2180        1998       2315
GR     2000       2385      2000.5       2500        2002        2750        2004       2830

X1    16546         51    1033.85    2193.69         879         879         879
X3       10
GR   2006.9       1000     2006.8    1010.78     2006.1      1016.3      2006.7     1024.48     2006.8     1033.85
GR   2005.8    1039.27     2006.4    1045.74     2005.4      1105.06     2005.9     1124.21     2004.8     1165.3
GR   2004.5    1207.41     2003.2     1248.7     2002.7      1303.12     2003.2     1323.23     2003.7     1363.28
GR     2003    1384.95     2002.4    1422.56     2002.9      1449.26     2002.1     1478.94     2001.6     1523.77
GR   1999.6     1542.4     1994.6    1560.28     1994.9      1595.91       1993     1611.38     1993.5     1666.94
GR   1994.8    1684.76     2001.8    1696.43     2002.6      1732.45     2002.1     1766.78     2003.9     1784.85
GR   2006.1    1817.89        2007    1842.65     2007.4      1867.41     2006.7     1892.85     2009.1     1918.63
GR   2008.6    1957.57     2008.3    2006.72     2008.7      2052.44     2009.6     2074.93     2009.6     2122.66
GR   2013.1    2156.53     2013.9    2193.69     2010.8      2246.21     2011.1     2266.5      2009.9     2285.66
GR   2011.5    2296.24     2014.4    2329.51     2009.4      2361.01     2013.7     2373.12     2009.6     2383.61
GR   2008.7    2409.39

NC      .045        .045        .045        0.1         0.3
     AERIAL SECTION AT UPSTREAM BOUNDARY OF SUNRISE PARK
```

X1	17058	43	1359.48	1938.16	512	512	512			
X3	10	0	0	0	0	0	0	0	0	
GR	2013	1000	2013	1073.16	2013.6	1143.99	2013.8	1197.07	2013.8	1251.55
GR	2013.8	1308.43	2013.8	1359.48	2013.3	1403.3	2012.6	1443.16	2010.6	1475.15
GR	2011.5	1499.88	2007.2	1508.86	2006.6	1524.38	2011.1	1542.91	2004.9	1561.98
GR	2006.2	1588.21	2004.6	1623.75	2006.7	1633.73	2005.4	1671.7	2005.6	1712.49
GR	2010.9	1735.99	2013	1760.7	2014.1	1799.91	2016.4	1839.49	2018	1893.93
GR	2019	1938.16	2018.8	1979.65	2017.8	2023.12	2016.8	2052.36	2016.9	2076.96
GR	2019.5	2087.45	2019.4	2117.17	2016.7	2144.75	2015.5	2171.7	2016.4	2196.52
GR	2018.6	2219.04	2017.6	2235.65	2015.1	2278.14	2016.4	2314.03	2014	2356.58
GR	2012.9	2417.09	2009.4	2453.61	2008.7	2504.6				

X1	17612	47	1599.17	2107.09	554	554	554			
X3	10									
GR	2017.5	1000	2017.9	1014.14	2019.1	1061.46	2018.6	1107.82	2018.6	1146.75
GR	2019.4	1149.73	2018	1156.88	2018.9	1169.22	2019.4	1218.1	2019.3	1281.77
GR	2019.5	1337.02	2019.2	1373.49	2020.2	1403.28	2019.5	1447.41	2020.7	1473.98
GR	2020.2	1530.55	2018.8	1547.3	2018.2	1568.04	2019.6	1578.58	2020.2	1599.17
GR	2019.8	1621.27	2015.4	1638.14	2013.6	1657.35	2014.7	1708.33	2011.3	1714.43
GR	2014.2	1726.74	2014.4	1742.41	2013.8	1761.75	2014.8	1779.7	2011	1804.57
GR	2009.2	1843.45	2009.5	1862.85	2013.9	1873.55	2016.8	1894.29	2017.7	1912.3
GR	2017.3	1950.29	2019.1	1985.62	2019.6	2028.19	2020.6	2041.68	2022	2084.98
GR	2023.6	2107.09	2022.4	2120.89	2022.4	2158.33	2024	2187.61	2025	2213.62
GR	2025.4	2259.48	2025.1	2309						

ADDED 3 POINTS TO LEFT BANK FROM KENNY TOPO 1/20

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X1	18436	44	1374.86	2012.84	824	824	824			
X3	10									
GR	2024	780	2024	880	2024	965	2025.8	1000	2025.9	1060.03
GR	2025.5	1101.54	2025.5	1161.04	2025.7	1213.91	2026.5	1261.85	2026.7	1291.71
GR	2027.2	1333.82	2028.2	1374.86	2027.8	1416.23	2027.8	1469.12	2027.2	1499.51
GR	2025.6	1535.68	2023.2	1577.09	2021.5	1611.73	2019.6	1648.4	2019.1	1670.38
GR	2019.3	1692.62	2021.2	1722.68	2021.8	1742.03	2022.1	1774.31	2022.2	1800.18
GR	2024	1831.25	2025.3	1850.91	2025.3	1882.76	2025.1	1914.54	2026.7	1942.83
GR	2027.8	1971.11	2028.2	2012.84	2027.5	2047.72	2028	2090.73	2028.8	2121.56
GR	2029	2161.18	2028.7	2214.59	2029.6	2257.8	2031.1	2294.58	2033	2320.6
GR	2034.6	2346.17	2034.6	2360.41	2033.6	2385.33	2030.5	2447.19		

DEBRIS REPRESENTED BY CROSS SECTIONS 18462 AND 18472
SECTION 18462 CUT FROM CNLV TOPO

X1	18462	14	32	429	26	26	26		-2.4	
GR	2032	0	2032	32	2030	42	2028	57	2026	70
GR	2022.4	131	2022.4	194	2024	209	2024	232	2026	234
GR	2028	336	2030	341	2032	429	2034	479		

SECTION 18462 DUPLICATED 10' U/S

X1	18472	14	32	429	10	10	10		-2.4	
GR	2032	0	2032	32	2030	42	2028	57	2026	70
GR	2022.4	131	2022.4	194	2024	209	2024	232	2026	234
GR	2028	336	2030	341	2032	429	2034	479		

SECTION 18619 CUT FROM CNLV TOPO

X1	18619	25	0	397	147	147	147		-2.4	
GR	2029	0	2028	50	2026	80	2024	102	2024	128
GR	2026	180	2027	215	2027	227	2026	248	2024	264
GR	2024	342	2026	347	2028	364	2030	370	2032	397
GR	2032	418	2030	430	2028	465	2028	491	2030	555
GR	2031	590	2032	709	2034	789	2034	797	2034	894

SECTION 18710 CUT SECTION FROM CNLV TOPO

X1	18710	23	1000	1700	91	91	91		-2.4	
GR	2031	1000	2030	1070	2030	1125	2028	1160	2026	1180
GR	2026	1210	2030	1220	2030	1240	2018	1260	2018	1310
GR	2020	1345	2022	1380	2024	1410	2026	1435	2028	1450
GR	2030	1535	2032	1580	2032	1700	2038	1735	2038	1745
GR	2034	1770	2034	1865	2036	2095				

SECTION 19020 CUT SECTION FROM CNLV TOPO

X1	19020	13	1000	1470	310	310	310		-2.4	
GR	2032	1000	2030	1050	2028	1090	2026	1110	2024	1130
GR	2022	1155	2020	1180	2020	1370	2022	1430	2030	1465
GR	2032	1470	2034	1575	2036	1610				

SECTION 19215 CUT SECTION FROM CNLV TOPO

1

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X1	19215	13	1000	1330	195	195	195		-2.4	
GR	2036	1000	2034	1025	2032	1038	2032	1070	2030	1089
GR	2028	1098	2028	1119	2030	1125	2032	1160	2032	1260
GR	2034	1272	2038	1300	2040	1330				

X1	19802	46	1510.5	2179.13	587	587	587			
X3	10									
GR	2041.6	1000	2041.5	1046.48	2039.3	1081.39	2038.7	1110.52	2039.7	1154.42

```
GR   2040.5    1184.19    2038.7    1210.92    2034.8    1249.33    2032.9    1287.07    2031.9    1300.58
GR     2032    1315.86    2034.6    1346.74    2036.8     1373.6    2039.7    1416.99    2042.4    1448.51
GR   2044.4    1482.22    2044.4     1510.5    2043.7    1540.75    2043.7    1569.59    2040.9    1599.88
GR   2039.5    1643.73    2038.4    1703.43    2038.9    1715.29    2037.5    1725.92    2034.5     1762.3
GR   2034.3     1780.5    2032.5    1794.35      2032    1814.83    2032.2    1837.85    2032.7     1857.1
GR   2033.5    1881.06    2034.3    1914.07    2036.2    1954.17    2036.5    1979.88    2038.2    2000.14
GR   2039.5    2048.44    2040.8    2101.47    2041.2    2137.26    2041.3    2179.13    2040.3    2206.98
GR   2040.1    2282.34    2040.5    2296.63      2041    2352.88    2041.4    2379.33    2041.7    2393.79
GR   2046.5    2440.08

X1     20595         30    1175.03    1780.94        793        793        793
X3        10
GR   2053.4       1000    2050.3     1053.9    2049.5    1072.42    2048.6    1147.63    2048.5    1175.03
GR   2047.3     1213.4    2042.3    1233.31    2041.5    1252.21    2041.7    1278.91    2040.3    1292.04
GR   2040.8    1307.82    2040.3    1315.35    2041.5    1329.05    2041.5     1367.1    2039.4    1374.77
GR   2039.3    1391.01    2042.2    1402.49    2042.1    1412.56    2043.6    1428.19    2043.8    1441.31
GR   2045.9    1463.28    2045.7     1509.8      2046    1549.61    2046.9    1571.99    2046.6    1606.16
GR   2046.3    1620.17    2046.5    1666.78    2047.3    1701.91      2047     1730.5    2048.2    1780.94

X1     21291         40    1082.37    1603.93        696        696        696
X3        10
GR   2057.5       1000    2055.7     2041.47    2054.1    1052.27    2054.9    1065.72    2056.1    1082.37
GR   2055.6    1096.57    2049.8    1121.39    2050.1    1157.01    2050.9    1186.54    2050.7    1226.18
GR   2049.7    1271.29    2048.6    1312.57    2046.2    1326.33    2045.8    1342.04    2048.1    1357.87
GR   2048.9    1388.15      2049    1432.26    2045.4    1440.93    2045.4    1453.12    2046.2    1460.09
GR   2047.4    1479.88    2046.7    1508.66    2048.6    1525.56    2047.4    1541.05    2049.2    1557.32
GR   2054.2    1580.56    2055.5    1603.93    2055.3    1614.05    2050.1    1634.03    2051.5    1646.85
GR   2050.2    1662.75    2053.2    1691.04    2054.7    1703.17    2054.1    1717.68    2054.8    1740.29
GR   2054.2    1755.38    2055.3    1779.76    2056.9    1804.58    2059.6    1840.52    2058.5    1875.28

X1     22138         45    1153.02     1845.3        847        847        847
X3        10
GR     2065       1000    2064.2     1028.21    2064.2    1044.93    2064.8    1062.86      2065    1122.17
GR   2065.1    1153.02    2063.6     1171.24      2057    1198.51    2056.9    1209.25    2055.3    1220.44
GR   2055.9       1233      2055     1254.99    2055.5    1267.43    2054.9    1288.54    2052.6    1299.22
GR     2054    1331.64    2053.4     1343.77    2054.8    1353.31    2053.5    1364.18    2055.4    1376.62
GR   2055.7    1393.52    2056.7     1440.89    2057.5    1492.61    2057.6    1551.85    2057.4    1558.95
GR   2057.5    1574.03    2059.6     1587.92    2057.9    1602.87    2058.3    1624.73    2058.9      1664
GR     2059    1681.88    2061.6     1696.4      2061    1715.37    2064.1      1752      2066    1780.08
GR   2066.5    1808.11    2066.7     1845.3    2065.3    1884.82    2064.3    1915.48    2063.9    1951.16
GR   2062.8    1987.23    2061.8    2019.52    2060.2    2043.65    2059.3    2078.64    2058.5    2091.44
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X1     23230         27    1139.83    1531.88        1092       1092       1092
X3        10
GR   2076.7       1000    2076.1     1016.84    2074.9    1061.89    2068.1    1081.86    2075.4    1111.27
GR   2075.5    1139.83    2074.2     1166.71    2066.5    1193.41    2065.6    1213.71    2066.8    1235.89
GR   2064.9    1255.54    2065.5     1264.15    2064.8    1280.17    2065.2    1292.98    2065.1     1311.7
GR   2063.6    1322.89    2063.2     1333.84    2064.3    1352.07    2063.1    1361.54    2064.2    1397.04
GR   2065.5    1403.83    2065.5     1425.63    2066.5    1435.79    2066.6    1449.87    2072.1    1482.47
GR     2082    1514.37    2082.3     1531.88

X1     24530         24    1057.36    1506.91        1300       1300       1300
X3        10
GR   2089.3       1000    2089.1     1057.36    2088.1      1097    2087.5    1131.87    2079.2    1157.95
GR   2079.2    1170.13    2077.3     1177.86    2078.6    1189.17      2079    1212.67    2077.7    1231.33
GR   2076.5    1287.94    2077.2     1303.9     2078.3    1319.85    2078.3    1331.35    2077.1    1340.46
GR   2076.8    1364.53    2077.8     1380.92    2077.8    1409.89    2075.6    1424.15    2075.4    1434.07
GR   2085.4    1460.45    2105.9     1487.26    2106.5    1506.91    2104.8    1528.79

X1    25616         35    1184.78    1836.38        1086       1086       1086
X3        10
GR   2101.4       1000       2101    1045.55    2099.9    1064.96    2098.8    1097.76    2100.6     1140.3
GR   2100.5    1184.78    2100.1     1232.97    2098.8    1266.02    2095.4    1298.04    2093.6    1320.41
GR   2090.3    1337.94    2088.6     1351.7     2085.1     1366.4    2085.5    1380.16      2088    1389.21
GR     2088    1401.52    2086.9     1411.19    2086.2    1423.94    2087.8    1440.11    2088.3    1475.16
GR   2089.9    1536.61    2090.5     1565.47    2089.9    1577.62    2091.1    1606.85    2095.5     1630.6
GR   2096.8     1656.2    2092.3     1681.9       2092    1698.26    2094.5    1711.86    2095.2    1722.18
GR     2098    1749.32      2098     1767.19    2099.3      1795    2100.6    1836.38    2099.8    1884.62

X1     26383         35    1170.09    1701.35        767        767        767
X3        10
GR   2113.1       1000    2111.6     1036.82    2109.6     1062.2    2108.4    1109.45    2106.8    1118.94
GR   2109.3    1139.73    2109.8     1170.09    2108.5    1193.39    2105.4    1226.56    2095.8    1254.34
GR   2096.8    1269.86    2095.3     1278.59    2094.3    1298.05    2092.4     1307.9    2091.9    1327.03
GR   2090.2    1338.57      2090     1360.32    2092.4    1367.29    2093.1    1381.56    2092.1    1414.58
GR   2091.1    1427.75    2096.3     1445.95    2101.5    1471.22    2102.6    1501.08    2101.3      1515
GR   2100.7    1570.49    2102.6     1604.17    2103.1    1638.74    2103.7    1673.36    2105.6    1701.35
GR     2106    1729.64    2104.9     1761.13    2107.4    1791.33    2107.1    1828.72    2106.3    1856.7

QT        1        6258
NC     .045        .045        .030
    SECTION CUT FROM TOPO
X1    27000           5          51         117         617        617        617
GR     2112           0        2112          51      2101.5         72     2101.5          96        2112         117
    SECTION CUT FROM TOPO

X1    27303           5          51         117         303        303        303
GR     2115           0        2115          51      2104.5         72     2104.5          96        2115         117

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
```

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1
0

CCHV= .300 CEHV= .500
*SECNO 5852.000
3280 CROSS SECTION 5852.00 EXTENDED 1.10 FEET

5852.000	12.50	1925.70	.00	1925.70	1926.22	.52	.00	.00	1924.60
8062.1	2788.4	5023.7	250.0	1318.9	700.1	188.5	.0	.0	1924.60
.00	2.11	7.18	1.33	.030	.030	.030	.000	1913.20	420.00
.001138	0.	0.	0.	0	0	0	.00	1538.85	1958.85

*SECNO 5973.000
WATER EL=X5 CARD= 1925.700
3280 CROSS SECTION 5973.00 EXTENDED 1.10 FEET

5973.000	12.50	1925.70	.00	.00	1926.22	.52	.14	.00	1924.60
8062.1	2788.4	5023.7	250.0	1318.9	700.1	188.5	6.1	4.2	1924.60
.01	2.11	7.18	1.33	.030	.030	.030	.000	1913.20	420.00
.001138	120.	120.	120.	0	0	0	.00	1538.85	1958.85

CCHV= .100 CEHV= .300
*SECNO 6092.000
3280 CROSS SECTION 6092.00 EXTENDED 1.62 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.22

6092.000	12.22	1926.22	.00	.00	1926.32	.10	.06	.04	1922.60
8062.1	2891.4	3571.1	1599.6	1947.1	1015.4	1319.2	15.5	8.9	1923.10
.02	1.49	3.52	1.21	.030	.030	.030	.000	1914.00	1000.00
.000230	127.	127.	127.	2	0	0	.00	1642.46	2642.46

*SECNO 6370.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .35

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
6370.000	10.84	1925.64	1922.34	.00	1926.77	1.14	.14	.31	1925.40
8062.1	334.8	7712.7	14.6	228.2	882.6	26.0	32.8	16.4	1925.40
.03	1.47	8.74	.56	.030	.030	.030	.000	1914.80	1316.43
.001868	278.	278.	278.	8	14	0	.00	716.51	2032.94

*SECNO 6828.000

3301 HV CHANGED MORE THAN HVINS

6828.000	10.11	1926.31	.00	.00	1928.00	1.69	1.06	.17	1926.90
8470.5	.0	8470.5	.0	.0	812.1	.0	43.1	20.7	1928.00
.04	.00	10.43	.00	.000	.030	.000	.000	1916.20	1776.20
.002909	458.	458.	458.	2	0	0	.00	100.53	1876.72

*SECNO 7265.000

3301 HV CHANGED MORE THAN HVINS

7265.000	8.95	1927.45	.00	.00	1929.74	2.28	1.56	.18	1930.00
8470.5	.0	8470.5	.0	.0	698.4	.0	50.7	21.7	1930.90
.05	.00	12.13	.00	.000	.030	.000	.000	1918.50	1767.09
.004501	437.	437.	437.	3	0	0	.00	95.97	1863.06

CCHV= .100 CEHV= .300
*SECNO 7730.000

3301 HV CHANGED MORE THAN HVINS

7730.000	7.97	1929.47	.00	.00	1932.51	3.04	2.55	.23	1933.50
8470.5	.0	8470.5	.0	.0	605.7	.0	57.6	22.7	1934.20
.06	.00	13.98	.00	.000	.030	.000	.000	1921.50	1838.05
.006804	465.	465.	465.	3	0	0	.00	91.90	1929.95

*SECNO 8323.000

8323.000	8.33	1933.53	.00	.00	1936.28	2.75	3.74	.03	1937.90
8470.5	.0	8470.5	.0	.0	636.0	.0	66.1	23.9	1938.90
.07	.00	13.32	.00	.000	.030	.000	.000	1925.20	2265.61
.005873	593.	593.	593.	2	0	0	.00	92.79	2358.41

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 8794.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8794.000	3.15	1944.74	1944.74	.00	1945.64	.90	3.66	.19	1945.60
8470.5	.0	8398.3	72.2	.0	1101.2	19.0	75.5	27.9	1943.60
.09	.00	7.63	3.80	.000	.030	.030	.000	1941.60	1123.44
.010821	470.	470.	470.	20	22	0	.00	644.33	1767.77

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, XRATIO = 2.67

3470 ENCROACHMENT STATIONS= 1661.3 2712.5 TYPE= 1 TARGET= 1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 100000.00 ELREA= 1945.50

9120.000	15.43	1946.33	1944.44	.00	1946.67	.33	.97	.06	100000.00
8470.5	.0	8278.9	191.6	.0	1767.4	137.9	86.0	32.4	1945.50
.11	.00	4.68	1.39	.000	.029	.035	.000	1930.90	1661.33
.001517	301.	301.	301.	16	25	0	.00	655.96	2317.29

CCHV= .100 CEHV= .300
*SECNO 9237.000
3280 CROSS SECTION 9237.00 EXTENDED 2.66 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1950.00

9237.000	6.66	1946.66	.00	.00	1946.89	.23	.22	.01	1948.00
8470.5	.0	8470.5	.0	.0	2183.9	.0	91.5	34.1	1950.00
.12	.00	3.88	.00	.000	.045	.000	.000	1940.00	1974.58
.002342	117.	117.	117.	3	0	0	.00	577.03	2551.61

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 9429.000

3470 ENCROACHMENT STATIONS= 1573.0 2815.0 TYPE= 1 TARGET= -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1949.10

9429.000	5.02	1947.12	.00	.00	1947.42	.30	.51	.02	1948.00
8470.5	.0	8470.5	.0	.0	1928.9	.0	100.5	36.5	1949.10
.13	.00	4.39	.00	.000	.045	.000	.000	1942.10	1792.51
.003041	192.	192.	192.	3	0	0	.00	514.82	2307.34

*SECNO 10155.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1567.2 2685.3 TYPE= 1 TARGET= -1567.240

10155.000	5.54	1954.24	1954.24	.00	1954.98	.74	4.66	.13	1953.70
8470.5	5073.2	3392.7	4.6	722.8	501.8	2.6	126.9	48.0	1953.80
.16	7.02	6.76	1.76	.045	.045	.045	.000	1948.70	1567.24
.021484	726.	726.	726.	20	8	0	.00	864.63	2431.87

*SECNO 10962.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.46

10962.000	5.72	1960.62	.00	.00	1960.84	.22	5.81	.05	1959.90
8470.5	3004.5	2068.3	3377.7	725.3	600.0	950.0	159.3	66.0	1959.30
.22	4.14	3.48	3.56	.045	.045	.045	.000	1954.90	1076.48
.003562	807.	807.	807.	4	0	0	.00	1085.68	2215.24

*SECNO 11614.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1966.90 ELREA= 1965.50

11614.000	5.82	1966.12	1966.12	.00	1967.06	.94	4.96	.22	1966.90
8470.5	.0	7707.2	763.3	.0	968.1	138.3	184.6	79.3	1965.50
.24	.00	7.96	5.52	.000	.045	.045	.000	1960.30	1087.82
.026296	652.	652.	652.	3	8	0	.00	682.04	1769.85

*SECNO 12202.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.36

12202.000	9.22	1971.92	.00	.00	1972.57	.65	5.49	.03	1971.40
8470.5	87.8	5179.9	3202.8	64.3	677.3	779.3	202.3	87.9	1974.30
.27	1.36	7.65	4.11	.045	.045	.045	.000	1962.70	1116.25
.004735	588.	588.	588.	4	0	0	.00	594.90	1897.66

*SECNO 13094.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	10.95	1975.65	.00	.00	1976.45	.80	3.83	.04	1978.00
8470.5	.0	8470.5	.0	.0	1181.3	.0	230.0	95.8	1977.60
.30	.00	7.17	.00	.000	.045	.000	.000	1964.70	1511.45
.003917	892.	892.	892.	3	0	0	.00	179.10	1690.55

*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	10.23	1980.53	.00	.00	1981.84	1.31	5.24	.15	1987.80
8470.5	.0	8470.5	.0	.0	921.8	.0	255.9	99.7	1984.20
.34	.00	9.19	.00	.000	.045	.000	.000	1970.30	1687.52
.006257	1073.	1073.	1073.	2	0	0	.00	135.98	1823.50

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14368.000	5.92	1988.52	1988.52	.00	1989.42	.90	1.49	.04	1985.60
8470.5	271.8	4482.6	3716.0	85.3	466.0	846.8	261.3	101.8	1985.60
.34	3.19	9.62	4.39	.045	.045	.045	.000	1982.60	1418.45
.008893	201.	201.	201.	20	14	0	.00	782.72	2201.17

*SECNO 15114.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.98

15114.000	11.53	1992.13	.00	.00	1992.46	.33	2.98	.06	1991.90
8470.5	1.2	6037.6	2431.7	3.3	1160.3	953.9	291.4	115.6	1988.40
.39	.37	5.20	2.55	.045	.045	.045	.000	1980.60	1545.90
.002262	746.	746.	746.	4	0	0	.00	828.63	2412.98

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15667.000	5.69	1995.29	1995.29	.00	1996.12	.83	2.13	.15	1993.60
8470.5	499.8	6459.1	1511.6	190.0	784.8	523.8	314.3	127.2	1993.60
.41	2.63	8.23	2.89	.045	.045	.045	.000	1989.60	1280.61
.007922	553.	553.	553.	20	8	0	.00	993.01	2273.62

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 16546.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	8.11	2001.11	.00	.00	2002.19	1.09	5.99	.08	2006.80
8470.5	.0	8470.5	.0	.0	1012.3	.0	339.6	138.9	2013.90
.44	.00	8.37	.00	.000	.045	.000	.000	1993.00	1528.41
.005927	879.	879.	879.	3	0	0	.00	166.86	1695.27

CCHV= .100 CEHV= .300
*SECNO 17058.000

3265 DIVIDED FLOW

3280 CROSS SECTION 17058.00 EXTENDED 1.13 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	5.23	2009.83	2009.83	.00	2011.65	1.82	5.09	.22	2013.80
8470.5	.0	8470.5	.0	.0	782.3	.0	350.2	141.1	2019.00
.45	.00	10.83	.00	.000	.045	.000	.000	2004.60	1503.37
.013963	512.	512.	512.	20	14	0	.00	218.71	1731.23

*SECNO 17612.000

3265 DIVIDED FLOW

3280 CROSS SECTION 17612.00 EXTENDED .05 FEET

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.59

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2020.20 ELREA= 2023.60

17612.000	8.34	2017.54	.00	.00	2018.33	.79	6.58	.10	2020.20
8470.5	.0	8470.5	.0	.0	1184.1	.0	362.7	144.5	2023.60
.48	.00	7.15	.00	.000	.045	.000	.000	2009.20	1629.91
.007876	554.	554.	554.	5	0	0	.00	307.47	1955.11

*SECNO 18436.000
3280 CROSS SECTION 18436.00 EXTENDED 1.43 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2028.20 ELREA= 2028.20

18436.000	6.34	2025.44	.00	.00	2026.30	.87	7.95	.02	2028.20

```
   8470.5        .0     8470.5        .0        .0     1131.7        .0      384.6      151.0     2028.20
      .51        .00       7.48       .00       .000      .045       .000       .000     2019.10     1538.53
   .012084      824.       824.       824.         4         0          0        .00      381.94     1920.46


*SECNO 18462.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 18462.000       5.51   2025.51    2025.51       .00    2027.07       1.56       .40        .21     2029.60
   8470.5        .0     8470.5        .0        .0      844.3         .0       385.2      151.2     2029.60
      .51        .00      10.03       .00       .000      .045       .000       .000     2020.00       57.60
   .020678      26.        26.        26.         5        15          0        .00      273.73      331.32


*SECNO 18472.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

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   15APR98      13:58:53                                                                          PAGE   19

    SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 18472.000       6.28   2026.28       .00        .00    2027.27        .99        .14        .06     2029.60
   8470.5        .0     8470.5        .0        .0      1061.8         .0       385.4      151.3     2029.60
      .51        .00       7.98       .00       .000      .045       .000       .000     2020.00       51.90
   .010206      10.        10.        10.         6         0          0        .00      285.81      337.70


*SECNO 18619.000

3265 DIVIDED FLOW

3280 CROSS SECTION  18619.00 EXTENDED      1.14 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.76

 18619.000       6.14   2027.74       .00        .00    2028.14        .39        .81        .06     2026.60
   8639.7        .0     8220.3      419.5        .0      1606.3      169.4      390.2      152.6     2029.60
      .52        .00       5.12       2.48       .000      .045       .045       .000     2021.60        .00
   .003443     147.       147.       147.         2         0          0        .00      502.83      560.03


*SECNO 18710.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.48

 18710.000      12.54   2028.14       .00        .00    2028.36        .22        .21        .02     2028.60
   8988.0        .0     8988.0        .0        .0      2386.9         .0       394.5      153.7     2029.60
      .52        .00       3.77       .00       .000      .045       .000       .000     2015.60     1031.88
   .001705      91.        91.        91.         4         0          0        .00      515.37      1547.25


*SECNO 19020.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.17

 19020.000      10.89   2028.49       .00        .00    2028.59        .10        .21        .01     2029.60
   8988.0        .0     8988.0        .0        .0      3560.1         .0       415.7      157.1     2029.60
      .56        .00       2.52       .00       .000      .045       .000       .000     2017.60     1027.76
   .000361     310.       310.       310.         2         0          0        .00      439.47      1467.22


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   15APR98      13:58:53                                                                          PAGE   20

    SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 19215.000       6.82   2032.42   2032.42       .00    2034.11       1.69       .22        .48     2033.60
   8988.0        .0     8988.0        .0        .0      861.8         .0       425.6      158.6     2037.60
      .56        .00      10.43       .00       .000      .045       .000       .000     2025.60     1014.72
   .020612     195.       195.       195.        20        14          0        .00      263.04      1277.76
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*SECNO 19802.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.87

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2044.40 ELREA= 2041.30

19802.000	7.53	2039.53	.00	.00	2040.09	.56	5.87	.11	2044.40
8988.0	.0	8988.0	.0	.0	1493.1	.0	441.5	161.1	2041.30
.59	.00	6.02	.00	.000	.045	.000	.000	2032.00	1642.76
.005882	587.	587.	587.	3	0	0	.00	406.95	2049.70

*SECNO 20595.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2048.50 ELREA= 2048.20

20595.000	6.79	2046.09	.00	.00	2047.22	1.13	6.95	.17	2048.50
8988.0	.0	8988.0	.0	.0	1054.4	.0	464.7	169.9	2048.20
.62	.00	8.52	.00	.000	.045	.000	.000	2039.30	1218.23
.014446	793.	793.	793.	3	0	0	.00	333.53	1551.77

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 21291.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2056.10 ELREA= 2055.50

21291.000	6.97	2052.37	.00	.00	2052.83	.46	5.55	.07	2056.10
8988.0	.0	8988.0	.0	.0	1646.2	.0	486.2	176.2	2055.50
.65	.00	5.46	.00	.000	.045	.000	.000	2045.40	1110.40
.005048	696.	696.	696.	3	0	0	.00	461.65	1572.05

*SECNO 22138.000

3265 DIVIDED FLOW

3280 CROSS SECTION 22138.00 EXTENDED .42 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2065.10 ELREA= 2066.70

22138.000	6.32	2058.92	.00	.00	2059.81	.88	6.85	.13	2065.10
8988.0	.0	8988.0	.0	.0	1191.3	.0	513.8	185.3	2066.70
.68	.00	7.54	.00	.000	.045	.000	.000	2052.60	1190.58
.014997	847.	847.	847.	3	0	0	.00	466.33	1667.40

*SECNO 23230.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.48

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	6.57	2069.67	.00	.00	2070.49	.82	10.68	.01	2075.50
8988.0	.0	8988.0	.0	.0	1238.4	.0	544.3	194.7	2082.30
.72	.00	7.26	.00	.000	.045	.000	.000	2063.10	1182.41
.006875	1092.	1092.	1092.	4	0	0	.00	285.68	1468.09

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*SECNO 24530.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2089.10 ELREA=      2106.50

 24530.000      5.81   2081.21       .00       .00   2082.34      1.13     11.76       .09   2089.10
    8988.0        .0     8988.0        .0        .0    1055.3        .0     578.5     203.4   2106.50
       .77       .00       8.52      .00      .000      .045      .000      .000   2075.40   1151.62
   .012426     1300.     1300.     1300.         4         0         0       .00    297.78   1449.41


*SECNO 25616.000

3265 DIVIDED FLOW


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2100.50 ELREA=      2100.60

 25616.000      7.74   2092.84       .00       .00   2093.72       .88     11.35       .02   2100.50
    8988.0        .0     8988.0        .0        .0    1192.4        .0     606.5     211.0   2100.60
       .81       .00       7.54      .00      .000      .045      .000      .000   2085.10   1324.47
   .008918     1086.     1086.     1086.         5         0         0       .00    315.72   1702.81


*SECNO 26383.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2109.80 ELREA=      2105.60

 26383.000      8.59   2098.59       .00       .00   2099.60      1.01      5.84       .04   2109.80
    8988.0        .0     8988.0        .0        .0    1114.4        .0     626.8     215.7   2105.60
       .83       .00       8.07      .00      .000      .045      .000      .000   2090.00   1246.28
   .006574      767.      767.      767.         3         0         0       .00    210.77   1457.05


*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27000.000      9.74   2111.24   2111.24       .00   2114.63      3.39      4.32       .71   2112.00
    6258.0        .0     6258.0        .0        .0     423.5        .0     637.7     217.6   2112.00
       .84       .00      14.78      .00      .000      .030      .000      .000   2101.50     52.52
   .007698      617.      617.      617.        20         8         0       .00     62.96    115.48


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   15APR98      13:58:53                                                                    PAGE   23

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 27303.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27303.000      9.69   2114.19   2114.19       .00   2117.63      3.45      2.36       .02   2115.00
    6258.0        .0     6258.0        .0        .0     420.1        .0     640.7     218.1   2115.00
       .85       .00      14.90      .00      .000      .030      .000      .000   2104.50     52.63
   .007872      303.      303.      303.         3         5         0       .00     62.74    115.37


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   15APR98      13:58:53                                                                    PAGE   24


  TW     LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
     408.35     408.55        .05     408.35     408.55        .05          5   1926.183   1925.675   6109.000   6397.000


  TW     LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00     408.35     408.55        .05          5   1925.675   1926.345   6397.000   6842.000


  TW     LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00        .00        .00     408.35     408.55        .05          5   1926.345   1927.550   6842.000   7287.000


  TW     Weir flow due to rubble and constriction at excavation Losee/Asure

     ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
     169.25     168.71        .32     577.60     577.26        .06          5   2026.282   2027.744   18472.000  18619.000


  TW     Weir flow due to rubble and constriction at excavation Losee/Asure

     ASQ       QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
     348.28     348.51        .07     925.87     925.77        .01          5   2027.744   2028.145   18619.000  18710.000
```

TW Weir flow due to rubble and constriction at excavation Losee/Asure

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	925.87	925.77	.01	5	2028.145	2028.488	18710.000	19020.000

TW Weir flow due to rubble and constriction at excavation Losee/Asure

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	925.87	925.77	.01	5	2028.488	2032.423	19020.000	19215.000

TW Weir flow from right bank of NLVDB outlet channel

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	925.87	925.77	.01	5	2111.240	2114.186	27000.000	27303.000

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THIS RUN EXECUTED 15APR98 13:58:55

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH WITH DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5852.000	.00	.00	.00	1913.20	8062.13	1925.70	.00	1926.22	11.38	7.18	2207.51	2389.53
*	5973.000	120.00	100000.00	100000.00	1913.20	8062.13	1925.70	.00	1926.22	11.38	7.18	2207.51	2389.53
*	6092.000	127.00	.00	.00	1914.00	8062.13	1926.22	.00	1926.32	2.30	3.52	4281.66	5314.30
*	6370.000	278.00	.00	.00	1914.80	8062.13	1925.64	1922.34	1926.77	18.68	8.74	1136.73	1865.21
	6828.000	458.00	.00	.00	1916.20	8470.48	1926.31	.00	1928.00	29.09	10.43	812.14	1570.44
	7265.000	437.00	.00	.00	1918.50	8470.48	1927.45	.00	1929.74	45.01	12.13	698.41	1262.56
	7730.000	465.00	.00	.00	1921.50	8470.48	1929.47	.00	1932.51	68.04	13.98	605.71	1026.90
	8323.000	593.00	.00	.00	1925.20	8470.48	1933.53	.00	1936.28	58.73	13.32	635.98	1105.30
*	8794.000	470.00	.00	.00	1941.60	8470.48	1944.74	1944.74	1945.64	108.21	7.63	1120.21	814.27
*	9120.000	301.00	.00	.00	1930.90	8470.48	1946.33	1944.44	1946.67	15.17	4.68	1905.31	2174.80
	9237.000	117.00	.00	.00	1940.00	8470.48	1946.66	.00	1946.89	23.42	3.88	2183.88	1750.28
	9429.000	192.00	.00	.00	1942.10	8470.48	1947.12	.00	1947.42	30.41	4.39	1928.87	1535.99
*	10155.000	726.00	.00	.00	1948.70	8470.48	1954.24	1954.24	1954.98	214.84	6.76	1227.25	577.89
*	10962.000	807.00	.00	.00	1954.90	8470.48	1960.62	.00	1960.84	35.62	3.48	2275.31	1419.32
*	11614.000	652.00	.00	.00	1960.30	8470.48	1966.12	1966.12	1967.06	262.96	7.96	1106.35	522.35
*	12202.000	588.00	.00	.00	1962.70	8470.48	1971.92	.00	1972.57	47.35	7.65	1520.98	1231.01
	13094.000	892.00	.00	.00	1964.70	8470.48	1975.65	.00	1976.45	39.17	7.17	1181.26	1353.44

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	14167.000	1073.00	.00	.00	1970.30	8470.48	1980.53	.00	1981.84	62.57	9.19	921.83	1070.81
*	14368.000	201.00	.00	.00	1982.60	8470.48	1988.52	1988.52	1989.42	88.93	9.62	1398.08	898.23
*	15114.000	746.00	.00	.00	1980.60	8470.48	1992.13	.00	1992.46	22.62	5.20	2117.43	1780.85
*	15667.000	553.00	.00	.00	1989.60	8470.48	1995.29	1995.29	1996.12	79.22	8.23	1498.56	951.67
	16546.000	879.00	.00	.00	1993.00	8470.48	2001.11	.00	2002.19	59.27	8.37	1012.30	1100.28
*	17058.000	512.00	.00	.00	2004.60	8470.48	2009.83	2009.83	2011.65	199.63	10.83	782.25	599.51
*	17612.000	554.00	.00	.00	2009.20	8470.48	2017.54	.00	2018.33	78.76	7.15	1184.13	954.46
	18436.000	824.00	.00	.00	2019.10	8470.48	2025.44	.00	2026.30	120.84	7.48	1131.71	770.54
*	18462.000	26.00	.00	.00	2020.00	8470.48	2025.51	2025.51	2027.07	206.78	10.03	844.26	589.05

*	18472.000	10.00	.00	.00	2020.00	8470.48	2026.28	.00	2027.27	102.06	7.98	1061.82	836.45
*	18619.000	147.00	.00	.00	2021.60	8639.72	2027.74	.00	2028.14	34.43	5.12	1775.68	1472.38
*	18710.000	91.00	.00	.00	2015.60	8988.00	2028.14	.00	2028.36	17.05	3.77	2386.93	2177.02
*	19020.000	310.00	.00	.00	2017.60	8988.00	2028.49	.00	2028.59	3.61	2.52	3560.14	4731.38
*	19215.000	195.00	.00	.00	2025.60	8988.00	2032.42	2032.42	2034.11	206.12	10.43	861.82	626.05
*	19802.000	587.00	.00	.00	2032.00	8988.00	2039.53	.00	2040.09	58.82	6.02	1493.06	1171.90
*	20595.000	793.00	.00	.00	2039.30	8988.00	2046.09	.00	2047.22	144.46	8.52	1054.36	747.80
*	21291.000	696.00	.00	.00	2045.40	8988.00	2052.37	.00	2052.83	50.48	5.46	1646.23	1265.04
*	22138.000	847.00	.00	.00	2052.60	8988.00	2058.92	.00	2059.81	149.97	7.54	1191.32	733.94
*	23230.000	1092.00	.00	.00	2063.10	8988.00	2069.67	.00	2070.49	68.75	7.26	1238.42	1084.03
	24530.000	1300.00	.00	.00	2075.40	8988.00	2081.21	.00	2082.34	124.26	8.52	1055.28	806.30
	25616.000	1086.00	.00	.00	2085.10	8988.00	2092.84	.00	2093.72	89.18	7.54	1192.41	951.75
	26383.000	767.00	.00	.00	2090.00	8988.00	2098.59	.00	2099.60	65.74	8.07	1114.37	1108.50
*	27000.000	617.00	.00	.00	2101.50	6258.00	2111.24	2111.24	2114.63	76.98	14.78	423.51	713.24
*	27303.000	303.00	.00	.00	2104.50	6258.00	2114.19	2114.19	2117.63	78.72	14.90	420.07	705.33

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LNLV WASH WITH DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	5852.000	8062.13	1925.70	.00	.00	.00	1538.85	.00
*	5973.000	8062.13	1925.70	.00	.00	.00	1538.85	120.00
*	6092.000	8062.13	1926.22	.00	.52	.00	1642.46	127.00
*	6370.000	8062.13	1925.64	.00	-.58	.00	716.51	278.00
	6828.000	8470.48	1926.31	.00	.67	.00	100.53	458.00
	7265.000	8470.48	1927.45	.00	1.15	.00	95.97	437.00
	7730.000	8470.48	1929.47	.00	2.02	.00	91.90	465.00
	8323.000	8470.48	1933.53	.00	4.05	.00	92.79	593.00
*	8794.000	8470.48	1944.74	.00	11.22	.00	644.33	470.00
*	9120.000	8470.48	1946.33	.00	1.59	.00	655.96	301.00
	9237.000	8470.48	1946.66	.00	.33	.00	577.03	117.00
	9429.000	8470.48	1947.12	.00	.46	.00	514.82	192.00
*	10155.000	8470.48	1954.24	.00	7.11	.00	864.63	726.00
*	10962.000	8470.48	1960.62	.00	6.38	.00	1085.68	807.00
*	11614.000	8470.48	1966.12	.00	5.50	.00	682.04	652.00
*	12202.000	8470.48	1971.92	.00	5.80	.00	594.90	588.00
	13094.000	8470.48	1975.65	.00	3.73	.00	179.10	892.00
	14167.000	8470.48	1980.53	.00	4.88	.00	135.98	1073.00
*	14368.000	8470.48	1988.52	.00	7.99	.00	782.72	201.00
*	15114.000	8470.48	1992.13	.00	3.61	.00	828.63	746.00
*	15667.000	8470.48	1995.29	.00	3.16	.00	993.01	553.00
	16546.000	8470.48	2001.11	.00	5.81	.00	166.86	879.00
*	17058.000	8470.48	2009.83	.00	8.72	.00	218.71	512.00
*	17612.000	8470.48	2017.54	.00	7.71	.00	307.47	554.00

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	16436.000	8470.48	2025.44	.00	7.89	.00	381.94	824.00
*	18462.000	8470.48	2025.51	.00	.07	.00	273.73	26.00

*	18472.000	8470.48	2026.28	.00	.77	.00	285.81	10.00
*	18619.000	8639.72	2027.74	.00	1.46	.00	502.83	147.00
*	18710.000	8988.00	2028.14	.00	.40	.00	515.37	91.00
*	19020.000	8988.00	2028.49	.00	.34	.00	439.47	310.00
*	19215.000	8988.00	2032.42	.00	3.93	.00	263.04	195.00
*	19802.000	8988.00	2039.53	.00	7.11	.00	406.95	587.00
*	20595.000	8988.00	2046.09	.00	6.56	.00	333.53	793.00
*	21291.000	8988.00	2052.37	.00	6.28	.00	461.65	696.00
*	22138.000	8988.00	2058.92	.00	6.55	.00	466.33	847.00
*	23230.000	8988.00	2069.67	.00	10.75	.00	285.68	1092.00
	24530.000	8988.00	2081.21	.00	11.54	.00	297.78	1300.00
	25616.000	8988.00	2092.84	.00	11.62	.00	315.72	1086.00
	26383.000	8988.00	2098.59	.00	5.75	.00	210.77	767.00
*	27000.000	6258.00	2111.24	.00	12.65	.00	62.96	617.00
*	27303.000	6258.00	2114.19	.00	2.95	.00	62.74	303.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

NOTE SECNO= 5973.000 PROFILE= 1 WSEL BASED ON X5 CARD

WARNING SECNO= 6092.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 6370.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 8794.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8794.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 8794.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 9120.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 10155.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10155.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 10155.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 10962.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11614.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 11614.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 12202.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 14368.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 14368.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 14368.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 15114.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 15667.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 15667.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 15667.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 17058.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 17058.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 17058.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 17612.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 18462.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 18462.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 18472.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 18619.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 18710.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 19020.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 19215.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

1
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CAUTION SECNO= 19215.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 19215.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 19802.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=  20595.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  21291.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  22138.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  23230.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  27000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  27303.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

Paper Copy F
Interstate 15 to Craig Road subcritical

500-year flood event

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    11APR98    TIME   12:37:38 *
 *****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*           (916) 756-1104           *
**************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX    XXXXX
X     X  X        X                    X
X     X  X        X     X              X
X     X  XXXXXXX  XXXXX              XXXXXXX
```

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1
    11APR98      12:37:38                                                    PAGE     1


                                                          THIS RUN EXECUTED 11APR98    12:37:38

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1       FEMA 500-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLV WASH WITH DIVERSION

 J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0          2                             .0033                                        1894.3

 J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       0                     -1


 J3   VARIABLE CODES FOR SUMMARY PRINTOUT

      150


 QT         1        4694

 NC       .03        .03        .014         .1          .3

   Add xsec 1+50 from as-built plans (rectangular):
 X1       150         12        1000      1035.1
 X3        10
 GR      1900        900        1897         910        1896        1000        1886     1000.01        1886      1017.1
 GR      1896     1017.11        1896      1017.9        1886     1017.91        1886        1035        1896      1035.1
 GR      1896       1060        1908        1120


 X1     243.6          8        1000     1035.01        93.6        93.6        93.6
 GR    1896.2       1000      1886.2     1000.01      1886.2      1017.1      1896.2     1017.11      1896.2      1017.9
 GR    1886.2     1017.91      1886.2        1035      1896.2     1035.01


 X1     244.6          8        1000     1035.01           1           1           1
 GR    1896.2       1000      1886.2     1000.01      1886.2      1017.1      1886.2     1017.11      1886.2      1017.9
 GR    1886.2     1017.91      1886.2        1035      1896.2     1035.01

   Duplicate 1+50 to 4+50 (beginning of transition):
1
    11APR98      12:37:38                                                    PAGE     2


 X1       450          8        1000        1036       205.4       205.4       205.4                    1.0
 X3        10
 GR      1900        900        1897         910        1896        1000        1886        1001        1886        1035
 GR      1896       1036        1896        1060        1908        1120

    Begin Transition XS 5+50 from As-Built Plans

 X1       544          4        1000        1050          94          94          94
 GR    1897.2       1000      1887.2        1015      1887.2        1035      1897.2        1050


 X1       600          4        1000        1050          56          56          56
 GR    1897.4       1000      1887.4        1015      1887.4        1035      1897.7        1050
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X1      700         4       1000       1050        100        100        100
GR   1897.7      1000     1887.7       1015     1887.7       1035     1897.7       1050


X1     1200         4       1000       1050        500        500        500
GR   1899.3      1000     1889.3       1015     1889.3       1035     1899.3       1050


X1     1700         4       1000       1050        500        500        500
GR     1901      1000       1891       1015       1891       1035       1901       1050


NC    0.030     0.030      0.014        0.1         0.3

X1     2000         4       1000       1050        300        300        300
GR     1902      1000       1892       1015       1892       1035       1902       1050


NC     .014      .014       .014
X1     2200         4       1000       1050        200        200        200
GR   1902.6      1000     1892.6       1015     1892.6       1035     1902.6       1050

  Duplicate 22+20 (beginning of transition):

NH        3      .035     1296.8       .014     1346.5       .035       1460
X1     3724        13     1296.8     1346.5       1524       1524       1524
X3       10         0          0     1220.1          0          0          0          0
GR   1904.6       700     1904.6        745       1904        755       1904        785       1908       1190
GR     1908      1222     1907.6     1296.8     1897.6     1311.8     1897.6     1331.5     1907.6     1346.5
GR     1908      1430       1912       1450     1912.3       1460


NC      .03       .03       .014         .1          .3

1
   11APR98      12:37:38                                                                                  PAGE     3


X1     3823         4       1000     1043.8         99         99         99
GR   1908.5      1000     1898.       1000.01     1898.      1028.      1908.5     1043.8

  'N'-CHANNEL DIVERSION
    SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY

X1     4020        28     1603.14     1646.95        197        197        197
X3       10         0          0     1602.66     1914.9     1730.86          0          0          0          0
GR   1908.2       840       1908        900       1908       1904       1170     1907.2     1528.6
GR   1907.5      1550.5     1907.5     1570.6       1907     1595.27     1909.2     1603.14    1898.6     1603.2
GR   1898.6      1631.2     1909.1     1646.95      1909     1686.54     1912.3     1705.34    1913       1719.59
GR     1913      1740.66    1911.7     1747.43    1911.7     1757.13    1907.1     1771.7     1907       1781.99
GR   1910.6      1793.57    1910.7     1799.62    1910.3     1803.01    1910.1     1820.73    1912       2200
GR   1912.4      2480       1912.4     2510       1916       2900

  CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020

X1     4060        29       1604       1647.8         40         40         40
X3       10         0          0     1604.1          0     1720.21          0          0          0
GR   1908.2       840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5      1550.5     1907.5     1570.6       1907     1595.27    1909.3       1604   1898.76     1604.1
GR   1898.7      1632       1909.3     1647.8     1909.3     1657.51      1909     1686.54    1912.3     1705.34
GR     1913      1719.59    1913       1740.66    1911.7     1747.43    1911.7     1757.13    1907.1     1771.7
GR     1907      1781.99    1910.6     1793.57    1910.7     1799.62    1910.3     1803.01    1910.1     1820.73
GR     1912      2200       1912.4     2480       1912.4     2510       1916       2900


NC                                       .3          .5
QT        1      5868

NH        3      .035       840       .014     1657.51       .035       2900
   CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115        29       1604     1643.6         55         55         55
X3       10         0          0     1603.92         0     1721.64          0          0          0
GR   1908.2       840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5      1550.5     1907.5     1570.6       1907     1595.27    1909.3       1604   1898.8     1604.1
GR   1898.8      1643.5     1909.3     1643.6     1909.3     1657.51      1909     1686.54    1912.3     1705.34
GR     1913      1719.59    1913       1740.66    1911.7     1747.43    1911.7     1757.13    1907.1     1771.7
GR     1907      1781.99    1910.6     1793.57    1910.7     1799.62    1910.3     1803.01    1910.1     1820.73
GR     1912      2200       1912.4     2480       1912.4     2510       1916       2900


NC      .035      .035       .014         .3          .5

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     4188        17          0       52.9         73         73         73
X3        0         0          0          0          0       56.3          0          0          0
GR     1915         0     1899.4        0.1     1899.4       12.3     1899.4       13.5   1899.4       25.8
GR   1899.4        27     1899.4       39.3     1899.4       40.5     1899.4       52.8   1914.8       52.9
GR     1912        65       1912         85     1909.8        140       1912        300    1912.8        685
GR   1912.8       710       1916       1125

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL
1                                                                                                        PAGE     4
   11APR98      12:37:38


  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125
```

```
X1     4189        18         0       52.9          1          1          1
X3       10
BT      -18         0    1914.8    1909.7        .01     1914.7     1909.7        .1     1914.8     1909.7
BT               12.3    1914.7    1909.7      12.31     1914.7     1899.4       13.5     1914.7     1899.4
BT              13.51    1914.7    1909.7       25.8     1914.7     1909.7      25.81     1914.7     1899.4
BT                 27    1914.7    1899.4      27.01     1914.6     1909.7       39.3     1914.6     1909.7
BT              39.31    1914.6    1899.4       40.5     1914.6     1899.4      40.51     1914.6     1909.7
BT               52.8    1914.6    1909.7      52.81     1914.6     1909.7       52.9     1914.6     1909.7
GR   1914.8         0    1909.7        .01     1899.4        0.1     1899.4       12.3     1899.4      12.31
GR   1899.4      13.5    1899.4      13.51     1899.4       25.8     1899.4      25.81     1899.4         27
GR   1899.4     27.01    1899.4       39.3     1899.4      39.31     1899.4       40.5     1899.4      40.51
GR   1899.4      52.8    1909.7      52.81     1914.6       52.9


X1     4246        18         0       52.9         57         57         57
X3       10
BT      -18         0       1915    1910.2        .01       1915     1910.2        .1       1915     1910.2
BT               12.3    1914.9    1910.2      12.31     1914.9     1899.9       13.5     1914.9     1899.9
BT              13.51    1914.9    1910.2       25.8     1914.9     1910.2      25.81     1914.9     1899.9
BT                 27    1914.9    1899.9      27.01     1914.8     1910.2       39.3     1914.8     1910.2
BT              39.31    1914.8    1899.9       40.5     1914.8     1899.9      40.51     1914.8     1910.2
BT               52.8    1914.8    1910.2      52.81     1914.8     1910.2       52.9     1914.8     1910.2
GR     1915         0    1910.2        .01     1899.9        0.1     1899.9       12.3     1899.9      12.31
GR   1899.9      13.5    1899.9      13.51     1899.9       25.8     1899.9      25.81     1899.9         27
GR   1899.9     27.01    1899.9       39.3     1899.9      39.31     1899.9       40.5     1899.9      40.51
GR   1899.9      52.8    1910.2      52.81     1914.8       52.9


QT       1      6339

X1     4247        10         0       52.9          1          1          1
GR     1915         0    1899.9        0.1     1899.9       12.3     1899.9       13.5     1899.9       25.8
GR   1899.9        27    1899.9       39.3     1899.9       40.5     1899.9       52.8     1914.8       52.9


NC       .03        .03       .014         .1         .3
  Left overbank topo from RR through Lone Mtn. should be extended/refined
   when additional mapping available:
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1     4360         4       1000       1057        113        113        113
GR   1911.4      1000    1900.9       1021     1900.9       1036     1911.4       1057


X1     4831         4       1000       1057        471        471        471
GR   1915.3      1000    1904.8       1021     1904.8       1036     1915.3       1057
```



```
X1     4920         4       1000       1057         89         89         89
GR     1916      1000    1905.5       1021     1905.5       1036       1916       1057

   ADDED TRAPEZOIDAL SECTION

X1     5005         4       1000       1057         85         85         85
GR   1916.7      1000    1906.2       1021     1906.2       1036     1916.7       1057


X1     5105         4       1000    1035.01        100        100        100
GR   1919.2      1000    1908.2    1000.01     1908.2       1035     1919.2    1035.01


X1     5200         4       1000    1038.21         95         95         95
GR   1919.8      1000    1908.8    1000.01     1908.8     1038.2     1919.8    1038.21


X1     5500         4       1000    1048.21        300        300        300
GR   1921.8      1000    1910.8    1000.01     1910.8     1048.2     1921.8    1048.21


X1     5852         4       1000    1060.01        352        352        352
GR   1924.1      1000    1913.1    1000.01     1913.1       1060     1924.1    1060.01
```



```
     SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      OLOSS    L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB          ACH        AROB       VOL     TWA      R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL           XNCH       XNR        WTN     ELMIN    SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL        IDC        ICONT      CORAR   TOPWID   ENDST


 *PROF 1

 CCHV=      .100 CEHV=      .300
 *SECNO 150.000

 3265 DIVIDED FLOW


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1896.00 ELREA=       1896.00

    150.000       8.52    1894.52    1894.35    1894.30    1898.54       4.02        .00        .00    1896.00
     4694.0         .0     4694.0         .0         .0      291.8         .0         .0         .0    1896.00
```

.00	.00	16.09	.00	.000	.014	.000	.000	1886.00	1000.00
.003311	0.	0.	0.	0	5	0	.00	34.29	1035.09

*SECNO 243.600

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

243.600	9.31	1895.51	.00	.00	1898.88	3.37	.28	.06	1896.20
4694.0	.0	4694.0	.0	.0	318.4	.0	.7	.1	1896.20
.00	.00	14.74	.00	.000	.014	.000	.000	1886.20	1000.00
.002629	94.	94.	94.	5	0	0	.00	34.22	1035.01

*SECNO 244.600

244.600	9.85	1896.05	.00	.00	1898.93	2.88	.00	.05	1896.20
4694.0	.0	4694.0	.0	.0	344.5	.0	.7	.1	1896.20
.00	.00	13.62	.00	.000	.014	.000	.000	1886.20	1000.00
.001416	1.	1.	1.	3	0	0	.00	35.01	1035.01

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
450.000	8.93	1895.93	.00	.00	1899.45	3.52	.33	.19	1897.00
4694.0	.0	4694.0	.0	.0	311.8	.0	2.2	.2	1897.00
.01	.00	15.06	.00	.000	.014	.000	.000	1887.00	1000.11
.001845	205.	205.	205.	3	0	0	.00	35.79	1035.89

*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

544.000	9.38	1896.57	1896.57	.00	1899.93	3.36	.17	.02	1897.20
4694.0	.0	4694.0	.0	.0	319.3	.0	2.9	.3	1897.20
.01	.00	14.70	.00	.000	.014	.000	.000	1887.20	1000.94
.001784	94.	94.	94.	20	8	0	.00	48.13	1049.06

*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

600.000	9.41	1896.81	1896.81	.00	1900.17	3.36	.10	.00	1897.40
4694.0	.0	4694.0	.0	.0	319.0	.0	3.3	.4	1897.70
.01	.00	14.72	.00	.000	.014	.000	.000	1887.40	1000.89
.001781	56.	56.	56.	3	5	0	.00	47.81	1048.70

*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

700.000	9.38	1897.08	1897.08	.00	1900.43	3.35	.18	.00	1897.70
4694.0	.0	4694.0	.0	.0	319.4	.0	4.0	.5	1897.70
.01	.00	14.70	.00	.000	.014	.000	.000	1887.70	1000.94
.001783	100.	100.	100.	2	5	0	.00	48.13	1049.06

*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1200.000	9.38	1898.68	1898.68	.00	1902.03	3.35	.89	.00	1899.30
4694.0	.0	4694.0	.0	.0	319.6	.0	7.7	1.1	1899.30
.02	.00	14.69	.00	.000	.014	.000	.000	1889.30	1000.93
.001780	500.	500.	500.	20	5	0	.00	48.14	1049.07

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

```
  1700.000      9.38   1900.38   1900.38       .00   1903.73      3.35       .89       .00   1901.00
    4694.0        .0    4694.0        .0        .0    319.5         .0      11.4       1.6   1901.00
       .03       .00     14.69       .00      .000     .014       .000      .000   1891.00   1000.93
   .001781      500.      500.      500.        20        5          0       .00     48.14   1049.07


CCHV=      .100 CEHV=      .300
*SECNO 2000.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2000.000      9.38   1901.38   1901.38       .00   1904.73      3.35       .53       .00   1902.00
    4694.0        .0    4694.0        .0        .0    319.6         .0      13.6       1.9   1902.00
       .03       .00     14.69       .00      .000     .014       .000      .000   1892.00   1000.93
   .001780      300.      300.      300.        20        5          0       .00     48.14   1049.07


*SECNO 2200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000      9.38   1901.98   1901.98       .00   1905.33      3.35       .36       .00   1902.60
    4694.0        .0    4694.0        .0        .0    319.6         .0      15.0       2.2   1902.60
       .04       .00     14.69       .00      .000     .014       .000      .000   1892.60   1000.93
   .001781      200.      200.      200.        20        5          0       .00     48.14   1049.07


1490 NH CARD USED
*SECNO 3724.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      9.40   1907.00   1907.00       .00   1910.39      3.39      2.73       .01   1907.60
    4694.0        .0    4694.0        .0        .0    317.7         .0      26.2       3.8   1907.60
       .07       .00     14.77       .00      .000     .014       .000      .000   1897.60   1297.70
   .001806      1524.     1524.     1524.        20        5          0       .00     47.90   1345.60


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 3823.000
  3823.000      9.58   1907.58       .00       .00   1910.59      3.01       .16       .04   1908.50
    4694.0        .0    4694.0        .0        .0    337.2         .0      26.9       3.9   1908.50
       .07       .00     13.92       .00      .000     .014       .000      .000   1898.00   1000.00
   .001528       99.       99.       99.         4         0          0       .00     42.41   1042.41


*SECNO 4020.000

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=       1  TARGET=      128.200
 ELENCL=    1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      8.96   1907.56       .00       .00   1911.08      3.52       .34       .15   1909.20
    4694.0        .0    4694.0        .0        .0    311.6         .0      28.4       4.1   1909.10
       .07       .00     15.07       .00      .000     .014       .000      .000   1898.60   1603.15
   .001905      197.      197.      197.         2         0          0       .00     41.50   1644.65


*SECNO 4060.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=       1  TARGET=      116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1909.30

  4060.000      8.78   1907.48   1907.48       .00   1911.24      3.76       .08       .07 100000.00
    4694.0        .0    4694.0        .0        .0    301.6         .0      28.7       4.2   1909.30
       .07       .00     15.57       .00      .000     .014       .000      .000   1898.70   1604.10
   .002084       40.       40.       40.         2         5          0       .00     40.99   1645.09


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
```

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1603.9 1721.6 TYPE= 1 TARGET= 117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4115.000	8.81	1907.61	1907.61	.00	1912.03	4.42	.12	.33	1909.30
5868.0	.0	5868.0	.0	.0	347.7	.0	29.1	4.2	1909.30
.07	.00	16.88	.00	.000	.014	.000	.000	1898.80	1604.02
.002269	55.	55.	55.	3	5	0	.00	39.57	1643.58

CCHV= .300 CEHV= .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.34

3470 ENCROACHMENT STATIONS= .0 56.3 TYPE= 1 TARGET= 56.299

4188.000	12.39	1911.79	.00	.00	1913.04	1.25	.06	.95	1915.00
5868.0	.0	5868.0	.0	.0	654.0	.0	29.9	4.3	1914.80
.08	.00	8.97	.00	.000	.014	.000	.000	1899.40	.02
.000416	73.	73.	73.	5	0	0	.00	52.86	52.88

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .49

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.60 MAX ELLC= 1909.70

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	11.97	1911.37	.00	.00	1913.46	2.08	.00	.42	1914.80
5868.0	.0	5868.0	.0	.0	506.6	.0	29.9	4.3	1914.60
.08	.00	11.58	.00	.000	.014	.000	.000	1899.40	.01
.001724	1.	1.	1.	2	0	0	-125.15	52.83	52.84

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.80 MAX ELLC= 1910.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	11.57	1911.47	.00	.00	1913.56	2.08	.10	.00	1915.00
5868.0	.0	5868.0	.0	.0	506.6	.0	30.6	4.4	1914.80
.08	.00	11.58	.00	.000	.014	.000	.000	1899.90	.01
.001724	57.	57.	57.	2	0	0	-103.96	52.83	52.83

*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.03

4247.000	12.36	1912.28	.00	.00	1913.74	1.46	.00	.19	1915.00
6339.0	.0	6339.0	.0	.0	653.6	.0	30.6	4.4	1914.80
.08	.00	9.70	.00	.000	.014	.000	.000	1899.90	.02
.000486	1.	1.	1.	3	0	0	.00	52.87	52.88

CCHV= .100 CEHV= .300
*SECNO 4360.000
3280 CROSS SECTION 4360.00 EXTENDED .57 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4360.000	11.07	1911.97	1911.97	.00	1915.67	3.70	.09	.67	1911.40
6339.0	.0	6339.0	.0	.0	410.6	.0	32.0	4.5	1911.40
.08	.00	15.44	.00	.000	.014	.000	.000	1900.90	1000.00
.001741	113.	113.	113.	20	15	0	.00	57.00	1057.00

*SECNO 4831.000
3280 CROSS SECTION 4831.00 EXTENDED .60 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4831.000	11.10	1915.90	1915.90	.00	1919.57	3.67	.82	.00	1915.30
6339.0	.0	6339.0	.0	.0	412.2	.0	36.4	5.1	1915.30
.09	.00	15.38	.00	.000	.014	.000	.000	1904.80	1000.00
.001721	471.	471.	471.	20	5	0	.00	57.00	1057.00

*SECNO 4920.000
3280 CROSS SECTION 4920.00 EXTENDED .59 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4920.000	11.09	1916.59	1916.59	.00	1920.27	3.68	.15	.00	1916.00
6339.0	.0	6339.0	.0	.0	411.7	.0	37.3	5.2	1916.00
.09	.00	15.40	.00	.000	.014	.000	.000	1905.50	1000.00
.001727	89.	89.	89.	20	5	0	.00	57.00	1057.00

*SECNO 5005.000
3280 CROSS SECTION 5005.00 EXTENDED .59 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5005.000	11.09	1917.29	1917.29	.00	1920.97	3.68	.15	.00	1916.70
6339.0	.0	6339.0	.0	.0	411.9	.0	38.1	5.4	1916.70
.09	.00	15.39	.00	.000	.014	.000	.000	1906.20	1000.00
.001725	85.	85.	85.	20	5	0	.00	57.00	1057.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5105.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	10.03	1918.23	1918.23	.00	1923.29	5.07	.20	.42	1919.20
6339.0	.0	6339.0	.0	.0	350.9	.0	39.0	5.5	1919.20
.09	.00	18.06	.00	.000	.014	.000	.000	1908.20	1000.00
.002449	100.	100.	100.	20	11	0	.00	35.01	1035.01

*SECNO 5200.000
3280 CROSS SECTION 5200.00 EXTENDED .76 FEET

3301 HV CHANGED MORE THAN HVINS

5200.000	11.76	1920.56	.00	.00	1923.65	3.09	.16	.20	1919.80
6339.0	.0	6339.0	.0	.0	449.2	.0	39.8	5.5	1919.80
.10	.00	14.11	.00	.000	.014	.000	.000	1908.80	1000.00
.001252	95.	95.	95.	6	0	0	.00	38.21	1038.21

*SECNO 5500.000
3280 CROSS SECTION 5500.00 EXTENDED .04 FEET

3301 HV CHANGED MORE THAN HVINS

5500.000	11.05	1921.85	.00	.00	1924.05	2.20	.31	.09	1921.80
6339.0	.0	6339.0	.0	.0	532.3	.0	43.2	5.8	1921.80
.10	.00	11.91	.00	.000	.014	.000	.000	1910.80	1000.00

.000846	300.	300.	300.	3	0	0	.00	48.21	1048.21

*SECNO 5852.000

5852.000	9.23	1922.33	.00	.00	1924.36	2.03	.30	.02	1924.10
6339.0	.0	6339.0	.0	.0	553.8	.0	47.6	6.3	1924.10
.11	.00	11.45	.00	.000	.014	.000	.000	1913.10	1000.00
.000859	352.	352.	352.	2	0	0	.00	60.01	1060.01

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THIS RUN EXECUTED 11APR98 12:37:39

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH WITH DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	150.000	.00	.00	.00	1886.00	4694.00	1894.52	1894.35	1898.54	33.11	16.09	291.80	815.74
	243.600	93.60	.00	.00	1886.20	4694.00	1895.51	.00	1898.88	26.29	14.74	318.42	915.54
	244.600	1.00	.00	.00	1886.20	4694.00	1896.05	.00	1898.93	14.16	13.62	344.52	1247.60
	450.000	205.40	.00	.00	1887.00	4694.00	1895.93	.00	1899.45	18.45	15.06	311.77	1092.77
*	544.000	94.00	.00	.00	1887.20	4694.00	1896.57	1896.57	1899.93	17.84	14.70	319.34	1111.21
*	600.000	56.00	.00	.00	1887.40	4694.00	1896.81	1896.81	1900.17	17.81	14.72	318.97	1112.15
*	700.000	100.00	.00	.00	1887.70	4694.00	1897.08	1897.08	1900.43	17.83	14.70	319.41	1111.58
*	1200.000	500.00	.00	.00	1889.30	4694.00	1898.68	1898.68	1902.03	17.80	14.69	319.61	1112.50
*	1700.000	500.00	.00	.00	1891.00	4694.00	1900.38	1900.38	1903.73	17.81	14.69	319.55	1112.22
*	2000.000	300.00	.00	.00	1892.00	4694.00	1901.38	1901.38	1904.73	17.80	14.69	319.64	1112.67
*	2200.000	200.00	.00	.00	1892.60	4694.00	1901.98	1901.98	1905.33	17.81	14.69	319.56	1112.30
*	3724.000	1524.00	.00	.00	1897.60	4694.00	1907.00	1907.00	1910.39	18.06	14.77	317.70	1104.65
	3823.000	99.00	.00	.00	1898.00	4694.00	1907.58	.00	1910.59	15.28	13.92	337.18	1200.71
	4020.000	197.00	.00	.00	1898.60	4694.00	1907.56	.00	1911.08	19.05	15.07	311.57	1075.51
*	4060.000	40.00	.00	.00	1898.70	4694.00	1907.48	1907.48	1911.24	20.84	15.57	301.55	1028.23
*	4115.000	55.00	.00	.00	1898.80	5868.00	1907.61	1907.61	1912.03	22.69	16.88	347.66	1231.78
*	4188.000	73.00	.00	.00	1899.40	5868.00	1911.79	.00	1913.04	4.16	8.97	653.96	2877.71

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4189.000	1.00	1914.60	1909.70	1899.40	5868.00	1911.37	.00	1913.46	17.24	11.58	506.60	1413.37
	4246.000	57.00	1914.80	1910.20	1899.90	5868.00	1911.47	.00	1913.56	17.24	11.58	506.58	1413.26
*	4247.000	1.00	.00	.00	1899.90	6339.00	1912.28	.00	1913.74	4.86	9.70	653.58	2875.26
*	4360.000	113.00	.00	.00	1900.90	6339.00	1911.97	1911.97	1915.67	17.41	15.44	410.65	1519.38
*	4831.000	471.00	.00	.00	1904.80	6339.00	1915.90	1915.90	1919.57	17.21	15.38	412.21	1528.16
*	4920.000	89.00	.00	.00	1905.50	6339.00	1916.59	1916.59	1920.27	17.27	15.40	411.74	1525.50
*	5005.000	85.00	.00	.00	1906.20	6339.00	1917.29	1917.29	1920.97	17.25	15.39	411.86	1526.17
*	5105.000	100.00	.00	.00	1908.20	6339.00	1918.23	1918.23	1923.29	24.49	18.06	350.94	1280.82
	5200.000	95.00	.00	.00	1908.80	6339.00	1920.56	.00	1923.65	12.52	14.11	449.23	1791.16
	5500.000	300.00	.00	.00	1910.80	6339.00	1921.85	.00	1924.05	8.46	11.91	532.32	2179.35
	5852.000	352.00	.00	.00	1913.10	6339.00	1922.33	.00	1924.36	8.59	11.45	553.80	2163.26

1
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LNLV WASH WITH DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	150.000	4694.00	1894.52	.00	.00	.22	34.29	.00
	243.600	4694.00	1895.51	.00	.98	.00	34.22	93.60
	244.600	4694.00	1896.05	.00	.54	.00	35.01	1.00
	450.000	4694.00	1895.93	.00	-.12	.00	35.79	205.40
*	544.000	4694.00	1896.57	.00	.64	.00	48.13	94.00
*	600.000	4694.00	1896.81	.00	.23	.00	47.81	56.00
*	700.000	4694.00	1897.08	.00	.27	.00	48.13	100.00
*	1200.000	4694.00	1898.68	.00	1.60	.00	48.14	500.00
*	1700.000	4694.00	1900.38	.00	1.70	.00	48.14	500.00
*	2000.000	4694.00	1901.38	.00	1.00	.00	48.14	300.00
*	2200.000	4694.00	1901.98	.00	.60	.00	48.14	200.00
*	3724.000	4694.00	1907.00	.00	5.02	.00	47.90	1524.00
	3823.000	4694.00	1907.58	.00	.58	.00	42.41	99.00
	4020.000	4694.00	1907.56	.00	-.03	.00	41.50	197.00
*	4060.000	4694.00	1907.48	.00	-.08	.00	40.99	40.00
*	4115.000	5868.00	1907.61	.00	.13	.00	39.57	55.00
*	4188.000	5868.00	1911.79	.00	4.19	.00	52.86	73.00
*	4189.000	5868.00	1911.37	.00	-.42	.00	52.83	1.00
	4246.000	5868.00	1911.47	.00	.10	.00	52.83	57.00
*	4247.000	6339.00	1912.28	.00	.81	.00	52.87	1.00
*	4360.000	6339.00	1911.97	.00	-.31	.00	57.00	113.00
*	4831.000	6339.00	1915.90	.00	3.93	.00	57.00	471.00
*	4920.000	6339.00	1916.59	.00	.69	.00	57.00	89.00
*	5005.000	6339.00	1917.29	.00	.70	.00	57.00	85.00

*	5105.000	6339.00	1918.23	.00	.93	.00	35.01	100.00
	5200.000	6339.00	1920.56	.00	2.33	.00	38.21	95.00
	5500.000	6339.00	1921.85	.00	1.28	.00	48.21	300.00
	5852.000	6339.00	1922.33	.00	.48	.00	60.01	352.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 544.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 544.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 544.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 700.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1200.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1200.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 1700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1700.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1700.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 2000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2000.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2000.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

```
 CAUTION SECNO=   2200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2200.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   2200.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   3724.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3724.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   3724.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4060.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4060.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4115.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4115.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   4188.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   4189.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   4247.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4360.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4360.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4360.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4831.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4831.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4831.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4920.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
1
    11APR98       12:37:38                                                                    PAGE   19


 CAUTION SECNO=   4920.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4920.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5005.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5005.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5005.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5105.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5105.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5105.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

Paper Copy G
Interstate 15 to Craig Road supercritical

10- through 500-year flood event

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES         *
 *                                       *
 *  Version   4.6.2;  May 1991           *
 *                                       *
 *  RUN DATE    15APR98    TIME   14:11:38  *
 *****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX     XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

1

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THIS RUN EXECUTED 15APR98 14:11:38

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************
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```
THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC
T1      FEMA 10-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      LNLV WASH W/O DIVERSION

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2                    1     .0033                                  1888.9

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      0                   -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150


QT       4       1281       2183       2833       6339

NC     .03        .03       .014         .3         .1
    CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)



X1     5852          4       1000    1060.01        352        352        352
GR   1924.1       1000     1913.1    1000.01     1913.1       1060     1924.1    1060.01

X1     5500          4       1000    1048.21        300        300        300
GR   1921.8       1000     1910.8    1000.01     1910.8     1048.2     1921.8    1048.21
```

1

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X1     5200          4       1000    1038.21         95         95         95
GR   1919.8       1000     1908.8    1000.01     1908.8     1038.2     1919.8    1038.21

X1     5105          4       1000    1035.01        100        100        100
GR   1919.2       1000     1908.2    1000.01     1908.2       1035     1919.2    1035.01

    ADDED TRAPEZOIDAL SECTION

X1     5005          4       1000       1057         85         85         85
GR   1916.7       1000     1906.2       1021     1906.2       1036     1916.7      1057

X1     4920          4       1000       1057         89         89         89
GR     1916       1000     1905.5       1021     1905.5       1036       1916      1057
```

```
X1     4831         4       1000       1057        471        471        471
GR   1915.3      1000     1904.8       1021     1904.8       1036     1915.3       1057


NC       .03        .03        .014         .3          .1
  Left overbank topo from RR through Lone Mtn. should be extended/refined
   when additional mapping available:
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1     4360         4       1000       1057         113        113        113
GR   1911.4      1000     1900.9       1021     1900.9       1036     1911.4       1057


QT        4       1281       2183       2833       5868

NC     .012       .012       .014         .5          .3

X1     4247         10          0       52.9           1          1          1
GR     1915          0     1899.9        0.1     1899.9       12.3     1899.9       13.5     1899.9       25.8
GR   1899.9         27     1899.9       39.3     1899.9       40.5     1899.9       52.8     1914.8       52.9

X1     4246         16          0       52.9          57         57         57
X3       10
BT      -20          0       1915       1915          .1       1915     1910.2       12.3     1914.9     1910.2
BT             12.3       1914.9     1899.9       13.5     1914.9     1899.9       13.5     1914.9     1910.2
BT             25.8       1914.9     1910.2       25.8     1914.9     1899.9         27     1914.9     1899.9
BT               27       1914.8     1910.2       39.3     1914.8     1910.2       39.3     1914.8     1899.9
BT             40.5       1914.8     1899.9       40.5     1914.8     1910.2       52.8     1914.8     1910.2
BT             52.9       1914.8     1914.8         55       1912       1912        115     1910.9     1910.9
BT              230         1912       1912        650     1913.1     1913.1
GR     1915          0     1899.9        0.1     1899.9       12.3     1899.9       13.5     1899.9       25.8
GR   1899.9         27     1899.9       39.3     1899.9       40.5     1899.9       52.8     1914.8       52.9
GR     1912         55     1910.9        115       1912        230     1913.1        650     1913.1        675
GR     1916       1090

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL
1
   15APR98      14:11:38                                                                                    PAGE    3


  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125

X1     4189         17          0       52.9           1          1          1
X3       10
BT      -21          0     1914.8     1914.8          .1     1914.8     1909.7       12.3     1914.7     1909.7
BT             12.3       1914.7     1899.4       13.5     1914.7     1899.4       13.5     1914.7     1909.7
BT             25.8       1914.7     1909.7       25.8     1914.7     1899.4         27     1914.7     1899.4
BT               27       1914.6     1909.7       39.3     1914.6     1909.7       39.3     1914.6     1899.4
BT             40.5       1914.6     1899.4       40.5     1914.6     1909.7       52.8     1914.6     1909.7
BT             52.9       1914.6     1914.6         65       1912       1912         85       1912       1912
BT              140       1909.8     1909.8        300       1912       1912        685     1912.8     1912.8
GR   1914.8          0     1899.4        0.1     1899.4       12.3     1899.4       13.5     1899.4       25.8
GR   1899.4         27     1899.4       39.3     1899.4       40.5     1899.4       52.8     1914.6       52.9
GR     1912         65       1912         85     1909.8        140       1912        300     1912.8        685
GR   1912.8        710       1916       1125

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)

X1     4188         17          0       52.9          73         73         73
GR     1915          0     1899.4        0.1     1899.4       12.3     1899.4       13.5     1899.4       25.8
GR   1899.4         27     1899.4       39.3     1899.4       40.5     1899.4       52.8     1914.8       52.9
GR     1912         65       1912         85     1909.8        140       1912        300     1912.8        685
GR   1912.8        710       1916       1125


NC     .035       .035       .014         .5          .3

QT        4       1025       1746       2266       4694
   CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115         29       1604     1643.6         55         55         55
X3       10
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907    1595.27     1909.3       1604     1898.8     1604.1
GR   1898.8     1643.5     1909.3     1643.6     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900

NH        3       .035        840       .014    1657.51       .035       2900

   CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020
X1     4060         29       1604     1647.8         40         40         40
X3       10          0          0          0          0          0          0          0          0
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907    1595.27     1909.3       1604    1898.76     1604.1
GR   1898.7       1632     1909.3     1647.8     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900

1
   15APR98      14:11:38                                                                                    PAGE    4


NC       .03        .03        .014         .3          .1

  'N'-CHANNEL DIVERSION
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```
     SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY
X1     4020       28    1603.14    1646.95       197       197       197
X3       10        0          0          0         0         0         0         0         0         0
GR   1908.2      840       1908        900      1908       980      1904      1170    1907.2    1528.6
GR   1907.5   1550.5     1907.5     1570.6      1907   1595.27    1909.2   1603.14    1898.6    1603.2
GR   1898.6   1631.2     1909.1     1646.95     1909   1686.54    1912.3   1705.34      1913   1719.59
GR     1913  1740.66     1911.7     1747.43    1911.7   1757.13    1907.1   1771.7       1907   1781.99
GR   1910.6  1793.57     1910.7     1799.62    1910.3   1803.01    1910.1   1820.73      1912      2200
GR   1912.4     2480     1912.4        2510      1916      2900
  Duplicate 22+20 (beginning of transition):

X1     3823        4       1000     1043.8        99        99        99
GR   1908.5     1000       1898    1000.01      1898      1028    1908.5    1043.8

NH        3      .035     1296.8       .014    1346.5      .035      1460
X1     3724       13     1296.8     1346.5      1524      1524      1524
X3       10
GR   1904.6      700     1904.6        745      1904       755      1904       785      1908      1190
GR     1908     1222     1907.6     1296.8    1897.6   1311.8    1897.6    1331.5    1907.6    1346.5
GR     1908     1430       1912       1450    1912.3      1460

NC     .014     .014      .014
X1     2200        4       1000       1050       200       200       200
GR   1902.6     1000     1892.6       1015    1892.6      1035    1902.6      1050

NC     0.030    0.030     0.014        0.3       0.1

X1     2000        4       1000       1050       300       300       300
GR     1902     1000       1892       1015      1892      1035      1902      1050

X1     1700        4       1000       1050       500       500       500
GR     1901     1000       1891       1015      1891      1035      1901      1050

X1     1200        4       1000       1050       500       500       500
GR   1899.3     1000     1889.3       1015    1889.3      1035    1899.3      1050

X1      700        4       1000       1050       100       100       100
GR   1897.7     1000     1887.7       1015    1887.7      1035    1897.7      1050

1
    15APR98      14:11:38                                                                    PAGE     5

X1      600        4       1000       1050        56        56        56
GR   1897.4     1000     1887.4       1015    1887.4      1035    1897.7      1050

    Begin Transition XS 5+50 from As-Built Plans

X1      544        4       1000       1050        94        94        94
GR   1897.2     1000     1887.2       1015    1887.2      1035    1897.2      1050

  Duplicate 1+50 to 4+50 (beginning of transition):

X1      450        8       1000       1036     205.4     205.4     205.4                 1.0
X3       10
GR     1900      900       1897        910      1896      1000      1886      1001      1886      1035
GR     1896     1036       1896       1060      1908      1120

X1    244.6        8       1000    1035.01         1         1         1
GR   1896.2     1000     1886.2    1000.01    1886.2    1017.1    1886.2   1017.11    1886.2    1017.9
GR   1886.2  1017.91     1886.2       1035    1896.2   1035.01

X1    243.6        8       1000    1035.01      93.6      93.6      93.6
GR   1896.2     1000     1886.2    1000.01    1886.2    1017.1    1896.2   1017.11    1896.2    1017.9
GR   1886.2  1017.91     1886.2       1035    1896.2   1035.01

  Add xsec 1+50 from as-built plans (rectangular):

X1      150       12       1000     1035.1
X3       10
GR     1900      900       1897        910      1896      1000      1886   1000.01      1886    1017.1
GR     1896  1017.11       1896     1017.9      1886   1017.91      1886      1035      1896    1035.1
GR     1896     1060       1908       1120

1
    15APR98      14:11:38                                                                    PAGE     6

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 1

 CCHV=     .300 CEHV=     .100
 *SECNO 5852.000
   5852.000      2.18   1915.28   1915.51   1888.90   1916.77      1.49       .00       .00   1924.10
```

1281.0	.0	1281.0	.0	.0	130.9	.0	.0	.0	1924.10
.00	.00	9.79	.00	.000	.014	.000	.000	1913.10	1000.01
.003298	0.	0.	0.	0	47	5	.00	59.99	1060.00

*SECNO 5500.000

3301 HV CHANGED MORE THAN HVINS

5500.000	2.26	1913.06	1913.59	.00	1915.20	2.14	1.37	.20	1921.80
1281.0	.0	1281.0	.0	.0	109.1	.0	1.0	.4	1921.80
.01	.00	11.75	.00	.000	.014	.000	.000	1910.80	1000.01
.004646	352.	352.	352.	6	11	0	.00	48.19	1048.20

*SECNO 5200.000

5200.000	2.77	1911.57	1912.07	.00	1913.86	2.29	1.30	.04	1919.80
1281.0	.0	1281.0	.0	.0	105.4	.0	1.7	.7	1919.80
.02	.00	12.15	.00	.000	.014	.000	.000	1908.80	1000.01
.004051	300.	300.	300.	6	11	0	.00	38.20	1038.20

*SECNO 5105.000

5105.000	3.03	1911.23	1911.65	.00	1913.49	2.26	.36	.00	1919.20
1281.0	.0	1281.0	.0	.0	106.1	.0	1.9	.8	1919.20
.02	.00	12.07	.00	.000	.014	.000	.000	1908.20	1000.01
.003645	95.	95.	95.	8	11	0	.00	35.00	1035.00

*SECNO 5005.000

5005.000	4.21	1910.41	1911.06	.00	1913.02	2.62	.36	.11	1916.70
1281.0	.0	1281.0	.0	.0	98.7	.0	2.2	.9	1916.70
.02	.00	12.98	.00	.000	.014	.000	.000	1906.20	1012.58
.003590	100.	100.	100.	7	14	0	.00	31.85	1044.42

*SECNO 4920.000

4920.000	3.97	1909.47	1910.37	.00	1912.54	3.08	.34	.14	1916.00
1281.0	.0	1281.0	.0	.0	91.0	.0	2.4	1.0	1916.00
.02	.00	14.08	.00	.000	.014	.000	.000	1905.50	1013.07
.004504	85.	85.	85.	7	8	0	.00	30.87	1043.93

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4831.000

4831.000	3.82	1908.62	1909.66	.00	1912.02	3.40	.43	.10	1915.30
1281.0	.0	1281.0	.0	.0	86.5	.0	2.5	1.0	1915.30
.02	.00	14.80	.00	.000	.014	.000	.000	1904.80	1013.36
.005179	89.	89.	89.	6	11	0	.00	30.29	1043.64

CCHV= .300 CEHV= .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

4360.000	3.46	1904.36	1905.76	.00	1908.79	4.44	2.91	.31	1911.40
1281.0	.0	1281.0	.0	.0	75.8	.0	3.4	1.3	1911.40
.03	.00	16.90	.00	.000	.014	.000	.000	1900.90	1014.08
.007520	471.	471.	471.	6	11	0	.00	28.83	1042.92

CCHV= .500 CEHV= .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.81

4247.000	1.28	1901.18	1902.53	.00	1906.80	5.61	1.41	.59	1915.00
1281.0	.0	1281.0	.0	.0	67.4	.0	3.6	1.4	1914.80
.03	.00	19.01	.00	.000	.014	.000	.000	1899.90	.09
.024620	113.	113.	113.	4	15	0	.00	52.72	52.81

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	1.40	1901.30	1902.65	.00	1906.71	5.42	.03	.06	1915.00
1281.0	.0	1281.0	.0	.0	68.6	.0	3.6	1.4	1914.80
.03	.00	18.68	.00	.000	.014	.000	.000	1899.90	.09
.026055	1.	1.	1.	7	22	0	-5.03	52.72	52.81

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 21 MIN ELTRD= 1909.80 MAX ELLC= 1914.80

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	1.61	1901.01	1902.15	.00	1905.13	4.13	1.19	.39	1914.80
1281.0	.0	1281.0	.0	.0	78.6	.0	3.7	1.5	1914.60
.03	.00	16.30	.00	.000	.014	.000	.000	1899.40	.09
.017167	57.	57.	57.	7	22	0	-5.76	52.72	52.81

*SECNO 4188.000

4188.000	1.48	1900.88	1902.03	.00	1905.08	4.20	.02	.04	1915.00
1281.0	.0	1281.0	.0	.0	77.9	.0	3.7	1.5	1914.80
.03	.00	16.45	.00	.000	.014	.000	.000	1899.40	.09
.015346	1.	1.	1.	9	14	0	.00	52.72	52.81

CCHV= .500 CEHV= .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4115.000	1.78	1900.58	1901.55	.00	1903.91	3.33	.91	.26	1909.30
1025.0	.0	1025.0	.0	.0	70.0	.0	3.8	1.6	1909.30
.03	.00	14.64	.00	.000	.014	.000	.000	1898.80	1604.08
.009919	73.	73.	73.	7	14	0	.00	39.43	1643.52

1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4060.000	3.39	1902.09	1902.09	.00	1903.65	1.56	.23	2.71	1909.30
1025.0	.0	1025.0	.0	.0	102.3	.0	3.9	1.6	1909.30
.04	.00	10.02	.00	.000	.014	.000	.000	1898.70	1604.07
.002321	55.	55.	55.	20	14	0	.00	32.98	1637.05

CCHV= .300 CEHV= .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.20 ELREA= 1909.10

4020.000	3.24	1901.84	1901.94	.00	1903.51	1.68	.10	.03	1909.20
1025.0	.0	1025.0	.0	.0	98.7	.0	4.0	1.7	1909.10
.04	.00	10.38	.00	.000	.014	.000	.000	1898.60	1603.18
.002597	40.	40.	40.	2	5	0	.00	32.88	1636.06

*SECNO 3823.000

3823.000	3.14	1901.14	1901.35	.00	1902.94	1.80	.54	.04	1908.50
1025.0	.0	1025.0	.0	.0	95.2	.0	4.5	1.8	1908.50
.04	.00	10.77	.00	.000	.014	.000	.000	1898.00	1000.01
.002899	197.	197.	197.	5	8	0	.00	32.71	1032.72

1490 NH CARD USED
*SECNO 3724.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1907.60 ELREA= 1907.60

3724.000	3.93	1901.53	1901.53	.00	1903.14	1.62	.25	.35	1907.60
1025.0	.0	1025.0	.0	.0	100.5	.0	4.7	1.9	1907.60
.05	.00	10.20	.00	.000	.014	.000	.000	1897.60	1305.91
.002167	99.	99.	99.	20	11	0	.00	31.48	1337.39

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

2200.000	3.22	1895.82	1896.49	.00	1898.37	2.55	4.49	.28	1902.60
1025.0	.0	1025.0	.0	.0	79.9	.0	7.8	3.0	1902.60
.08	.00	12.82	.00	.000	.014	.000	.000	1892.60	1010.17
.004235	1524.	1524.	1524.	5	5	0	.00	29.66	1039.83

CCHV= .300 CEHV= .100

*SECNO 2000.000

2000.000	3.48	1895.48	1895.90	.00	1897.59	2.11	.73	.04	1902.00
1025.0	.0	1025.0	.0	.0	87.9	.0	8.2	3.1	1902.00
.08	.00	11.66	.00	.000	.014	.000	.000	1892.00	1009.77
.003207	200.	200.	200.	5	11	0	.00	30.46	1040.23

*SECNO 1700.000

1700.000	3.46	1894.46	1894.90	.00	1896.61	2.15	.97	.01	1901.00
1025.0	.0	1025.0	.0	.0	87.2	.0	8.8	3.3	1901.00
.09	.00	11.76	.00	.000	.014	.000	.000	1891.00	1009.81
.003291	300.	300.	300.	7	8	0	.00	30.38	1040.19

*SECNO 1200.000

1200.000	3.43	1892.73	1893.20	.00	1894.92	2.19	1.67	.01	1899.30
1025.0	.0	1025.0	.0	.0	86.3	.0	9.8	3.7	1899.30
.10	.00	11.88	.00	.000	.014	.000	.000	1889.30	1009.85
.003391	500.	500.	500.	6	8	0	.00	30.29	1040.15

*SECNO 700.000

700.000	3.53	1891.23	1891.61	.00	1893.29	2.06	1.62	.01	1897.70
1025.0	.0	1025.0	.0	.0	88.9	.0	10.8	4.0	1897.70
.11	.00	11.53	.00	.000	.014	.000	.000	1887.70	1009.72
.003104	500.	500.	500.	4	8	0	.00	30.55	1040.28

*SECNO 600.000

600.000	3.54	1890.94	1891.31	.00	1892.98	2.04	.31	.00	1897.40
1025.0	.0	1025.0	.0	.0	89.4	.0	11.0	4.1	1897.70
.12	.00	11.47	.00	.000	.014	.000	.000	1887.40	1009.69
.003048	100.	100.	100.	8	8	0	.00	30.47	1040.16

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 544.000

544.000	3.48	1890.68	1891.10	.00	1892.79	2.11	.17	.02	1897.20
1025.0	.0	1025.0	.0	.0	88.0	.0	11.2	4.1	1897.20
.12	.00	11.65	.00	.000	.014	.000	.000	1887.20	1009.77
.003201	56.	56.	56.	7	8	0	.00	30.46	1040.23

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	2.18	1889.18	1890.03	.00	1892.11	2.94	.43	.25	1897.00
1025.0	.0	1025.0	.0	.0	74.6	.0	11.3	4.2	1897.00
.12	.00	13.75	.00	.000	.014	.000	.000	1887.00	1000.78
.006923	94.	94.	94.	5	11	0	.00	34.44	1035.22

*SECNO 244.600

3301 HV CHANGED MORE THAN HVINS

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   244.600      2.44   1888.64   1889.18       .00   1890.89      2.25      1.16       .07   1896.20
    1025.0        .0    1025.0        .0        .0      85.2        .0      11.7       4.3   1896.20
       .12       .00     12.03       .00      .000      .014      .000      .000   1886.20   1000.01
   .004668       205.      205.      205.         6        11         0       .00     34.99   1035.00


*SECNO 243.600

3265 DIVIDED FLOW

   243.600      2.59   1888.79   1889.22       .00   1890.86      2.07       .00       .02   1896.20
    1025.0        .0    1025.0        .0        .0      88.8        .0      11.7       4.3   1896.20
       .12       .00     11.54       .00      .000      .014      .000      .000   1886.20   1000.01
   .004719         1.        1.        1.         4        11         0       .00     34.19   1035.00


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 150.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

   150.000      3.03   1889.03   1889.03       .00   1890.55      1.52       .34       .16   1896.00
    1025.0        .0    1025.0        .0        .0      103.7        .0      11.9       4.4   1896.00
       .13       .00      9.88       .00      .000      .014      .000      .000   1886.00   1000.01
   .002958         94.       94.       94.        20         8         0       .00     34.22   1035.03


T1       FEMA 50-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       LMLVW WASH WITH DIVERSION

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

         0          3                     1      .0033                                       1890.1

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*PROF 2

CCHV=      .300 CEHV=      .100
*SECNO 5852.000
  5852.000      3.05   1916.15   1916.54   1890.10   1918.36      2.22       .00       .00   1924.10
    2183.0        .0    2183.0        .0        .0      182.7        .0        .0        .0   1924.10
       .00       .00     11.95       .00      .000      .014      .000      .000   1913.10   1000.01
   .001264         0.        0.        0.         0        14         3       .00     60.00   1060.00


*SECNO 5500.000

3301 HV CHANGED MORE THAN HVINS

  5500.000      3.39   1914.19   1914.78       .00   1916.97      2.78      1.23       .17   1921.80
    2183.0        .0    2183.0        .0        .0      163.1        .0       1.4        .4   1921.80
       .01       .00     13.38       .00      .000      .014      .000      .000   1910.80   1000.01
   .003727         352.      352.      352.         6        11         0       .00     48.20   1048.20


*SECNO 5200.000
  5200.000      4.18   1912.98   1913.45       .00   1915.89      2.91      1.04       .04   1919.80
    2183.0        .0    2183.0        .0        .0      159.4        .0       2.5        .7   1919.80
       .01       .00     13.69       .00      .000      .014      .000      .000   1908.80   1000.01
   .003224         300.      300.      300.         6        11         0       .00     38.20   1038.20


*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000      4.95   1913.15   1913.15       .00   1915.62      2.47       .26       .04   1919.20
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2183.0	.0	2183.0	.0	.0	173.1	.0	2.9	.8	1919.20
.02	.00	12.61	.00	.000	.014	.000	.000	1908.20	1000.01
.002336	95.	95.	95.	20	8	0	.00	35.00	1035.00

*SECNO 5005.000

3301 HV CHANGED MORE THAN HVINS

5005.000	5.75	1911.95	1912.69	.00	1915.13	3.18	.27	.21	1916.70
2183.0	.0	2183.0	.0	.0	152.5	.0	3.2	.9	1916.70
.02	.00	14.31	.00	.000	.014	.000	.000	1906.20	1009.49
.003127	100.	100.	100.	8	11	0	.00	38.01	1047.51

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4920.000

3301 HV CHANGED MORE THAN HVINS

4920.000	5.44	1910.94	1912.00	.00	1914.67	3.74	.30	.17	1916.00
2183.0	.0	2183.0	.0	.0	140.7	.0	3.5	1.0	1916.00
.02	.00	15.51	.00	.000	.014	.000	.000	1905.50	1010.12
.003901	85.	85.	85.	7	8	0	.00	36.75	1046.88

*SECNO 4831.000

4831.000	5.25	1910.05	1911.29	.00	1914.18	4.13	.37	.12	1915.30
2183.0	.0	2183.0	.0	.0	133.8	.0	3.8	1.0	1915.30
.02	.00	16.31	.00	.000	.014	.000	.000	1904.80	1010.50
.004483	89.	89.	89.	7	11	0	.00	35.99	1046.50

CCHV= .300 CEHV= .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

4360.000	4.72	1905.62	1907.38	.00	1911.18	5.57	2.57	.43	1911.40
2183.0	.0	2183.0	.0	.0	115.3	.0	5.2	1.4	1911.40
.03	.00	18.94	.00	.000	.014	.000	.000	1900.90	1011.56
.006767	471.	471.	471.	5	11	0	.00	33.87	1045.44

CCHV= .500 CEHV= .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

4247.000	1.92	1901.82	1903.65	.00	1909.11	7.30	1.21	.86	1915.00
2183.0	.0	2183.0	.0	.0	100.7	.0	5.4	1.5	1914.80
.03	.00	21.68	.00	.000	.014	.000	.000	1899.90	.09
.019306	113.	113.	113.	8	15	0	.00	52.73	52.81

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	2.09	1901.99	1903.84	.00	1909.01	7.02	.02	.08	1915.00
2183.0	.0	2183.0	.0	.0	102.7	.0	5.4	1.5	1914.80
.03	.00	21.26	.00	.000	.014	.000	.000	1899.90	.09
.022182	1.	1.	1.	7	15	0	-7.53	52.73	52.81

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 21 MIN ELTRD= 1909.80 MAX ELLC= 1914.80

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	2.28	1901.68	1903.34	.00	1907.56	5.88	1.10	.34	1914.80
2183.0	.0	2183.0	.0	.0	112.2	.0	5.6	1.6	1914.60
.03	.00	19.46	.00	.000	.014	.000	.000	1899.40	.09
.017036	57.	57.	57.	11	15	0	-8.22	52.73	52.82

*SECNO 4188.000

4188.000	2.11	1901.51	1903.15	.00	1907.50	5.99	.02	.05	1915.00
2183.0	.0	2183.0	.0	.0	111.2	.0	5.6	1.6	1914.80
.03	.00	19.64	.00	.000	.014	.000	.000	1899.40	.09
.014016	1.	1.	1.	9	14	0	.00	52.73	52.81

CCHV= .500 CEHV= .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4115.000	2.45	1901.25	1902.73	.00	1906.34	5.09	.89	.27	1909.30
1746.0	.0	1746.0	.0	.0	96.4	.0	5.8	1.7	1909.30
.03	.00	18.11	.00	.000	.014	.000	.000	1898.80	1604.08
.010313	73.	73.	73.	11	14	0	.00	39.45	1643.52

1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4060.000	4.33	1903.03	1903.46	.00	1905.66	2.63	.28	.80	1909.30
1746.0	.0	1746.0	.0	.0	134.1	.0	5.9	1.7	1909.30
.03	.00	13.02	.00	.000	.014	.000	.000	1898.70	1604.06
.002996	55.	55.	55.	20	14	0	.00	34.40	1638.46

CCHV= .300 CEHV= .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.20 ELREA= 1909.10

4020.000	4.27	1902.87	1903.31	.00	1905.53	2.66	.12	.01	1909.20
1746.0	.0	1746.0	.0	.0	133.3	.0	6.0	1.8	1909.10
.03	.00	13.10	.00	.000	.014	.000	.000	1898.60	1603.18
.003055	40.	40.	40.	12	8	0	.00	34.43	1637.61

*SECNO 3823.000

3823.000	4.30	1902.30	1902.72	.00	1904.93	2.64	.60	.00	1908.50
1746.0	.0	1746.0	.0	.0	134.0	.0	6.6	1.9	1908.50
.04	.00	13.03	.00	.000	.014	.000	.000	1898.00	1000.01
.003011	197.	197.	197.	7	8	0	.00	34.45	1034.46

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1490 NH CARD USED
*SECNO 3724.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1907.60 ELREA= 1907.60

3724.000	5.39	1902.99	1902.99	.00	1905.10	2.11	.24	.33	1907.60
1746.0	.0	1746.0	.0	.0	149.6	.0	7.0	2.0	1907.60
.04	.00	11.67	.00	.000	.014	.000	.000	1897.60	1303.72
.002021	99.	99.	99.	20	11	0	.00	35.86	1339.58

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCR CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

2200.000	4.40	1897.00	1897.95	.00	1900.45	3.46	4.25	.40	1902.60
1746.0	.0	1746.0	.0	.0	117.0	.0	11.6	3.2	1902.60
.07	.00	14.92	.00	.000	.014	.000	.000	1892.60	1008.40
.004083	1524.	1524.	1524.	5	5	0	.00	33.20	1041.60

CCHV= .300 CEHV= .100

*SECNO 2000.000

2000.000	4.64	1896.64	1897.35	.00	1899.67	3.03	.74	.04	1902.00
1746.0	.0	1746.0	.0	.0	125.0	.0	12.2	3.4	1902.00
.07	.00	13.96	.00	.000	.014	.000	.000	1892.00	1008.04
.003378	200.	200.	200.	7	11	0	.00	33.92	1041.96

*SECNO 1700.000

1700.000	4.65	1895.65	1896.37	.00	1898.66	3.01	1.01	.00	1901.00
1746.0	.0	1746.0	.0	.0	125.4	.0	13.0	3.6	1901.00
.08	.00	13.92	.00	.000	.014	.000	.000	1891.00	1008.02
.003348	300.	300.	300.	8	8	0	.00	33.95	1041.98

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1200.000

1200.000	4.64	1893.94	1894.67	.00	1896.97	3.03	1.68	.01	1899.30
1746.0	.0	1746.0	.0	.0	125.0	.0	14.5	4.0	1899.30
.09	.00	13.97	.00	.000	.014	.000	.000	1889.30	1008.05
.003384	500.	500.	500.	7	8	0	.00	33.91	1041.95

*SECNO 700.000

700.000	4.70	1892.40	1893.07	.00	1895.31	2.91	1.64	.01	1897.70
1746.0	.0	1746.0	.0	.0	127.6	.0	15.9	4.4	1897.70
.10	.00	13.69	.00	.000	.014	.000	.000	1887.70	1007.93
.003192	500.	500.	500.	5	8	0	.00	34.14	1042.07

*SECNO 600.000

600.000	4.78	1892.18	1892.77	.00	1894.99	2.81	.31	.01	1897.40
1746.0	.0	1746.0	.0	.0	129.8	.0	16.2	4.5	1897.70
.10	.00	13.45	.00	.000	.014	.000	.000	1887.40	1007.81
.003024	100.	100.	100.	8	8	0	.00	34.17	1041.98

*SECNO 544.000

544.000	4.73	1891.93	1892.56	.00	1894.80	2.87	.17	.02	1897.20
1746.0	.0	1746.0	.0	.0	128.4	.0	16.4	4.5	1897.20
.10	.00	13.60	.00	.000	.014	.000	.000	1887.20	1007.89
.003133	56.	56.	56.	8	8	0	.00	34.21	1042.11

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	3.21	1890.21	1891.31	.00	1894.10	3.89	.39	.31	1897.00
1746.0	.0	1746.0	.0	.0	110.3	.0	16.6	4.6	1897.00
.10	.00	15.83	.00	.000	.014	.000	.000	1887.00	1000.68
.005840	94.	94.	94.	5	11	0	.00	34.64	1035.32

*SECNO 244.600

244.600	3.37	1889.57	1890.45	.00	1892.96	3.39	1.09	.05	1896.20
1746.0	.0	1746.0	.0	.0	118.1	.0	17.2	4.7	1896.20
.11	.00	14.78	.00	.000	.014	.000	.000	1886.20	1000.01
.004843	205.	205.	205.	6	11	0	.00	35.00	1035.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 243.600

3265 DIVIDED FLOW

243.600	3.58	1889.78	1890.51	.00	1892.93	3.15	.01	.02	1896.20

1746.0	.0	1746.0	.0	.0	122.5	.0	17.2	4.7	1896.20
.11	.00	14.25	.00	.000	.014	.000	.000	1886.20	1000.01
.005243	1.	1.	1.	4	11	0	.00	34.19	1035.00

*SECNO 150.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

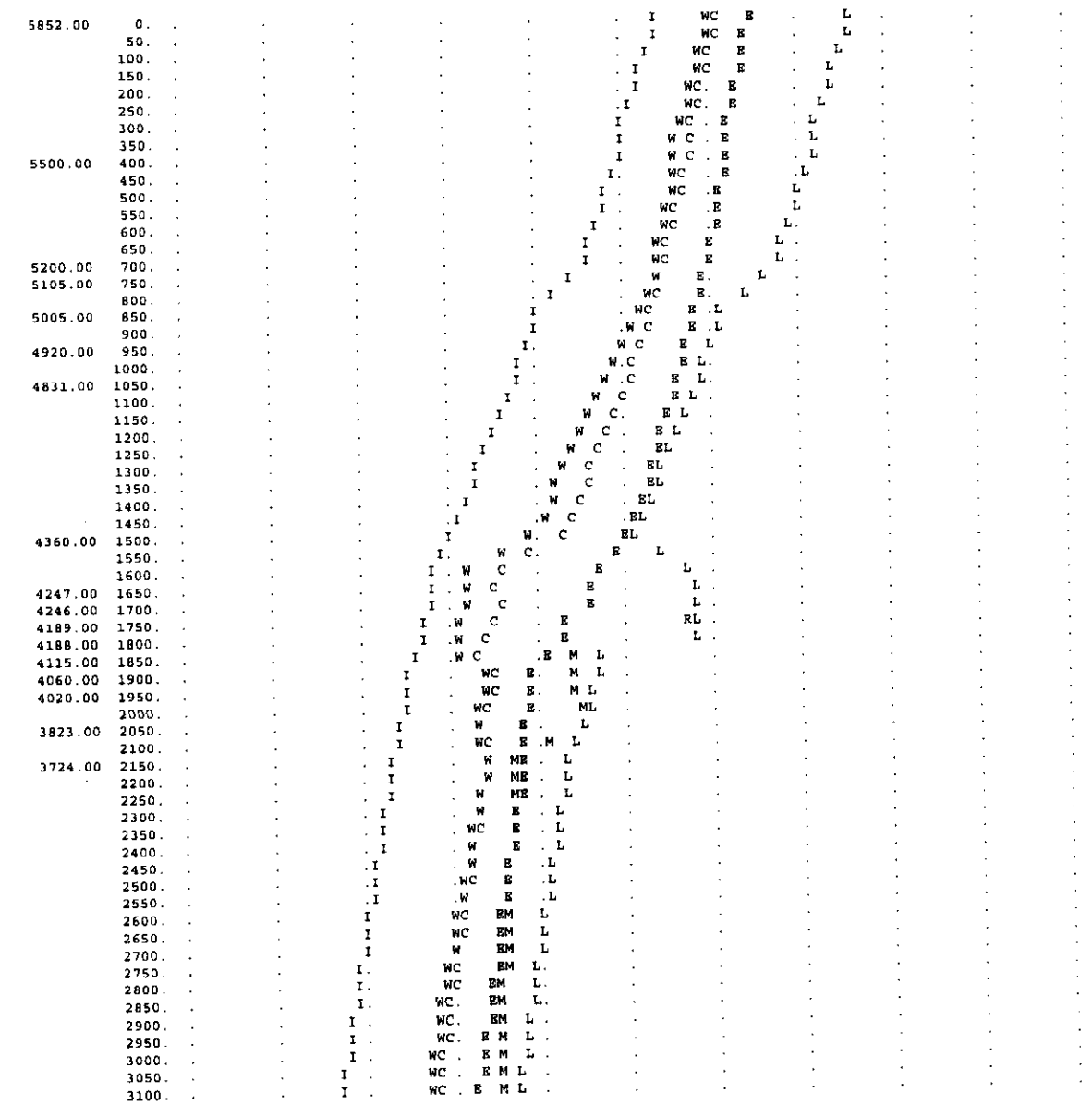
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1896.00 ELREA= 1896.00

150.000	4.31	1890.31	1890.31	.00	1892.49	2.18	.37	.12	1896.00
1746.0	.0	1746.0	.0	.0	147.4	.0	17.5	4.8	1896.00
.11	.00	11.84	.00	.000	.014	.000	.000	1886.00	1000.01
.003057	94.	94.	94.	20	11	0	.00	34.24	1035.04

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PROFILE FOR STREAM LNLVW WASH WITH DIVERSIO

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA



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          3150.  .          .       I  .       WC   . E  M L  .          .          .          .          .          .          .
          3200.  .          .      I   .       WC   . E  M L  .          .          .          .          .          .          .
          3250.  .          .      I   .      W C   .E  M L  .          .          .          .          .          .          .
          3300.  .          .      I   .      WC    .E  M L  .          .          .          .          .          .          .
          3350.  .          .     I    .      WC    .E  ML   .          .          .          .          .          .          .
          3400.  .          .     I    .     W C    .E  ML   .          .          .          .          .          .          .
          3450.  .          .     I    .     WC     E   ML   .          .          .          .          .          .          .
          3500.  .          .    I     .    W C     E   L    .          .          .          .          .          .          .
          3550.  .          .    I     .    W C     E   L    .          .          .          .          .          .          .
          3600.  .          .    I     .    WC      E.  ML   .          .          .          .          .          .          .
          3650.  .          .   I      .   W C     E.   L    .          .          .          .          .          .          .
2200.00   3700.  .          .   I      .   W C     E.   L    .          .          .          .          .          .          .
          3750.  .          .   I      .   W C     E.   L    .          .          .          .          .          .          .
          3800.  .          .   I      .  WC      E  .   L    .          .          .          .          .          .          .
          3850.  .          .  I       .  W C     E  .   L    .          .          .          .          .          .          .
2000.00   3900.  .          .  I       .  W C     E  .   L    .          .          .          .          .          .          .
          3950.  .          .  I       .  WC      E  .   L    .          .          .          .          .          .          .
          4000.  .          . I        .  WC      E  .   L    .          .          .          .          .          .          .
          4050.  .          . I        .  W C     E  .   L    .          .          .          .          .          .          .
          4100.  .          . I        .  WC      E  .   L    .          .          .          .          .          .          .
          4150.  .          .I         .  WC      E  .   L    .          .          .          .          .          .          .
1700.00   4200.  .          .I         .  W.C     E  .   L    .          .          .          .          .          .          .
          4250.  .          .I         .  WC      E  .   L    .          .          .          .          .          .          .
          4300.  .          .I         .  WC      E  .   L.   .          .          .          .          .          .          .
          4350.  .          .I         .  W C     E  .   L.   .          .          .          .          .          .          .
          4400.  .          .I         .  WC.     E  .   L.   .          .          .          .          .          .          .
          4450.  .          .I         .  WC.     E  .   L .  .          .          .          .          .          .          .
          4500.  .          .I         .  W C.    E  .   L .  .          .          .          .          .          .          .
          4550.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4600.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4650.  .          .I         .  W C .   E  .   L .  .          .          .          .          .          .          .
1200.00   4700.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4750.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4800.  .          .I         .  W C .   E  .   L .  .          .          .          .          .          .          .
          4850.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4900.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          4950.  .          .I         .  W C .   E  .   L .  .          .          .          .          .          .          .
          5000.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          5050.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          5100.  .          .I         .  W C .   E  .   L .  .          .          .          .          .          .          .
          5150.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
 700.00   5200.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          5250.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
 600.00   5300.  .          .I         .  W C .   E  .   L .  .          .          .          .          .          .          .
 544.00   5350.  .          .I         .  WC .    E  .   L .  .          .          .          .          .          .          .
          5400.  .          .I         .  W C .   E  .   L .  M  .      .          .          .          .          .          .
 450.00   5450.  .          .I         .  W .C .  E  .   L .     M      .          .          .          .          .          .
          5500.  .          .I         .  W C .   E  .   L .     M .    .          .          .          .          .          .
          5550.  .          .I         .  W C .   E  .   L .  M  .      .          .          .          .          .          .
          5600.  .          .I         .  W C.    E  .   L .  M  .      .          .          .          .          .          .
 244.60   5650.  .          I          .  W C.    E  .   L .     .      .          .          .          .          .          .
 243.60   5700.  .          I          .  WC .    E  .   L .     .      .          .          .          .          .          .
 150.00   5750.  .          I          .   W.     E  .   L .     M .    .          .          .          .          .          .
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 T1       FEMA 100-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLVW WASH WITH DIVERSION

 J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                   4                     1       .0033                                      1890.9

 J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       3


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      SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
      Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
      TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
      SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  *PROF 3

  CCHV=      .300 CEHV=      .100
  *SECNO 5852.000
    5852.000       3.56    1916.66    1917.19    1890.90    1919.39       2.73        .00        .00    1924.10
      2833.0         .0     2833.0         .0         .0      213.7         .0         .0         .0    1924.10
         .00        .00      13.25        .00       .000       .014       .000       .000    1913.10    1000.01
       .003328        0.         0.         0.          0         11          4        .00      60.00    1060.00


  *SECNO 5500.000
    5500.000       4.13    1914.93    1915.54        .00    1918.08       3.16       1.18        .13    1921.80
      2833.0         .0     2833.0         .0         .0      198.7         .0        1.7         .4    1921.80
         .01        .00      14.26        .00       .000       .014       .000       .000    1910.80    1000.01
       .003370       352.       352.       352.          6         11          0        .00      48.20    1048.20


  *SECNO 5200.000
    5200.000       5.19    1913.99    1914.33        .00    1917.16       3.17        .92        .00    1919.80
      2833.0         .0     2833.0         .0         .0      198.3         .0        3.0         .7    1919.80
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      .01       .00     14.29       .00      .000      .014      .000      .000  1908.80  1000.01
   .002777      300.      300.      300.         7        11         0       .00    38.20  1038.20


*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000      5.87  1914.07  1914.07       .00  1917.02      2.95       .24       .31  1919.20
  2833.0          .0  2833.0        .0        .0    205.5        .0       3.5        .8  1919.20
      .01       .00     13.78       .00      .000      .014      .000      .000  1908.20  1000.00
   .002341       95.       95.       95.        20         8         0       .00    35.00  1035.01


*SECNO 5005.000

3301 HV CHANGED MORE THAN HVINS

  5005.000      6.47  1912.67  1913.64       .00  1916.49      3.82       .28       .26  1916.70
  2833.0          .0  2833.0        .0        .0    180.6        .0       3.9        .9  1916.70
      .02       .00     15.68       .00      .000      .014      .000      .000  1906.20  1008.07
   .003314      100.      100.      100.         8        11         0       .00    40.87  1048.93


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 4920.000

3301 HV CHANGED MORE THAN HVINS

  4920.000      6.19  1911.69  1912.97       .00  1916.02      4.34       .31       .15  1916.00
  2833.0          .0  2833.0        .0        .0    169.6        .0       4.3       1.0  1916.00
      .02       .00     16.71       .00      .000      .014      .000      .000  1905.50  1008.62
   .003939       85.       85.       85.         7         8         0       .00    39.77  1048.38


*SECNO 4831.000
  4831.000      6.01  1910.81  1912.24       .00  1915.54      4.73       .37       .12  1915.30
  2833.0          .0  2833.0        .0        .0    162.4        .0       4.6       1.1  1915.30
      .02       .00     17.45       .00      .000      .014      .000      .000  1904.80  1008.98
   .004435       89.       89.       89.         7        11         0       .00    39.04  1048.02


CCHV=      .300 CEHV=      .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

  4360.000      5.46  1906.36  1908.34       .00  1912.58      6.23      2.50       .45  1911.40
  2833.0          .0  2833.0        .0        .0    141.5        .0       6.2       1.5  1911.40
      .03       .00     20.02       .00      .000      .014      .000      .000  1900.90  1010.08
   .006474      471.      471.      471.         5        11         0       .00    36.84  1046.92


CCHV=      .500 CEHV=      .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62

  4247.000      2.34  1902.24  1904.36       .00  1910.47      8.22      1.12      1.00  1915.00
  2833.0          .0  2833.0        .0        .0    123.1        .0       6.6       1.6  1914.80
      .03       .00     23.01       .00      .000      .014      .000      .000  1899.90       .08
   .016988      113.      113.      113.        10        15         0       .00    52.73    52.82


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   15APR98      14:11:38                                                                    PAGE   23

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 4246.000

3370 NORMAL BRIDGE, NRD=  20 MIN ELTRD=  1910.90 MAX ELLC=  1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1915.00 ELREA=      1914.80

  4246.000      2.56  1902.46  1904.58       .00  1910.35      7.89       .02       .10  1915.00
  2833.0          .0  2833.0        .0        .0    125.7        .0       6.6       1.6  1914.80
      .03       .00     22.54       .00      .000      .014      .000      .000  1899.90       .08
   .020494        1.        1.        1.         7        18         0     -9.21    52.73    52.82
```

```
*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  21 MIN ELTRD=  1909.80 MAX ELLC=  1914.80


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000      2.74   1902.14   1904.08       .00   1908.98      6.85      1.05       .31   1914.80
    2833.0        .0    2833.0        .0        .0    134.9        .0       6.8       1.7   1914.60
       .03       .00     21.00       .00       .00     .014      .000      .000   1899.40       .08
   .016650       57.       57.       57.         8       18         0     -9.89     52.74     52.82


*SECNO 4188.000
  4188.000      2.54   1901.94   1903.86       .00   1908.91      6.97       .01       .06   1915.00
    2833.0        .0    2833.0        .0        .0    133.7        .0       6.8       1.7   1914.80
       .03       .00     21.19       .00       .00     .014      .000      .000   1899.40       .08
   .013015         1.        1.        1.         9       14         0       .00     52.73     52.82


CCHV=      .500 CEHV=      .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

1                                                                                          PAGE   24
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      2.90   1901.70   1903.47       .00   1907.80      6.10       .85       .26   1909.30
    2266.0        .0    2266.0        .0        .0    114.3        .0       7.0       1.7   1909.30
       .03       .00     19.82       .00       .00     .014      .000      .000   1898.80   1604.07
   .010121       73.       73.       73.         8       14         0       .00     39.46   1643.53


1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4060.000      5.08   1903.78   1904.31       .00   1906.88      3.10       .28      1.00   1909.30
    2266.0        .0    2266.0        .0        .0    160.3        .0       7.1       1.8   1909.30
       .03       .00     14.14       .00       .00     .014      .000      .000   1898.70   1604.05
   .002979       55.       55.       55.        20       14         0       .00     35.52   1639.57


CCHV=      .300 CEHV=      .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      5.03   1903.63   1904.16       .00   1906.76      3.12       .12       .01   1909.20
    2266.0        .0    2266.0        .0        .0    159.7        .0       7.3       1.8   1909.10
       .03       .00     14.19       .00       .00     .014      .000      .000   1898.60   1603.17
   .003017       40.       40.       40.         9        8         0       .00     35.57   1638.74


*SECNO 3823.000
  3823.000      5.03   1903.03   1903.57       .00   1906.16      3.13       .60       .00   1908.50
    2266.0        .0    2266.0        .0        .0    159.6        .0       8.0       2.0   1908.50
       .03       .00     14.20       .00       .00     .014      .000      .000   1898.00   1000.01
   .003027      197.      197.      197.         9        8         0       .00     35.55   1035.56


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


1490 NH CARD USED
*SECNO 3724.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
```

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1907.60 ELREA= 1907.60

3724.000	6.26	1903.86	1903.86	.00	1906.26	2.40	.24	.29	1907.60
2266.0	.0	2266.0	.0	.0	182.2	.0	8.4	2.1	1907.60
.04	.00	12.44	.00	.000	.014	.000	.000	1897.60	1302.41
.001957	99.	99.	99.	20	11	0	.00	38.49	1340.89

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

2200.000	5.12	1897.72	1898.82	.00	1901.68	3.96	4.12	.47	1902.60
2266.0	.0	2266.0	.0	.0	141.9	.0	14.1	3.4	1902.60
.06	.00	15.97	.00	.000	.014	.000	.000	1892.60	1007.31
.003971	1524.	1524.	1524.	5	5	0	.00	35.38	1042.69

CCHV= .300 CEHV= .100

*SECNO 2000.000

2000.000	5.35	1897.35	1898.22	.00	1900.90	3.55	.73	.04	1902.00
2266.0	.0	2266.0	.0	.0	149.9	.0	14.7	3.5	1902.00
.07	.00	15.12	.00	.000	.014	.000	.000	1892.00	1006.98
.003404	200.	200.	200.	7	11	0	.00	36.04	1043.02

*SECNO 1700.000

1700.000	5.36	1896.36	1897.25	.00	1899.88	3.52	1.02	.00	1901.00
2266.0	.0	2266.0	.0	.0	150.4	.0	15.8	3.8	1901.00
.07	.00	15.07	.00	.000	.014	.000	.000	1891.00	1006.96
.003369	300.	300.	300.	8	8	0	.00	36.09	1043.04

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1200.000

1200.000	5.34	1894.64	1895.55	.00	1898.19	3.54	1.69	.01	1899.30
2266.0	.0	2266.0	.0	.0	150.0	.0	17.5	4.2	1899.30
.08	.00	15.11	.00	.000	.014	.000	.000	1889.30	1006.97
.003395	500.	500.	500.	8	8	0	.00	36.06	1043.03

*SECNO 700.000

700.000	5.46	1893.16	1893.95	.00	1896.53	3.38	1.64	.02	1897.70
2266.0	.0	2266.0	.0	.0	153.7	.0	19.2	4.6	1897.70
.09	.00	14.74	.00	.000	.014	.000	.000	1887.70	1006.82
.003170	500.	500.	500.	6	8	0	.00	36.36	1043.18

*SECNO 600.000

600.000	5.53	1892.93	1893.65	.00	1896.21	3.28	.31	.01	1897.40
2266.0	.0	2266.0	.0	.0	156.0	.0	19.6	4.7	1897.70
.09	.00	14.53	.00	.000	.014	.000	.000	1887.40	1006.70
.003028	100.	100.	100.	7	8	0	.00	36.36	1043.06

*SECNO 544.000

544.000	5.47	1892.67	1893.44	.00	1896.02	3.35	.17	.02	1897.20
2266.0	.0	2266.0	.0	.0	154.4	.0	19.8	4.7	1897.20
.09	.00	14.68	.00	.000	.014	.000	.000	1887.20	1006.79
.003131	56.	56.	56.	10	8	0	.00	36.42	1043.21

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	3.91	1890.91	1892.12	.00	1895.32	4.41	.38	.32	1897.00
2266.0	.0	2266.0	.0	.0	134.4	.0	20.1	4.8	1897.00
.10	.00	16.86	.00	.000	.014	.000	.000	1887.00	1000.61
.005325	94.	94.	94.	6	11	0	.00	34.78	1035.39

*SECNO 244.600

244.600	4.02	1890.22	1891.25	.00	1894.25	4.03	1.03	.04	1896.20
2266.0	.0	2266.0	.0	.0	140.6	.0	20.8	5.0	1896.20
.10	.00	16.12	.00	.000	.014	.000	.000	1886.20	1000.01
.004757	205.	205.	205.	7	11	0	.00	35.00	1035.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 243.600

3265 DIVIDED FLOW

243.600	4.25	1890.45	1891.33	.00	1894.22	3.77	.01	.03	1896.20
2266.0	.0	2266.0	.0	.0	145.5	.0	20.8	5.0	1896.20
.10	.00	15.57	.00	.000	.014	.000	.000	1886.20	1000.01
.005349	1.	1.	1.	4	11	0	.00	34.20	1035.00

*SECNO 150.000

3265 DIVIDED FLOW

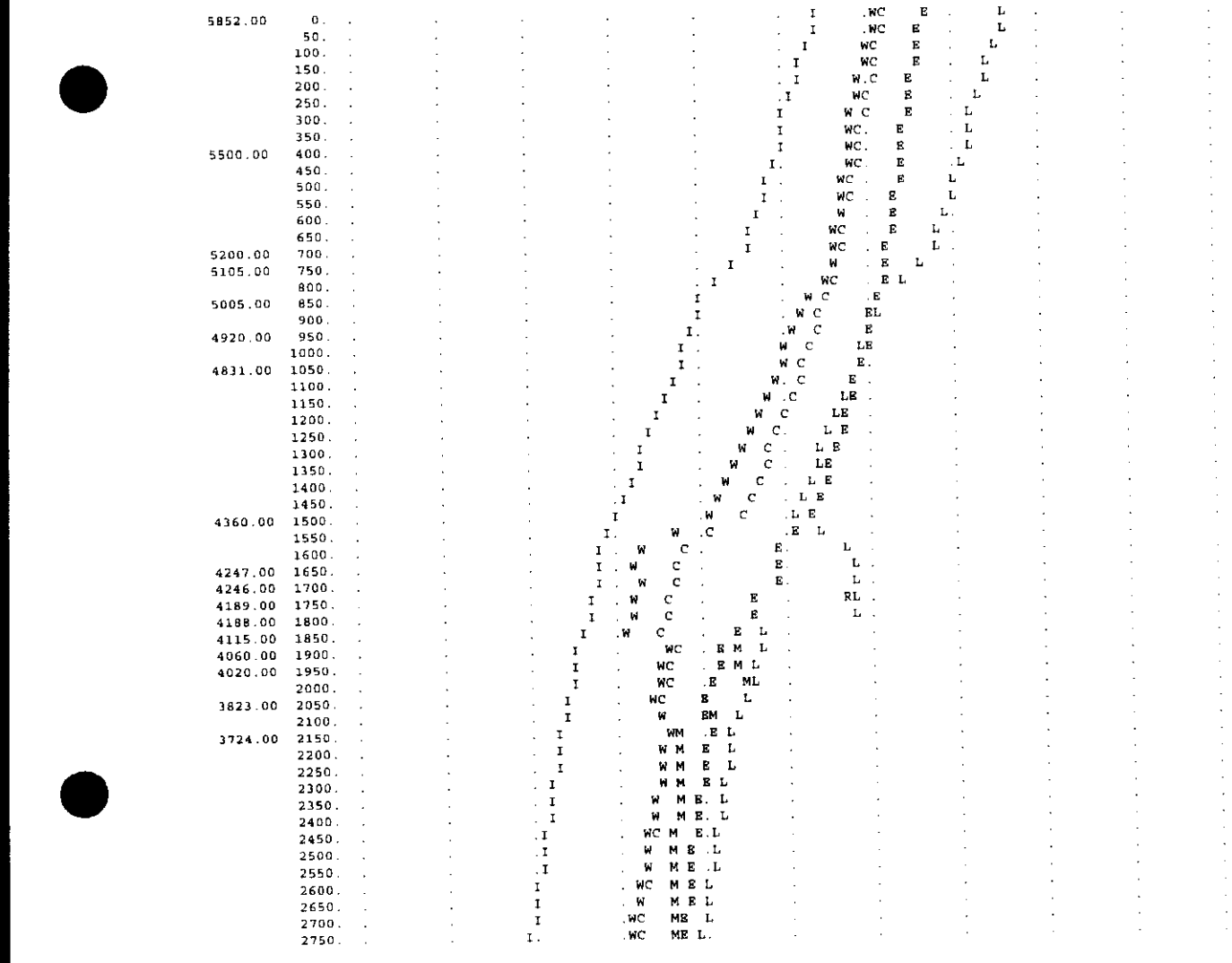
3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1896.00 ELREA= 1896.00

150.000	4.99	1890.99	1891.13	.00	1893.72	2.73	.39	.10	1896.00
2266.0	.0	2266.0	.0	.0	170.9	.0	21.1	5.0	1896.00
.10	.00	13.26	.00	.000	.014	.000	.000	1886.00	1000.01
.003371	94.	94.	94.	2	11	0	.00	34.24	1035.05

1
PROFILE FOR STREAM LNLVW WASH WITH DIVERSIO

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA



```
          2800.  .          .          I.          WC   M E L.
          2850.  .          .          I.          WC   ME  L.
          2900.  .          .         I .          WC   ME L .
          2950.  .          .         I .         WC    ME L .
          3000.  .          .         I .         WC    E  L .
          3050.  .          .        I  .        W C    E L  .
          3100.  .          .        I  .        WC.    E L  .
          3150.  .          .        I  .        WC.    E L  .
          3200.  .          .      I    .       W C.    E L  .
          3250.  .          .      I    .       WC .    E L  .
          3300.  .          .      I    .      W C .    E L  .
          3350.  .          .     I     .      W C .   EML  .
          3400.  .          .     I     .      WC  .   EML  .
          3450.  .          .     I     .     W C  .   EML  .
          3500.  .          .    I      .     W C  . E L   .
          3550.  .          .    I      .    W C   . E L   .
          3600.  .          .    I      .    W C   . EML   .
          3650.  .          .   I       .    W C   . EL    .
2200.00   3700.  .          .   I       .   W  C   .E L   .
          3750.  .          .   I       .   W C    .E L   .
          3800.  .          .   I       .   W C    .E L   .
          3850.  .          .  I        .   W C    E L    .
2000.00   3900.  .          .  I        .   WC     E L    .
          3950.  .          .  I        .  W C     E. L   .
          4000.  .          . I         .  W C     E.L    .
          4050.  .          . I         .  WC      E.L    .
          4100.  .          . I         . W C      E .L   .
          4150.  .          I           . W C      E L    .
1700.00   4200.  .          I           . W C      E L    .
          4250.  .          I           . W C      E  L   .
          4300.  .         I.           . W C      E L.   .
          4350.  .         I.           . WC       E L.   .
          4400.  .         I.           .W.C       E  L.  .
          4450.  .        I .           .W.C       E L .  .
          4500.  .        I .           . WC       E L .  .
          4550.  .        I .           .W C       E  L .
          4600.  .       I  .           .W C       E L  .
          4650.  .       I  .           .WC.       E L  .
1200.00   4700.  .       I  .           .W C.      E  L .
          4750.  .      I   .           .W C.      E L  .
          4800.  .      I   .           .WC .      E L  .
          4850.  .      I   .           .W C .     E  L .
          4900.  .     I    .           .W C .     E L  .
          4950.  .     I    .           .W C .     E L  .
          5000.  .     I    .           .WC  .     E  L .
          5050.  .    I     .           .W C .     E L  .
          5100.  .    I     .           .W C .     E L  .
          5150.  .    I     .           .WC  .     E  L .
 700.00   5200.  .   I      .           .W C .     E L  .
          5250.  .   I      .           .W C .     E L  .
 600.00   5300.  .   I      .           .WC  .     E  L .
 544.00   5350.  .  I       .           .W C .     E L  .
          5400.  .  I       .           .W C .     E. L   M   .
 450.00   5450.  .  I       .           .W C .     E. L       M
          5500.  .  I       .           .W. C .    E . L      M .
          5550.  . I        .           .W.C .     E .L   M   .
          5600.  . I        .           .W.C .     E  .L M    .
 244.60   5650.  I          .           .W .C .    E  L       .
 243.60   5700.  I          .           .W.C .     E  L       .
 150.00   5750.  I          .           .W   .     E    L     M .
1
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 T1      FEMA 500-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      LNLVW WASH WITH DIVERSION

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  5                     1       .0033                                      1894.3

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       4


1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 4

 CCHV=      .300 CEHV=      .100
 *SECNO 5852.000
   5852.000       5.94    1919.04    1920.10    1894.30    1923.96       4.92        .00        .00    1924.10
     6339.0         .0     6339.0         .0         .0      356.1         .0         .0         .0    1924.10
        .00        .00      17.80        .00       .000       .014       .000       .000    1913.10    1000.00
    .003328         0.         0.         0.          0         17          5        .00      60.00    1060.01


 *SECNO 5500.000
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3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5500.000      8.11   1918.91   1918.91      .00   1922.99      4.09      .92       .12   1921.80
    6339.0        .0    6339.0        .0       .0     390.7        .0      3.0        .4   1921.80
       .01        .00     16.23       .00      .000      .014      .000      .000   1910.80   1000.00
    .002112      352.      352.      352.       20        11         0       .00     48.20   1048.21


*SECNO 5200.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5200.000      9.49   1918.29   1918.29      .00   1923.04      4.75      .66      1.16   1919.80
    6339.0        .0    6339.0        .0       .0     362.5        .0      5.6         .7   1919.80
       .01        .00     17.49       .00      .000      .014      .000      .000   1908.80   1000.00
    .002312      300.      300.      300.       20         8         0       .00     38.21   1038.21


*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000     10.03   1918.23   1918.23      .00   1923.29      5.07      .23       .90   1919.20
    6339.0        .0    6339.0        .0       .0     350.9        .0      6.4         .8   1919.20
       .02        .00     18.06       .00      .000      .014      .000      .000   1908.20   1000.00
    .002450       95.       95.       95.       20         8         0       .00     35.01   1035.01


1                                                                                                    PAGE   30
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 5005.000

3301 HV CHANGED MORE THAN HVINS

  5005.000      8.95   1915.15   1917.30      .00   1922.34      7.18      .32       .63   1916.70
    6339.0        .0    6339.0        .0       .0     294.7        .0      7.1         .9   1916.70
       .01        .00     21.51       .00      .000      .014      .000      .000   1906.20   1003.09
    .004384      100.      100.      100.        7         8         0       .00     50.82   1053.91


*SECNO 4920.000
  4920.000      8.82   1914.32   1916.57      .00   1921.85      7.53      .38       .10   1916.00
    6339.0        .0    6339.0        .0       .0     287.9        .0      7.7        1.0   1916.00
       .01        .00     22.02       .00      .000      .014      .000      .000   1905.50   1003.36
    .004670       85.       85.       85.       10        11         0       .00     50.28   1053.64


*SECNO 4831.000
  4831.000      8.70   1913.50   1915.87      .00   1921.33      7.83      .43       .09   1915.30
    6339.0        .0    6339.0        .0       .0     282.3        .0      8.3        1.1   1915.30
       .02        .00     22.45       .00      .000      .014      .000      .000   1904.80   1003.58
    .004925       89.       89.       89.        8        11         0       .00     49.83   1053.42


CCHV=     .300 CEHV=     .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

  4360.000      8.27   1909.17   1911.97      .00   1918.35      9.18      2.58       .41   1911.40
    6339.0        .0    6339.0        .0       .0     260.7        .0      11.2        1.6   1911.40
       .02        .00     24.32       .00      .000      .014      .000      .000   1900.90   1004.47
    .006113      471.      471.      471.        6        11         0       .00     48.07   1052.53


CCHV=     .500 CEHV=     .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

1                                                                                                    PAGE   31
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  4247.000      3.99   1903.89   1907.15      .00   1915.95     12.06      .96      1.44   1915.00
    5868.0        .0    5868.0        .0       .0     210.6        .0      11.8        1.8   1914.80
```

.02	.00	27.87	.00	.000	.014	.000	.000	1899.90	.07
.013123	113.	113.	113.	14	11	0	.00	52.75	52.83

*SECNO 4246.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	4.39	1904.29	1907.51	.00	1915.76	11.47	.02	.18	1915.00
5868.0	.0	5868.0	.0	.0	215.9	.0	11.8	1.8	1914.80
.02	.00	27.18	.00	.000	.014	.000	.000	1899.90	.07
.018695	1.	1.	1.	6	12	0	-15.82	52.76	52.83

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 21 MIN ELTRD= 1909.80 MAX ELLC= 1914.80

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	4.61	1904.01	1907.00	.00	1914.45	10.45	1.00	.31	1914.80
5868.0	.0	5868.0	.0	.0	226.2	.0	12.1	1.8	1914.60
.02	.00	25.94	.00	.000	.014	.000	.000	1899.40	.07
.016426	57.	57.	57.	7	12	0	-16.58	52.76	52.83

*SECNO 4188.000

4188.000	4.24	1903.64	1906.65	.00	1914.32	10.68	.01	.12	1915.00
5868.0	.0	5868.0	.0	.0	223.8	.0	12.1	1.8	1914.80
.02	.00	26.22	.00	.000	.014	.000	.000	1899.40	.07
.010833	1.	1.	1.	9	14	0	.00	52.75	52.83

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .500 CEHV= .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4115.000	4.75	1903.55	1906.38	.00	1913.31	9.76	.74	.28	1909.30
4694.0	.0	4694.0	.0	.0	187.2	.0	12.5	1.9	1909.30
.02	.00	25.07	.00	.000	.014	.000	.000	1898.80	1604.05
.009313	73.	73.	73.	6	14	0	.00	39.49	1643.55

1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, XRATIO = .65

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4060.000	7.28	1905.98	1907.52	.00	1911.82	5.84	.32	1.18	1909.30
4694.0	.0	4694.0	.0	.0	242.1	.0	12.7	2.0	1909.30
.02	.00	19.39	.00	.000	.014	.000	.000	1898.70	1604.03
.003876	55.	55.	55.	9	14	0	.00	38.82	1642.86

CCHV= .300 CEHV= .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.20 ELREA= 1909.10

4020.000	7.25	1905.85	1907.36	.00	1911.66	5.81	.15	.00	1909.20
4694.0	.0	4694.0	.0	.0	242.7	.0	13.0	2.0	1909.10
.03	.00	19.34	.00	.000	.014	.000	.000	1898.60	1603.16
.003860	40.	40.	40.	5	11	0	.00	38.92	1642.08

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3823.000

3823.000	7.47	1905.47	1906.76	.00	1910.90	5.43	.72	.04	1908.50
4694.0	.0	4694.0	.0	.0	251.0	.0	14.1	2.2	1908.50
.03	.00	18.70	.00	.000	.014	.000	.000	1898.00	1000.00
.003510	197.	197.	197.	8	11	0	.00	39.23	1039.24

1490 NH CARD USED
*SECNO 3724.000
3280 CROSS SECTION 3724.00 EXTENDED 1.79 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1907.60 ELREA= 1907.60

3724.000	8.79	1906.39	1906.94	.00	1910.48	4.10	.28	.13	1907.60
4694.0	.0	4694.0	.0	.0	289.0	.0	14.7	2.3	1907.60
.03	.00	16.24	.00	.000	.014	.000	.000	1897.60	1298.62
.002341	99.	99.	99.	4	14	0	.00	46.06	1344.68

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

2200.000	7.95	1900.55	1901.98	.00	1905.87	5.32	4.24	.37	1902.60
4694.0	.0	4694.0	.0	.0	253.5	.0	24.2	3.9	1902.60
.05	.00	18.51	.00	.000	.014	.000	.000	1892.60	1003.08
.003366	1524.	1524.	1524.	6	8	0	.00	43.83	1046.92

CCHV= .300 CEHV= .100
*SECNO 2000.000

2000.000	8.03	1900.03	1901.38	.00	1905.20	5.17	.66	.02	1902.00
4694.0	.0	4694.0	.0	.0	257.3	.0	25.4	4.1	1902.00
.06	.00	18.24	.00	.000	.014	.000	.000	1892.00	1002.96
.003231	200.	200.	200.	8	11	0	.00	44.09	1047.04

*SECNO 1700.000

1700.000	8.00	1899.00	1900.40	.00	1904.21	5.21	.97	.01	1901.00
4694.0	.0	4694.0	.0	.0	256.3	.0	27.1	4.4	1901.00
.06	.00	18.31	.00	.000	.014	.000	.000	1891.00	1002.99
.003267	300.	300.	300.	7	8	0	.00	44.02	1047.01

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1200.000

1200.000	7.97	1897.27	1898.71	.00	1902.54	5.27	1.65	.02	1899.30
4694.0	.0	4694.0	.0	.0	254.8	.0	30.1	4.9	1899.30
.07	.00	18.42	.00	.000	.014	.000	.000	1889.30	1003.04
.003321	500.	500.	500.	10	8	0	.00	43.92	1046.96

*SECNO 700.000

700.000	8.02	1895.72	1897.11	.00	1900.89	5.17	1.64	.01	1897.70
4694.0	.0	4694.0	.0	.0	257.2	.0	33.0	5.4	1897.70
.08	.00	18.25	.00	.000	.014	.000	.000	1887.70	1002.96
.003236	500.	500.	500.	8	8	0	.00	44.08	1047.04

*SECNO 600.000

600.000	8.16	1895.56	1896.83	.00	1900.56	5.01	.32	.02	1897.40
4694.0	.0	4694.0	.0	.0	261.4	.0	33.6	5.5	1897.70
.08	.00	17.95	.00	.000	.014	.000	.000	1887.40	1002.77
.003078	100.	100.	100.	6	8	0	.00	44.11	1046.88

*SECNO 544.000

544.000	8.08	1895.28	1896.60	.00	1900.36	5.09	.17	.02	1897.20
4694.0	.0	4694.0	.0	.0	259.4	.0	33.9	5.5	1897.20
.08	.00	18.10	.00	.000	.014	.000	.000	1887.20	1002.89
.003161	56.	56.	56.	7	8	0	.00	44.23	1047.11

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	6.98	1893.98	1895.30	.00	1899.81	5.83	.33	.22	1897.00
4694.0	.0	4694.0	.0	.0	242.2	.0	34.5	5.6	1897.00
.08	.00	19.38	.00	.000	.014	.000	.000	1887.00	1000.30
.003857	94.	94.	94.	7	8	0	.00	35.40	1035.70

*SECNO 244.600

244.600	6.88	1893.08	1894.44	.00	1898.98	5.91	.81	.02	1896.20
4694.0	.0	4694.0	.0	.0	240.7	.0	35.6	5.8	1896.20
.08	.00	19.50	.00	.000	.014	.000	.000	1886.20	1000.00
.004014	205.	205.	205.	7	8	0	.00	35.00	1035.01

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 243.600

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

243.600	7.47	1893.67	1894.54	.00	1898.91	5.25	.00	.07	1896.20
4694.0	.0	4694.0	.0	.0	255.4	.0	35.6	5.8	1896.20
.08	.00	18.38	.00	.000	.014	.000	.000	1886.20	1000.00
.004742	1.	1.	1.	5	11	0	.00	34.21	1035.01

*SECNO 150.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

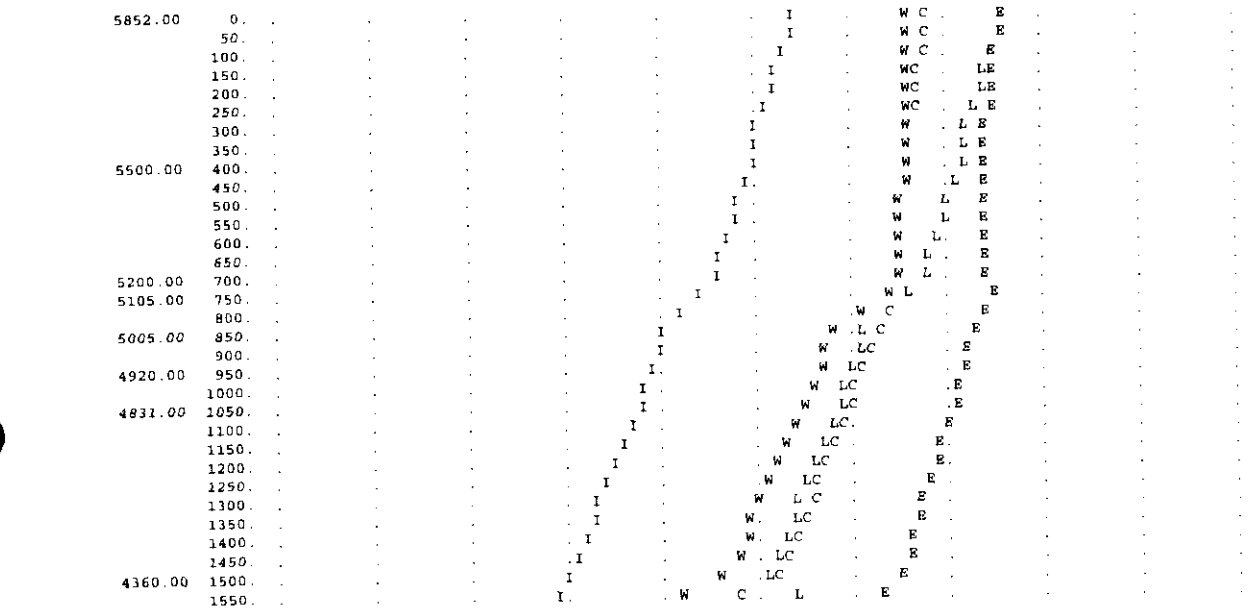
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1896.00 ELREA= 1896.00

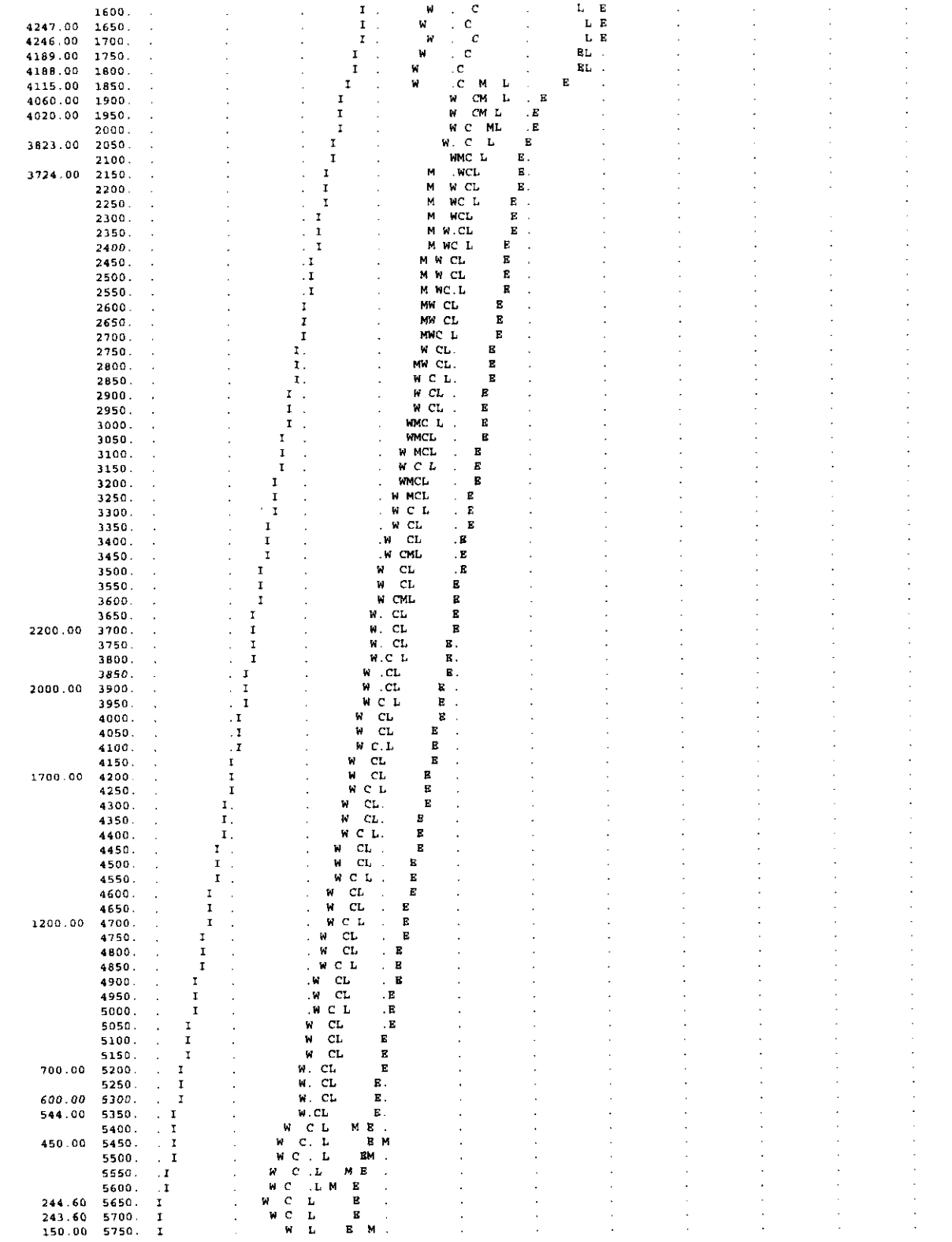
150.000	8.35	1894.35	1894.35	.00	1898.54	4.19	.38	.26	1896.00
4694.0	.0	4694.0	.0	.0	285.7	.0	36.2	5.9	1896.00
.08	.00	16.43	.00	.000	.014	.000	.000	1886.00	1000.00
.003504	94.	94.	94.	20	8	0	.00	34.29	1035.08

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PROFILE FOR STREAM LNLVW WASH WITH DIVERSIO

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA





THIS RUN EXECUTED 15APR98 14:11:39

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5852.000	.00	.00	.00	1913.10	1281.00	1915.28	1915.51	1916.77	32.98	9.79	130.90	223.05
	5852.000	.00	.00	.00	1913.10	2183.00	1916.15	1916.54	1918.36	32.64	11.95	182.72	382.08
	5852.000	.00	.00	.00	1913.10	2833.00	1916.66	1917.19	1919.39	33.28	13.25	213.73	491.07
	5852.000	.00	.00	.00	1913.10	6339.00	1919.04	1920.10	1923.96	33.28	17.80	356.13	1098.85
	5500.000	352.00	.00	.00	1910.80	1281.00	1913.06	1913.59	1915.20	46.46	11.75	109.06	187.94
	5500.000	352.00	.00	.00	1910.80	2183.00	1914.19	1914.78	1916.97	37.27	13.38	163.12	357.60
	5500.000	352.00	.00	.00	1910.80	2833.00	1914.93	1915.54	1918.08	33.70	14.26	198.67	488.01
*	5500.000	352.00	.00	.00	1910.80	6339.00	1918.91	1918.91	1922.99	21.12	16.23	390.68	1379.39
	5200.000	300.00	.00	.00	1908.80	1281.00	1911.57	1912.07	1913.86	40.51	12.15	105.43	201.27
	5200.000	300.00	.00	.00	1908.80	2183.00	1912.98	1913.45	1915.89	32.24	13.69	159.40	384.48
	5200.000	300.00	.00	.00	1908.80	2833.00	1913.99	1914.33	1917.16	27.77	14.29	198.27	537.57
*	5200.000	300.00	.00	.00	1908.80	6339.00	1918.29	1918.29	1923.04	23.12	17.49	362.53	1318.39
	5105.000	95.00	.00	.00	1908.20	1281.00	1911.23	1911.65	1913.49	36.45	12.07	106.13	212.19
*	5105.000	95.00	.00	.00	1908.20	2183.00	1913.15	1913.15	1915.62	23.36	12.61	173.05	451.69
*	5105.000	95.00	.00	.00	1908.20	2833.00	1914.07	1914.07	1917.02	23.41	13.78	205.52	585.54
*	5105.000	95.00	.00	.00	1908.20	6339.00	1918.23	1918.23	1923.29	24.50	18.06	350.91	1280.67
	5005.000	100.00	.00	.00	1906.20	1281.00	1910.41	1911.06	1913.02	35.90	12.98	98.67	213.78
	5005.000	100.00	.00	.00	1906.20	2183.00	1911.95	1912.69	1915.13	31.27	14.31	152.51	390.37
	5005.000	100.00	.00	.00	1906.20	2833.00	1912.67	1913.64	1916.49	33.14	15.68	180.62	492.15
	5005.000	100.00	.00	.00	1906.20	6339.00	1915.15	1917.30	1922.34	43.84	21.51	294.71	957.38
	4920.000	85.00	.00	.00	1905.50	1281.00	1909.47	1910.37	1912.54	45.04	14.08	90.98	190.88
	4920.000	85.00	.00	.00	1905.50	2183.00	1910.94	1912.00	1914.67	39.01	15.51	140.73	349.52
	4920.000	85.00	.00	.00	1905.50	2833.00	1911.69	1912.97	1916.02	39.39	16.71	169.55	451.37
	4920.000	85.00	.00	.00	1905.50	6339.00	1914.32	1916.57	1921.85	46.70	22.02	287.92	927.64
	4831.000	89.00	.00	.00	1904.80	1281.00	1908.62	1909.66	1912.02	51.79	14.80	86.55	177.99
	4831.000	89.00	.00	.00	1904.80	2183.00	1910.05	1911.29	1914.18	44.83	16.31	133.80	326.05
	4831.000	89.00	.00	.00	1904.80	2833.00	1910.81	1912.24	1915.54	44.35	17.45	162.38	425.42
	4831.000	89.00	.00	.00	1904.80	6339.00	1913.50	1915.87	1921.33	49.25	22.45	282.32	903.29

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	4360.000	471.00	.00	.00	1900.90	1281.00	1904.36	1905.76	1908.79	75.20	16.90	75.80	147.72
	4360.000	471.00	.00	.00	1900.90	2183.00	1905.62	1907.38	1911.18	67.67	18.94	115.28	265.37
	4360.000	471.00	.00	.00	1900.90	2833.00	1906.36	1908.34	1912.58	64.74	20.02	141.48	352.09
	4360.000	471.00	.00	.00	1900.90	6339.00	1909.17	1911.97	1918.35	61.13	24.32	260.66	810.74
*	4247.000	113.00	.00	.00	1899.90	1281.00	1901.18	1902.53	1906.80	246.20	19.01	67.38	81.64
*	4247.000	113.00	.00	.00	1899.90	2183.00	1901.82	1903.65	1909.11	193.06	21.68	100.71	157.11
*	4247.000	113.00	.00	.00	1899.90	2833.00	1902.24	1904.36	1910.47	169.88	23.01	123.10	217.36
*	4247.000	113.00	.00	.00	1899.90	5868.00	1903.89	1907.15	1915.95	131.23	27.87	210.56	512.23
	4246.000	1.00	1910.90	1915.00	1899.90	1281.00	1901.30	1902.65	1906.71	260.55	18.68	68.59	79.36
	4246.000	1.00	1910.90	1915.00	1899.90	2183.00	1901.99	1903.84	1909.01	221.82	21.26	102.67	146.57
	4246.000	1.00	1910.90	1915.00	1899.90	2833.00	1902.46	1904.58	1910.35	204.94	22.54	125.69	197.90
	4246.000	1.00	1910.90	1915.00	1899.90	5868.00	1904.29	1907.51	1915.76	186.95	27.18	215.91	429.17
	4189.000	57.00	1909.80	1914.80	1899.40	1281.00	1901.01	1902.15	1905.13	171.67	16.30	78.57	97.77
	4189.000	57.00	1909.80	1914.80	1899.40	2183.00	1901.68	1903.34	1907.56	170.36	19.46	112.17	167.25
	4189.000	57.00	1909.80	1914.80	1899.40	2833.00	1902.14	1904.08	1908.98	166.50	21.00	134.92	219.55
	4189.000	57.00	1909.80	1914.80	1899.40	5868.00	1904.01	1907.00	1914.45	164.26	25.94	226.24	457.84
	4188.000	1.00	.00	.00	1899.40	1281.00	1900.88	1902.03	1905.08	153.46	16.45	77.87	103.41
	4188.000	1.00	.00	.00	1899.40	2183.00	1901.51	1903.15	1907.50	140.16	19.64	111.17	184.39
	4188.000	1.00	.00	.00	1899.40	2833.00	1901.94	1903.86	1908.91	130.15	21.19	133.71	248.32
	4188.000	1.00	.00	.00	1899.40	5868.00	1903.64	1906.65	1914.32	108.33	26.22	223.76	563.79
	4115.000	73.00	.00	.00	1898.80	1025.00	1900.58	1901.55	1903.91	99.19	14.64	70.01	102.92
	4115.000	73.00	.00	.00	1898.80	1746.00	1901.25	1902.73	1906.34	103.13	18.11	96.43	171.93
	4115.000	73.00	.00	.00	1898.80	2266.00	1901.70	1903.47	1907.80	101.22	19.82	114.31	225.24
	4115.000	73.00	.00	.00	1898.80	4694.00	1903.55	1906.38	1913.31	93.13	25.07	187.22	486.41
*	4060.000	55.00	.00	.00	1898.70	1025.00	1902.09	1902.09	1903.65	23.21	10.02	102.30	212.74
*	4060.000	55.00	.00	.00	1898.70	1746.00	1903.01	1903.46	1905.66	29.96	13.02	134.06	318.99
*	4060.000	55.00	.00	.00	1898.70	2266.00	1903.78	1904.31	1906.88	29.79	14.14	160.28	415.20
*	4060.000	55.00	.00	.00	1898.70	4694.00	1905.98	1907.52	1911.82	38.76	19.39	242.14	753.94
	4020.000	40.00	.00	.00	1898.60	1025.00	1901.84	1901.94	1903.51	25.97	10.39	98.68	201.13
	4020.000	40.00	.00	.00	1898.60	1746.00	1902.87	1903.31	1905.53	30.55	13.10	133.31	315.87
	4020.000	40.00	.00	.00	1898.60	2266.00	1903.63	1904.16	1906.76	30.17	14.19	159.73	412.55
	4020.000	40.00	.00	.00	1898.60	4694.00	1905.85	1907.36	1911.66	38.60	19.34	242.70	755.49
	3823.000	197.00	.00	.00	1898.00	1025.00	1901.14	1901.35	1902.94	28.99	10.77	95.18	190.38
	3823.000	197.00	.00	.00	1898.00	1746.00	1902.30	1902.72	1904.93	30.11	13.03	133.98	318.20
	3823.000	197.00	.00	.00	1898.00	2266.00	1903.03	1903.57	1906.16	30.27	14.20	159.57	411.84
	3823.000	197.00	.00	.00	1898.00	4694.00	1905.47	1906.76	1910.90	35.10	18.70	251.02	792.35
*	3724.000	99.00	.00	.00	1897.60	1025.00	1901.53	1901.53	1903.14	21.67	10.20	100.46	220.20
*	3724.000	99.00	.00	.00	1897.60	1746.00	1902.99	1902.99	1905.10	20.21	11.67	149.62	388.40
*	3724.000	99.00	.00	.00	1897.60	2266.00	1903.86	1903.86	1906.26	19.57	12.44	182.21	512.18
	3724.000	99.00	.00	.00	1897.60	4694.00	1906.39	1906.94	1910.48	23.41	16.24	288.98	970.06

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2200.000	1524.00	.00	.00	1892.60	1025.00	1895.82	1896.49	1898.37	42.35	12.82	79.94	157.50
*	2200.000	1524.00	.00	.00	1892.60	1746.00	1897.00	1897.95	1900.45	40.83	14.92	117.01	273.24
*	2200.000	1524.00	.00	.00	1892.60	2266.00	1897.72	1898.82	1901.68	39.71	15.97	141.91	359.57
	2200.000	1524.00	.00	.00	1892.60	4694.00	1900.55	1901.98	1905.87	33.66	18.51	253.54	809.06
	2000.000	200.00	.00	.00	1892.00	1025.00	1895.48	1895.90	1897.59	32.07	11.66	87.94	180.99
	2000.000	200.00	.00	.00	1892.00	1746.00	1896.64	1897.35	1899.67	33.78	13.96	125.05	300.41
	2000.000	200.00	.00	.00	1892.00	2266.00	1897.35	1898.22	1900.90	34.04	15.12	149.86	388.37
	2000.000	200.00	.00	.00	1892.00	4694.00	1900.03	1901.38	1905.20	32.31	18.24	257.32	825.75
	1700.000	300.00	.00	.00	1891.00	1025.00	1894.46	1894.90	1896.61	32.91	11.76	87.16	178.66
	1700.000	300.00	.00	.00	1891.00	1746.00	1895.65	1896.37	1898.66	33.48	13.92	125.44	301.77
	1700.000	300.00	.00	.00	1891.00	2266.00	1896.36	1897.25	1899.88	33.69	15.07	150.40	390.37
	1700.000	300.00	.00	.00	1891.00	4694.00	1899.00	1900.40	1904.21	32.67	18.31	256.31	821.30
	1200.000	500.00	.00	.00	1889.30	1025.00	1892.73	1893.20	1894.92	33.91	11.88	86.27	176.03
	1200.000	500.00	.00	.00	1889.30	1746.00	1893.94	1894.67	1896.97	33.84	13.97	124.96	300.13
	1200.000	500.00	.00	.00	1889.30	2266.00	1894.64	1895.55	1898.19	33.95	15.11	150.01	388.92
	1200.000	500.00	.00	.00	1889.30	4694.00	1897.27	1898.71	1902.54	33.21	18.42	254.78	814.52
	700.000	500.00	.00	.00	1887.70	1025.00	1891.23	1891.61	1893.29	31.04	11.53	88.93	183.96
	700.000	500.00	.00	.00	1887.70	1746.00	1892.40	1893.07	1895.31	31.92	13.69	127.56	309.05
	700.000	500.00	.00	.00	1887.70	2266.00	1893.16	1893.95	1896.53	31.70	14.74	153.69	402.46
	700.000	500.00	.00	.00	1887.70	4694.00	1895.72	1897.11	1900.89	32.36	18.25	257.19	825.18
	600.000	100.00	.00	.00	1887.40	1025.00	1890.94	1891.31	1892.98	30.48	11.47	89.37	185.65
	600.000	100.00	.00	.00	1887.40	1746.00	1892.18	1892.77	1894.99	30.24	13.45	129.80	317.49
	600.000	100.00	.00	.00	1887.40	2266.00	1892.93	1893.65	1896.21	30.28	14.53	155.97	411.83
	600.000	100.00	.00	.00	1887.40	4694.00	1895.56	1896.83	1900.56	30.78	17.95	261.44	846.10
	544.000	56.00	.00	.00	1887.20	1025.00	1890.68	1891.10	1892.79	32.01	11.65	88.00	181.18
	544.000	56.00	.00	.00	1887.20	1746.00	1891.93	1892.56	1894.80	31.33	13.60	128.40	311.96
	544.000	56.00	.00	.00	1887.20	2266.00	1892.67	1893.44	1896.02	31.31	14.68	154.37	404.97
	544.000	56.00	.00	.00	1887.20	4694.00	1895.28	1896.60	1900.36	31.61	18.10	259.37	834.86
*	450.000	94.00	.00	.00	1887.00	1025.00	1889.18	1890.03	1892.11	69.23	13.75	74.55	123.19
	450.000	94.00	.00	.00	1887.00	1746.00	1890.21	1891.31	1894.10	58.40	15.83	110.30	228.47
	450.000	94.00	.00	.00	1887.00	2266.00	1890.91	1892.12	1895.32	53.25	16.86	134.40	310.52
	450.000	94.00	.00	.00	1887.00	4694.00	1893.98	1895.30	1899.81	38.57	19.38	242.16	755.83
	244.600	205.40	.00	.00	1886.20	1025.00	1888.64	1889.18	1890.89	46.68	12.03	85.19	150.01
	244.600	205.40	.00	.00	1886.20	1746.00	1889.57	1890.45	1892.96	48.43	14.78	118.14	250.90
	244.600	205.40	.00	.00	1886.20	2266.00	1890.22	1891.25	1894.25	47.57	16.12	140.57	328.56
	244.600	205.40	.00	.00	1886.20	4694.00	1893.08	1894.44	1898.98	40.14	19.50	240.70	740.87
	243.600	1.00	.00	.00	1886.20	1025.00	1888.79	1889.22	1890.86	47.19	11.54	88.78	149.20
	243.600	1.00	.00	.00	1886.20	1746.00	1889.78	1890.51	1892.93	52.43	14.25	122.51	241.13
	243.600	1.00	.00	.00	1886.20	2266.00	1890.45	1891.33	1894.22	53.49	15.57	145.49	309.82
	243.600	1.00	.00	.00	1886.20	4694.00	1893.67	1894.54	1898.91	47.42	18.38	255.39	681.64

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	150.000	93.60	.00	.00	1886.00	1025.00	1889.03	1889.03	1890.55	29.58	9.88	103.72	188.46
*	150.000	93.60	.00	.00	1886.00	1746.00	1890.31	1890.31	1892.49	30.57	11.84	147.42	315.80
	150.000	93.60	.00	.00	1886.00	2266.00	1890.99	1891.13	1893.72	33.71	13.26	170.90	390.26
*	150.000	93.60	.00	.00	1886.00	4694.00	1894.35	1894.35	1898.54	35.04	16.43	285.70	793.02

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LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	5852.000	1281.00	1915.28	.00	.00	26.38	59.99	.00
	5852.000	2183.00	1916.15	.86	.00	26.05	60.00	.00
	5852.000	2833.00	1916.66	.52	.00	25.76	60.00	.00
	5852.000	6339.00	1919.04	2.37	.00	24.74	60.00	.00
	5500.000	1281.00	1913.06	.00	-2.22	.00	48.19	352.00
	5500.000	2183.00	1914.19	1.12	-1.96	.00	48.20	352.00
	5500.000	2833.00	1914.93	.74	-1.74	.00	48.20	352.00
*	5500.000	6339.00	1918.91	3.98	-.13	.00	48.20	352.00
	5200.000	1281.00	1911.57	.00	-1.49	.00	38.20	300.00
	5200.000	2183.00	1912.98	1.41	-1.21	.00	38.20	300.00
	5200.000	2833.00	1913.99	1.02	-.93	.00	38.20	300.00
*	5200.000	6339.00	1918.29	4.30	-.62	.00	38.21	300.00
	5105.000	1281.00	1911.23	.00	-.34	.00	35.00	95.00
*	5105.000	2183.00	1913.15	1.92	.17	.00	35.00	95.00
*	5105.000	2833.00	1914.07	.93	.08	.00	35.00	95.00
*	5105.000	6339.00	1918.23	4.15	-.06	.00	35.01	95.00
	5005.000	1281.00	1910.41	.00	-.82	.00	31.85	100.00

	5005.000	2183.00	1911.95	1.55	-1.19	.00	38.01	100.00
	5005.000	2833.00	1912.67	.71	-1.41	.00	40.87	100.00
	5005.000	6339.00	1915.15	2.49	-3.07	.00	50.82	100.00
	4920.000	1281.00	1909.47	.00	-.94	.00	30.87	85.00
	4920.000	2183.00	1910.94	1.47	-1.02	.00	36.75	85.00
	4920.000	2833.00	1911.69	.75	-.98	.00	39.77	85.00
	4920.000	6339.00	1914.32	2.63	-.83	.00	50.28	85.00
	4831.000	1281.00	1908.62	.00	-.85	.00	30.29	89.00
	4831.000	2183.00	1910.05	1.43	-.89	.00	35.99	89.00
	4831.000	2833.00	1910.81	.76	-.88	.00	39.04	89.00
	4831.000	6339.00	1913.50	2.69	-.82	.00	49.83	89.00
	4360.000	1281.00	1904.36	.00	-4.26	.00	28.83	471.00
	4360.000	2183.00	1905.62	1.26	-4.43	.00	33.87	471.00
	4360.000	2833.00	1906.36	.74	-4.45	.00	36.84	471.00
	4360.000	6339.00	1909.17	2.81	-4.34	.00	48.07	471.00
*	4247.000	1281.00	1901.18	.00	-3.17	.00	52.72	113.00
*	4247.000	2183.00	1901.82	.63	-3.80	.00	52.73	113.00
*	4247.000	2833.00	1902.24	.42	-4.12	.00	52.73	113.00
*	4247.000	5868.00	1903.89	1.65	-5.28	.00	52.75	113.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4246.000	1281.00	1901.30	.00	.11	.00	52.72	1.00
	4246.000	2183.00	1901.99	.69	.17	.00	52.73	1.00
	4246.000	2833.00	1902.46	.47	.22	.00	52.73	1.00
	4246.000	5868.00	1904.29	1.83	.40	.00	52.76	1.00
	4189.000	1281.00	1901.01	.00	-.29	.00	52.72	57.00
	4189.000	2183.00	1901.68	.68	-.31	.00	52.73	57.00
	4189.000	2833.00	1902.14	.45	-.32	.00	52.74	57.00
	4189.000	5868.00	1904.01	1.87	-.28	.00	52.76	57.00
	4188.000	1281.00	1900.88	.00	-.13	.00	52.72	1.00
	4188.000	2183.00	1901.51	.63	-.17	.00	52.73	1.00
	4188.000	2833.00	1901.94	.43	-.20	.00	52.73	1.00
	4188.000	5868.00	1903.64	1.71	-.36	.00	52.75	1.00
	4115.000	1025.00	1900.58	.00	-.30	.00	39.43	73.00
	4115.000	1746.00	1901.25	.67	-.26	.00	39.45	73.00
	4115.000	2266.00	1901.70	.45	-.24	.00	39.46	73.00
	4115.000	4694.00	1903.55	1.85	-.10	.00	39.49	73.00
*	4060.000	1025.00	1902.09	.00	1.51	.00	32.98	55.00
*	4060.000	1746.00	1903.03	.94	1.78	.00	34.40	55.00
*	4060.000	2266.00	1903.78	.75	2.08	.00	35.52	55.00
*	4060.000	4694.00	1905.98	2.20	2.43	.00	38.82	55.00
	4020.000	1025.00	1901.84	.00	-.25	.00	32.88	40.00
	4020.000	1746.00	1902.87	1.03	-.16	.00	34.43	40.00
	4020.000	2266.00	1903.63	.76	-.15	.00	35.57	40.00
	4020.000	4694.00	1905.85	2.22	-.13	.00	38.92	40.00
	3823.000	1025.00	1901.14	.00	-.70	.00	32.71	197.00
	3823.000	1746.00	1902.30	1.16	-.57	.00	34.45	197.00
	3823.000	2266.00	1903.03	.73	-.60	.00	35.55	197.00
	3823.000	4694.00	1905.47	2.44	-.38	.00	39.23	197.00
*	3724.000	1025.00	1901.53	.00	.39	.00	31.48	99.00
*	3724.000	1746.00	1902.99	1.46	.69	.00	35.86	99.00
*	3724.000	2266.00	1903.86	.88	.83	.00	38.49	99.00
	3724.000	4694.00	1906.39	2.52	.92	.00	46.06	99.00
	2200.000	1025.00	1895.82	.00	-5.71	.00	29.66	1524.00
*	2200.000	1746.00	1897.00	1.18	-5.99	.00	33.20	1524.00
*	2200.000	2266.00	1897.72	.72	-6.14	.00	35.38	1524.00
	2200.000	4694.00	1900.55	2.83	-5.84	.00	43.83	1524.00
	2000.000	1025.00	1895.48	.00	-.33	.00	30.46	200.00
	2000.000	1746.00	1896.64	1.16	-.35	.00	33.92	200.00
	2000.000	2266.00	1897.35	.71	-.37	.00	36.04	200.00
	2000.000	4694.00	1900.03	2.68	-.52	.00	44.09	200.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1700.000	1025.00	1894.46	.00	-1.02	.00	30.38	300.00
	1700.000	1746.00	1895.65	1.19	-.99	.00	33.95	300.00
	1700.000	2266.00	1896.36	.71	-.99	.00	36.09	300.00
	1700.000	4694.00	1899.00	2.64	-1.03	.00	44.02	300.00
	1200.000	1025.00	1892.73	.00	-1.73	.00	30.29	500.00
	1200.000	1746.00	1893.94	1.20	-1.71	.00	33.91	500.00
	1200.000	2266.00	1894.64	.71	-1.72	.00	36.06	500.00
	1200.000	4694.00	1897.27	2.63	-1.73	.00	43.92	500.00
	700.000	1025.00	1891.23	.00	-1.51	.00	30.55	500.00
	700.000	1746.00	1892.40	1.18	-1.53	.00	34.14	500.00
	700.000	2266.00	1893.16	.75	-1.49	.00	36.36	500.00

	700.000	4694.00	1895.72	2.57	-1.55	.00	44.08	500.00
	600.000	1025.00	1890.94	.00	-.29	.00	30.47	100.00
	600.000	1746.00	1892.18	1.24	-.22	.00	34.17	100.00
	600.000	2266.00	1892.93	.75	-.22	.00	36.36	100.00
	600.000	4694.00	1895.56	2.62	-.17	.00	44.11	100.00
	544.000	1025.00	1890.68	.00	-.26	.00	30.46	56.00
	544.000	1746.00	1891.93	1.25	-.25	.00	34.21	56.00
	544.000	2266.00	1892.67	.74	-.26	.00	36.42	56.00
	544.000	4694.00	1895.28	2.60	-.28	.00	44.23	56.00
*	450.000	1025.00	1889.18	.00	-1.50	.00	34.44	94.00
	450.000	1746.00	1890.21	1.04	-1.72	.00	34.64	94.00
	450.000	2266.00	1890.91	.70	-1.77	.00	34.78	94.00
	450.000	4694.00	1893.98	3.07	-1.30	.00	35.40	94.00
	244.600	1025.00	1888.64	.00	-.54	.00	34.99	205.40
	244.600	1746.00	1889.57	.93	-.64	.00	35.00	205.40
	244.600	2266.00	1890.22	.64	-.69	.00	35.00	205.40
	244.600	4694.00	1893.08	2.86	-.90	.00	35.00	205.40
	243.600	1025.00	1888.79	.00	.16	.00	34.19	1.00
	243.600	1746.00	1889.78	.99	.21	.00	34.19	1.00
	243.600	2266.00	1890.45	.67	.24	.00	34.20	1.00
	243.600	4694.00	1893.67	3.21	.59	.00	34.21	1.00
*	150.000	1025.00	1889.03	.00	.24	.00	34.22	93.60
*	150.000	1746.00	1890.31	1.28	.53	.00	34.24	93.60
	150.000	2266.00	1890.99	.68	.54	.00	34.24	93.60
*	150.000	4694.00	1894.35	3.35	.68	.00	34.29	93.60

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 5500.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5500.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5500.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 5200.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5200.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5200.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 5105.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5105.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5105.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 4247.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4247.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4247.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4247.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 4060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4060.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4060.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 4060.000 PROFILE= 2 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 4060.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 4060.000 PROFILE= 3 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 4060.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 4060.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 3724.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 3724.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 3724.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 2200.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 2200.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 450.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 150.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 150.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 150.000 PROFILE= 2 CRITICAL DEPTH ASSUMED

1

CAUTION SECNO= 150.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 150.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 150.000 PROFILE= 4 CRITICAL DEPTH ASSUMED

```
 CAUTION SECNO=    150.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    150.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

Paper Copy H
"N" Channel

10- to 100-year flood event

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES         *
 *                                       *
 *  Version   4.6.2;  May 1991           *
 *                                       *
 *  RUN DATE    16APR98    TIME   08:14:20 *
 *****************************************
```

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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*       (916) 756-1104               *
**************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```


THIS RUN EXECUTED 16APR98 08:14:20

```
************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************
```

THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT 96

```
AC
T1      FEMA 10-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      N CHANNEL w/DIVERSION AT NLVDB

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2                   1         0                                    1902.9

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150


QT       3       256       436       567
NC    .014      .014      .014        .3        .1
  1661.9
X1    707.6         8      1000    1009.51        69        69        69
GR   1909.3      1000    1898.8    1000.01    1898.8    1004.3    1904.8    1004.31    1904.8    1005.1
GR   1898.8   1005.11    1898.8      1009.5    1909.3   1009.51

NC                                      .5        .3
  Upstream end Donovan Culvert
  1592.8
X1    638.6         8      1000    1016.51         1         1         1
GR   1904.4      1000    1898.4    1000.01    1898.4    1007.8    1904.4    1007.81    1904.4    1008.7
GR   1898.4   1008.71    1898.4     1016.5    1904.4   1016.51
  1591.8

X1    637.6         8      1000    1016.51      66.1      66.1      66.1
BT       -8      1000    1908.4    1904.4    1000.01    1908.4    1904.4    1007.8    1908.4    1904.4
BT             1007.81    1908.4    1904.4    1008.7    1908.4    1904.4    1008.71    1908.4    1904.4
BT              1016.5    1908.4    1904.4    1016.51    1908.4    1904.4
GR   1904.4      1000    1898.4    1000.01    1898.4    1007.8    1904.4    1007.81    1904.4    1008.7
GR   1898.4   1008.71    1898.4     1016.5    1904.4   1016.51
  1525.7
```



```
X1    571.5         8      1000    1016.51         1         1         1
BT       -8      1000      1908      1904    1000.01      1908      1904    1007.8      1908      1904
BT             1007.81      1908      1904    1008.7       1908      1904    1008.71     1908      1904
BT              1016.5      1908      1904    1016.51      1908      1904
GR     1904      1000      1898    1000.01      1898    1007.8      1904    1007.81     1904      1008.7
GR     1898   1008.71      1898     1016.5      1904   1016.51
  1524.7

X1    570.5         8      1000    1016.51      24.3      24.3      24.3
GR     1904      1000      1898    1000.01      1898    1007.8      1898    1007.81     1898      1008.7
GR     1898   1008.71      1898     1016.5      1904   1016.51
  Downstream end Donovan Culvert
```

```
NC      .014        .014        .014         .3          .1
  1500.4
X1     546.2           4        1000       1038        50.0        50.0        50.0
GR    1904.9        1000      1897.9       1014      1897.9        1024      1904.9        1038

  1450.4

X1     496.2           4        1000       1038        50.0        50.0        50.0
GR    1904.6        1000      1897.6       1014      1897.6        1024      1904.6        1038

  1400.4

X1     446.2           4        1000       1038        50.0        50.0        50.0
GR    1904.3        1000      1897.3       1014      1897.3        1024      1904.3        1038

  1350.4

X1     396.2           4        1000       1038        50.0        50.0        50.0
GR    1904.0        1000      1897.0       1014      1897.0        1024      1904.0        1038

  1300.4

X1     346.2           4        1000       1038       200.0       200.0       200.0
GR    1903.7        1000      1896.7       1014      1896.7        1024      1903.7        1038

    1100

X1     146.2           4        1000       1038       121.2       121.2       121.2
GR    1902.6        1000      1895.6       1014      1895.6        1024      1902.6        1038

   978.8

X1        25           4        1000       1038        24.0        24.0        24.0
GR    1901.9        1000      1894.9       1014      1894.9        1024      1901.9        1038

1
   16APR98      08:14:20                                                                    PAGE    3


NC      .014        .014        .014         .5          .3
   954.8
X1           1           8        1000    1025.01           1           1           1
GR    1900.7        1000      1894.7    1000.01      1894.7      1012.0      1900.7    1012.01      1900.7    1012.8
GR    1894.7     1013.01      1894.7      1025.0      1900.7     1025.01
   953.8

X1           0           8        1000    1025.01
BT          -8        1000      1905.7    1900.7    1000.01      1905.7      1900.7    1012.00      1905.7    1900.7
BT                  1012.01      1905.7    1900.7    1012.8       1905.7      1900.7    1013.01      1905.7    1900.7
BT                     1025      1905.7    1900.7    1025.01      1905.7      1900.7
GR    1900.7        1000      1894.7    1000.01      1894.7      1012.0      1900.7    1012.01      1900.7    1012.8
GR    1894.7     1013.01      1894.7      1025.0      1900.7     1025.01

1
   16APR98      08:14:20                                                                    PAGE    4

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 1
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
    707.600       2.99    1901.79    1901.79    1902.90    1903.30       1.50        .00        .00    1909.30
      256.0         .0      256.0         .0         .0       26.0         .0         .0         .0    1909.30
        .00        .00       9.84        .00       .000       .014       .000       .000    1898.80    1000.01
     .006325         0.         0.         0.          0         14          0        .00       8.70    1009.50


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

    638.600       1.31    1899.71    1900.43        .00    1902.18       2.47        .63        .48    1904.40
      256.0         .0      256.0         .0         .0       20.3         .0         .0         .0    1904.40
        .00        .00      12.61        .00       .000       .014       .000       .000    1898.40    1000.01
     .014571        69.        69.        69.          6         14          0        .00      15.59    1016.50


 *SECNO 637.600

 3265 DIVIDED FLOW
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3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1908.40 MAX ELLC=  1904.40

   637.600      1.30   1899.70   1900.42      .00   1902.16      2.46      .01      .00   1904.40
     256.0        .0     256.0        .0        .0      20.3        .0        .0        .0   1904.40
       .00       .00     12.59       .00      .000      .014      .000      .000   1898.40   1000.01
   .014498        1.        1.        1.         2        19         0       .00     15.59   1016.50


1
   16APR98      08:14:20                                                                      PAGE    5

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 571.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1908.00 MAX ELLC=  1904.00

   571.500      1.60   1899.60   1900.02      .00   1901.23      1.62      .69       .25   1904.00
     256.0        .0     256.0        .0        .0      25.1        .0        .1        .0   1904.00
       .00       .00     10.22       .00      .000      .014      .000      .000   1898.00   1000.01
   .007797       66.       66.       66.         6        19         0       .00     15.59   1016.50


*SECNO 570.500
   570.500      1.48   1899.48   1899.95      .00   1901.18      1.70      .01       .04   1904.00
     256.0        .0     256.0        .0        .0      24.5        .0        .1        .0   1904.00
       .00       .00     10.45       .00      .000      .014      .000      .000   1898.00   1000.01
   .007137        1.        1.        1.         5        11         0       .00     16.49   1016.50


CCHV=      .300 CEHV=      .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   546.200      2.31   1900.21   1900.21      .00   1901.10       .89      .10       .08   1904.90
     256.0        .0     256.0        .0        .0      33.8        .0        .1        .1   1904.90
       .00       .00      7.57       .00      .000      .014      .000      .000   1897.90   1009.38
   .002583       24.       24.       24.        20        14         0       .00     19.25   1028.62


*SECNO 496.200
   496.200      2.08   1899.68   1899.91      .00   1900.86      1.18      .16       .09   1904.60
     256.0        .0     256.0        .0        .0      29.4        .0        .1        .1   1904.60
       .01       .00      8.70       .00      .000      .014      .000      .000   1897.60   1009.84
   .003833       50.       50.       50.         4         5         0       .00     18.31   1028.16


1
   16APR98      08:14:20                                                                      PAGE    6

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 446.200
   446.200      1.98   1899.28   1899.62      .00   1900.61      1.33      .21       .04   1904.30
     256.0        .0     256.0        .0        .0      27.7        .0        .2        .1   1904.30
       .01       .00      9.24       .00      .000      .014      .000      .000   1897.30   1010.03
   .004538       50.       50.       50.         7         8         0       .00     17.94   1027.97


*SECNO 396.200
   396.200      1.94   1898.94   1899.32      .00   1900.35      1.41      .24       .03   1904.00
     256.0        .0     256.0        .0        .0      26.9        .0        .2        .1   1904.00
       .01       .00      9.53       .00      .000      .014      .000      .000   1897.00   1010.13
   .004954       50.       50.       50.         7         8         0       .00     17.75   1027.87


*SECNO 346.200
   346.200      1.89   1898.59   1899.01      .00   1900.07      1.48      .26       .02   1903.70
     256.0        .0     256.0        .0        .0      26.3        .0        .2        .1   1903.70
       .01       .00      9.75       .00      .000      .014      .000      .000   1896.70   1010.20
   .005296       50.       50.       50.         6        11         0       .00     17.61   1027.80


*SECNO 146.200
   146.200      1.89   1897.49   1897.91      .00   1898.99      1.50      1.07       .01   1902.60
     256.0        .0     256.0        .0        .0      26.0        .0        .3        .2   1902.60
       .02       .00      9.83       .00      .000      .014      .000      .000   1895.60   1010.22
   .005416      200.      200.      200.         7        11         0       .00     17.56   1027.78
```

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*SECNO 25.000
   25.000      1.87   1896.77   1897.21      .00   1898.31      1.54      .67       .01   1901.90
   256.0         .0     256.0        .0       .0      25.7        .0       .4        .3   1901.90
     .02         .00      9.96      .00      .000      .014      .000      .000   1894.90   1010.26
 .005619       121.      121.      121.         7        11         0       .00     17.48   1027.74


CCHV=     .500 CEHV=     .300
*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

1                                                                                          PAGE     7
  16APR98      08:14:20

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

    1.000        .90   1895.60   1896.22      .00   1897.78      2.17      .22       .32   1900.70
    256.0         .0     256.0        .0       .0      21.6        .0       .4        .3   1900.70
      .02         .00     11.83      .00      .000      .014      .000      .000   1894.70   1000.01
 .017179        24.       24.       24.        13        15         0       .00     24.02   1025.00


*SECNO  .000

3265 DIVIDED FLOW


3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

     .000        .92   1895.62   1896.22      .00   1897.74      2.12      .02       .02   1900.70
    256.0         .0     256.0        .0       .0      21.9        .0       .4        .3   1900.70
      .02         .00     11.68      .00      .000      .014      .000      .000   1894.70   1000.01
 .016506          1.        1.        1.         0        15         0       .00     24.02   1025.00


1
 PROFILE FOR STREAM  N CHANNEL w/DIVERSION AT


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
     SECNO   CUMDIS

    707.60      0.  .         .         .I        .         W         E         .         .         .L        .         .
               10.  .         .         I         .         W         E         .         .       L.          .         .
               20.  .         .         I         .        WC         E         .         .     L .           .         .
               30.  .         .         I         .       WC         E         .         .   L   .           .         .
               40.  .         .         I.        .      W. C        E         .         . L     .           .         .
               50.  .         .         I.        .      W .C        E.        .       L .       .         .         .
               60.  .         .         I.        .    W   C         E .       .     L   .       .         .         .
    638.60     70.  .         .         I.        .    W   C.        E .       .   L     .       .         .         .
    637.60     80.  .         .         I.        .    W   C.        E .       . L       .       .         .         .
               90.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              100.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              110.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              120.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              130.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
    571.50    140.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
    570.50    150.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              160.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
    546.20    170.  .         .         I .       .    W   C .       E .       .L        .       .         .         .
              180.  .         .         I .       .    W   C .       E .       .L        .       .         .         .
              190.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              200.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              210.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
    496.20    220.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              230.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              240.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              250.  .         .         I .       .    W   C .       E .       L .       .       .         .         .
              260.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
    446.20    270.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
              280.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
              290.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
              300.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
              310.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
    396.20    320.  .         .       I   .       .    W   C .       E .       L .       .       .         .         .
              330.  .         .     .I    .       .    W   C .       E .       L .       .       .         .         .
              340.  .         .     .I    .       .    W   C .       E .       L .       .       .         .         .
              350.  .         .     .I    .       .    W   C .       E .       L .       .       .         .         .
              360.  .         .     I     .       .    W   C .       E .       L .       .       .         .         .
    346.20    370.  .         .     I     .       .    W   C .       E .       L .       .       .         .         .
              380.  .         .     I     .       .   W.C    .       E .       L .       .       .         .         .
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            390.  .       I.       W.C    E  .          .  L    .       .       .       .       .       .
            400.  .       I.       W.C    E  .          .  L    .       .       .       .       .       .
            410.  .       I.       W C    E  .          .  L    .       .       .       .       .       .
            420.  .       I.       W C    E  .          .  L    .       .       .       .       .       .
            430.  .      I .       W C    E  .          . L     .       .       .       .       .       .
            440.  .      I .       W C    E  .          . L     .       .       .       .       .       .
            450.  .      I .      W C.    E  .          . L     .       .       .       .       .       .
            460.  .      I .      W C.    E  .          . L     .       .       .       .       .       .
            470.  .     I  .      W C.    E  .          .L      .       .       .       .       .       .
            480.  .     I  .     W  C.    E  .          .L      .       .       .       .       .       .
            490.  .     I  .     W C .    E  .          .L      .       .       .       .       .       .
            500.  .    I   .     W C .   E  .          .L      .       .       .       .       .       .
            510.  .    I   .     W C .   E  .          .L      .       .       .       .       .       .
            520.  .    I   .    W C  .   E  .          .L      .       .       .       .       .       .
            530.  .    I   .    W C  .   E  .          .L      .       .       .       .       .       .
            540.  .   I    .    W C  . E    .          L       .       .       .       .       .       .
            550.  .   I    .    W C  . E    .          L       .       .       .       .       .       .
            560.  .   I    .   W C   . E    .          L       .       .       .       .       .       .
  146.20    570.  .   I    .   W C   .E     .          L       .       .       .       .       .       .
            580.  .  I     .   W C   .E     .          L.      .       .       .       .       .       .
            590.  .  I     .  W C    .E     .          L.      .       .       .       .       .       .
            600.  .  I     .  W C    .E     .          L.      .       .       .       .       .       .
            610.  . I      .  W C    E      .         L .      .       .       .       .       .       .
            620.  . I      . W  C   E      .         L .      .       .       .       .       .       .
            630.  . I      . W C    E      .         L .      .       .       .       .       .       .
            640.  . I      . W C    E.     .        L  .      .       .       .       .       .       .
            650.  . I      . W C    E.     .        L  .      .       .       .       .       .       .
            660.  . I      .W C     E.     .        L  .      .       .       .       .       .       .
            670.  . I      .W C     E.     .        L  .      .       .       .       .       .       .
            680.  .I       .W C   E  .     .       L   .      .       .       .       .       .       .
   25.00    690.  .I       W  C   E  .     .       L   .      .       .       .       .       .       .
            700.  .I      W C      E  .     .     L     .      .       .       .       .       .       .
    1.00    710.  I    W  C .    E    .     .    L      .      .       .       .       .       .       .
     .00    720.  I    W  C .    E    .     .    L      .      .       .       .       .       .       .
1
   16APR98       08:14:20                                                                    PAGE    8

 T1       FEMA 50-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       N CHANNEL

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                  3                   1         0                             1904.2

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       2

1
   16APR98       08:14:20                                                                    PAGE    9

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 2
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
    707.600      4.26   1903.06   1903.06   1904.20   1905.21      2.15       .00       .00   1909.30
      436.0         .0     436.0        .0        .0      37.0         .0       .0        .0   1909.30
        .00        .00     11.77        .00       .000     .014      .000      .000   1898.80   1000.01
    .007564         0.        0.        0.        0        14         0       .00      8.70   1009.50


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41

    638.600      1.85   1900.25   1901.29       .00   1903.80      3.55       .71       .70   1904.40
      436.0         .0     436.0        .0        .0      28.8         .0        .1        .0   1904.40
        .00        .00     15.12        .00       .000     .014      .000      .000   1898.40   1000.01
    .014993       69.       69.       69.        9        14         0       .00     15.59   1016.50


 *SECNO 637.600

 3265 DIVIDED FLOW


 3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1908.40 MAX ELLC=  1904.40
```

637.600	1.87	1900.27	1901.29	.00	1903.77	3.51	.01	.01	1904.40
436.0	.0	436.0	.0	.0	29.0	.0	.1	.0	1904.40
.00	.00	15.03	.00	.000	.014	.000	.000	1898.40	1000.01
.014723	1.	1.	1.	0	12	0	.00	15.59	1016.50

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 571.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.00 MAX ELLC= 1904.00

571.500	2.18	1900.18	1900.89	.00	1902.72	2.54	.76	.29	1904.00
436.0	.0	436.0	.0	.0	34.1	.0	.1	.0	1904.00
.00	.00	12.79	.00	.000	.014	.000	.000	1898.00	1000.01
.009254	66.	66.	66.	5	12	0	.00	15.59	1016.50

*SECNO 570.500

570.500	2.03	1900.03	1900.78	.00	1902.67	2.63	.01	.05	1904.00
436.0	.0	436.0	.0	.0	33.5	.0	.1	.0	1904.00
.00	.00	13.02	.00	.000	.014	.000	.000	1898.00	1000.01
.007855	1.	1.	1.	9	11	0	.00	16.50	1016.50

CCHV= .300 CEHV= .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

546.200	2.53	1900.43	1901.02	.00	1902.45	2.02	.16	.06	1904.90
436.0	.0	436.0	.0	.0	38.2	.0	.1	.1	1904.90
.00	.00	11.40	.00	.000	.014	.000	.000	1897.90	1008.93
.005301	24.	24.	24.	4	14	0	.00	20.15	1029.07

*SECNO 496.200

496.200	2.51	1900.11	1900.73	.00	1902.17	2.06	.27	.01	1904.60
436.0	.0	436.0	.0	.0	37.9	.0	.2	.1	1904.60
.00	.00	11.51	.00	.000	.014	.000	.000	1897.60	1008.96
.005445	50.	50.	50.	6	11	0	.00	20.08	1029.04

*SECNO 446.200

446.200	2.50	1899.80	1900.43	.00	1901.89	2.08	.27	.01	1904.30
436.0	.0	436.0	.0	.0	37.6	.0	.2	.1	1904.30
.01	.00	11.58	.00	.000	.014	.000	.000	1897.30	1008.99
.005542	50.	50.	50.	6	11	0	.00	20.03	1029.01

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 396.200

396.200	2.49	1899.49	1900.13	.00	1901.60	2.11	.28	.01	1904.00
436.0	.0	436.0	.0	.0	37.4	.0	.3	.1	1904.00
.01	.00	11.65	.00	.000	.014	.000	.000	1897.00	1009.01
.005629	50.	50.	50.	6	11	0	.00	19.99	1028.99

*SECNO 346.200

346.200	2.48	1899.18	1899.82	.00	1901.31	2.13	.28	.01	1903.70
436.0	.0	436.0	.0	.0	37.3	.0	.3	.1	1903.70
.01	.00	11.70	.00	.000	.014	.000	.000	1896.70	1009.02
.005701	50.	50.	50.	6	11	0	.00	19.95	1028.98

*SECNO 146.200

146.200	2.51	1898.11	1898.72	.00	1900.18	2.07	1.12	.01	1902.60
436.0	.0	436.0	.0	.0	37.7	.0	.5	.2	1902.60
.01	.00	11.56	.00	.000	.014	.000	.000	1895.60	1008.98
.005506	200.	200.	200.	8	11	0	.00	20.05	1029.02

*SECNO 25.000

25.000	2.49	1897.39	1898.03	.00	1899.50	2.11	.68	.01	1901.90
436.0	.0	436.0	.0	.0	37.4	.0	.6	.3	1901.90
.02	.00	11.65	.00	.000	.014	.000	.000	1894.90	1009.01

```
   .005637      121.      121.      121.         6         11         0       .00     19.98   1028.99


CCHV=     .500 CEHV=     .300
*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.61

     1.000      1.34   1896.04   1896.87       .00   1898.91       2.87       .21       .38   1900.70
     436.0        .0     436.0        .0        .0      32.1         .0         .6         .3   1900.70
       .02       .00     13.60       .00      .000      .014       .000       .000   1894.70   1000.01
   .014566       24.       24.       24.        13        11          0       .00     24.03   1025.00


1
   16APR98      08:14:20                                                                          PAGE   12

     SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      OLOSS   L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA   R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN       ELMIN   SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR     TOPWID  ENDST


 *SECNO  .000

 3265 DIVIDED FLOW


 3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

       .000      1.34   1896.04   1896.86       .00   1898.89       2.85       .01       .01   1900.70
      436.0        .0     436.0        .0        .0      32.2         .0         .6         .3   1900.70
        .02       .00     13.55       .00      .000      .014       .000       .000   1894.70   1000.01
   .014427         1.        1.        1.         2         19         0       .00     24.03   1025.00


1
 PROFILE FOR STREAM  N CHANNEL


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
     SECNO   CUMDIS

    707.60      0.  .         .         .I        .         . W       . E       .         .  L      .         .
               10.  .         .         I         .         WC        . E       .        L.       .         .
               20.  .         .         I         .       WC.         .E        .      L  .       .         .
               30.  .         .         I         .     W C .         E.        .   L     .       .         .
               40.  .         .        I.         .   W  C  .         E .       .L.       .       .         .
               50.  .         .        I.         . W  C    .        E  .     L  .       .       .         .
               60.  .         .        I.         W   C     .       E   . L    .       .       .         .
    638.60     70.  .         .        I.       W  .  C     .      E  L.       .       .       .         .
    637.60     80.  .         .        I.       W  .  C     .     E   L.       .       .       .         .
               90.  .         .       I .       W  .  C     .    E    L .      .       .       .         .
              100.  .         .       I .       W  .  C     .   E     L .      .       .       .         .
              110.  .         .       I .       W  .  C     .  E      L .      .       .       .         .
              120.  .         .      I  .       W  .  C     . E       L .      .       .       .         .
              130.  .         .      I  .       W  .C       .E        L .      .       .       .         .
    571.50    140.  .         .      I  .       W  .C       E         L .      .       .       .         .
    570.50    150.  .         .      I  .       W  C        E         L .      .       .       .         .
              160.  .         .     I   .       W  .C       E.        L .      .       .       .         .
    546.20    170.  .         .     I   .       W. C       E.         .L      .       .       .         .
              180.  .         .     I   .       W .C       E          .L      .       .       .         .
              190.  .         .    I    .       W .C       E          L .     .       .       .         .
              200.  .         .    I    .       W .C       E          L .     .       .       .         .
              210.  .         .    I    .       W  C       E          L .     .       .       .         .
    496.20    220.  .         .    I    .       W  C       E          L .     .       .       .         .
              230.  .         .   I     .       W  C       E          L.      .       .       .         .
              240.  .         .   I     .       W   C      E          L.      .       .       .         .
              250.  .         .   I     .       W  C.      E          L.      .       .       .         .
              260.  .         .  I      .       W  C.      E          L .     .       .       .         .
    446.20    270.  .         .  I      .       W  C.      E          L .     .       .       .         .
              280.  .         .  I      .       W  C       E          L .     .       .       .         .
              290.  .         . I       .       W  C       E          L .     .       .       .         .
              300.  .         . I       .       W  C       E          L .     .       .       .         .
              310.  .         . I       .      W  C        E          L .     .       .       .         .
    396.20    320.  .         . I       .      W  C        E          L .     .       .       .         .
              330.  .        .I         .      W  C        E          L .     .       .       .         .
              340.  .        .I         .     W   C        E          L .     .       .       .         .
              350.  .        .I         .     W   C        E          L .     .       .       .         .
              360.  .        I          .     W   C        E          L .     .       .       .         .
    346.20    370.  .        I          .    W    C        E          L .     .       .       .         .
              380.  .        I          .    W    C        E          L .     .       .       .         .
              390.  .       I.          .    W    C        E          L .     .       .       .         .
              400.  .       I.          .    W    C        E          L .     .       .       .         .
              410.  .       I.          .   W     C        E          L .     .       .       .         .
              420.  .       I.          .   W     C        E          L .     .       .       .         .
              430.  .      I  .         .   W     C        .E         . L     .       .       .         .
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          440.  .      I .        .W  C     .E       .  L  .  .  .  .  .  .
          450.  .      I .         W  C     .E       .  L  .  .  .  .  .  .
          460.  .      I .         W  C     .E       .  L  .  .  .  .  .  .
          470.  .     I  .         W  C      E       . L   .  .  .  .  .  .
          480.  .     I  .        W.  C      E       . L   .  .  .  .  .  .
          490.  .     I  .        W.  C      E       . L   .  .  .  .  .  .
          500.  .    I   .        W. C      E.       .L    .  .  .  .  .  .
          510.  .    I   .        W. C      E.       .L    .  .  .  .  .  .
          520.  .    I   .       W .C       E.       .L    .  .  .  .  .  .
          530.  .    I   .       W .C       E.       .L    .  .  .  .  .  .
          540.  .   I    .       W .C      E .       L     .  .  .  .  .  .
          550.  .   I    .       W .C      E .       L     .  .  .  .  .  .
          560.  .   I    .      W  C       E .       L     .  .  .  .  .  .
   146.20 570.  .   I    .      W  C      E  .       L     .  .  .  .  .  .
          580.  .  I     .      W  C      E  .      L.     .  .  .  .  .  .
          590.  .  I     .     W   C      E  .      L.     .  .  .  .  .  .
          600.  .  I     .     W  C.      E  .      L.     .  .  .  .  .  .
          610.  . I      .     W  C.     E   .     L .     .  .  .  .  .  .
          620.  . I      .     W  C.     E   .     L .     .  .  .  .  .  .
          630.  . I      .    W   C .    E   .     L .     .  .  .  .  .  .
          640.  .I       .    W   C .   E    .    L  .     .  .  .  .  .  .
          650.  .I       .    W   C .   E    .    L  .     .  .  .  .  .  .
          660.  .I       .   W    C .   E    .    L  .     .  .  .  .  .  .
          670.  .I       .   W   C  .   E    .    L  .     .  .  .  .  .  .
          680.  .I       .   W   C  .  E     .   L   .     .  .  .  .  .  .
    25.00 690.  .I       .   W   C  .  E     .   L   .     .  .  .  .  .  .
          700.  .I       .W  C      .  E     .  L    .     .  .  .  .  .  .
     1.00 710.  I       W  .C      .E       L       .     .  .  .  .  .  .
      .00 720.  I       W  .C      .E       L       .     .  .  .  .  .  .
1
   16APR98      08:14:20                                                    PAGE   13

 T1      FEMA 100-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      N CHANNEL

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 4                   1         0                                   1905.0

 J2  NPROP     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       3


1
   16APR98      08:14:20                                                    PAGE   14

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 3
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
    707.600      5.08   1903.88   1903.88   1905.00   1906.44      2.56       .00       .00   1909.30
      567.0        .0     567.0        .0        .0      44.2        .0        .0        .0   1909.30
        .00       .00     12.83       .00       .00       .014      .000      .000   1898.80   1000.01
    .008341        0.        0.        0.         0        10         0       .00      8.71   1009.50


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

    638.600      2.21   1900.61   1901.84       .00   1904.84      4.23       .76       .84   1904.40
      567.0        .0     567.0        .0        .0      34.4        .0        .1        .0   1904.40
        .00       .00     16.50       .00       .00       .014      .000      .000   1898.40   1000.01
    .015311       69.       69.       69.         9        14         0       .00     15.59   1016.50


 *SECNO 637.600

 3265 DIVIDED FLOW


 3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1908.40 MAX ELLC=  1904.40

    637.600      2.21   1900.61   1901.84       .00   1904.82      4.22       .02       .00   1904.40
      567.0        .0     567.0        .0        .0      34.4        .0        .1        .0   1904.40
        .00       .00     16.48       .00       .00       .014      .000      .000   1898.40   1000.01
    .015255        1.        1.        1.         2        15         0       .00     15.59   1026.50


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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 571.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.00 MAX ELLC= 1904.00

571.500	2.56	1900.56	1901.44	.00	1903.69	3.13	.81	.33	1904.00
567.0	.0	567.0	.0	.0	40.0	.0	.1	.0	1904.00
.00	.00	14.19	.00	.000	.014	.000	.000	1898.00	1000.01
.009995	66.	66.	66.	5	15	0	.00	15.60	1016.50

*SECNO 570.500

570.500	2.38	1900.38	1901.31	.00	1903.62	3.24	.01	.06	1904.00
567.0	.0	567.0	.0	.0	39.2	.0	.1	.0	1904.00
.00	.00	14.45	.00	.000	.014	.000	.000	1898.00	1000.01
.008183	1.	1.	1.	9	11	0	.00	16.50	1016.50

CCHV= .300 CEHV= .100

*SECNO 546.200

546.200	2.74	1900.64	1901.51	.00	1903.40	2.76	.18	.05	1904.90
567.0	.0	567.0	.0	.0	42.6	.0	.1	.1	1904.90
.00	.00	13.32	.00	.000	.014	.000	.000	1897.90	1008.51
.006647	24.	24.	24.	2	14	0	.00	20.99	1029.49

*SECNO 496.200

496.200	2.76	1900.36	1901.21	.00	1903.06	2.70	.33	.01	1904.60
567.0	.0	567.0	.0	.0	43.0	.0	.2	.1	1904.60
.00	.00	13.19	.00	.000	.014	.000	.000	1897.60	1008.47
.006470	50.	50.	50.	6	11	0	.00	21.07	1029.53

*SECNO 446.200

446.200	2.77	1900.07	1900.91	.00	1902.74	2.66	.32	.00	1904.30
567.0	.0	567.0	.0	.0	43.3	.0	.2	.1	1904.30
.01	.00	13.10	.00	.000	.014	.000	.000	1897.30	1008.44
.006342	50.	50.	50.	6	11	0	.00	21.13	1029.56

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 396.200

396.200	2.78	1899.78	1900.61	.00	1902.42	2.64	.31	.00	1904.00
567.0	.0	567.0	.0	.0	43.5	.0	.3	.1	1904.00
.01	.00	13.03	.00	.000	.014	.000	.000	1897.00	1008.42
.006248	50.	50.	50.	6	11	0	.00	21.17	1029.58

*SECNO 346.200

346.200	2.79	1899.49	1900.31	.00	1902.11	2.62	.31	.00	1903.70
567.0	.0	567.0	.0	.0	43.7	.0	.3	.2	1903.70
.01	.00	12.98	.00	.000	.014	.000	.000	1896.70	1008.40
.006181	50.	50.	50.	6	11	0	.00	21.20	1029.60

*SECNO 146.200

146.200	2.87	1898.47	1899.21	.00	1900.91	2.44	1.18	.02	1902.60
567.0	.0	567.0	.0	.0	45.2	.0	.5	.2	1902.60
.01	.00	12.53	.00	.000	.014	.000	.000	1895.60	1008.29
.005609	200.	200.	200.	6	11	0	.00	21.49	1029.75

*SECNO 25.000

25.000	2.66	1897.76	1898.51	.00	1900.22	2.46	.68	.01	1901.90
567.0	.0	567.0	.0	.0	45.0	.0	.7	.3	1901.90
.01	.00	12.60	.00	.000	.014	.000	.000	1894.90	1008.28
.005687	121.	121.	121.	6	11	0	.00	21.45	1029.72

CCHV= .500 CEHV= .300

*SECNO 1.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.54

1.000	1.63	1896.33	1897.28	.00	1899.61	3.28	.20	.41	1900.70
567.0	.0	567.0	.0	.0	39.0	.0	.7	.3	1900.70
.01	.00	14.54	.00	.000	.014	.000	.000	1894.70	1000.01
.013514	24.	24.	24.	13	11	0	.00	24.04	1025.00

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .000

3265 DIVIDED FLOW

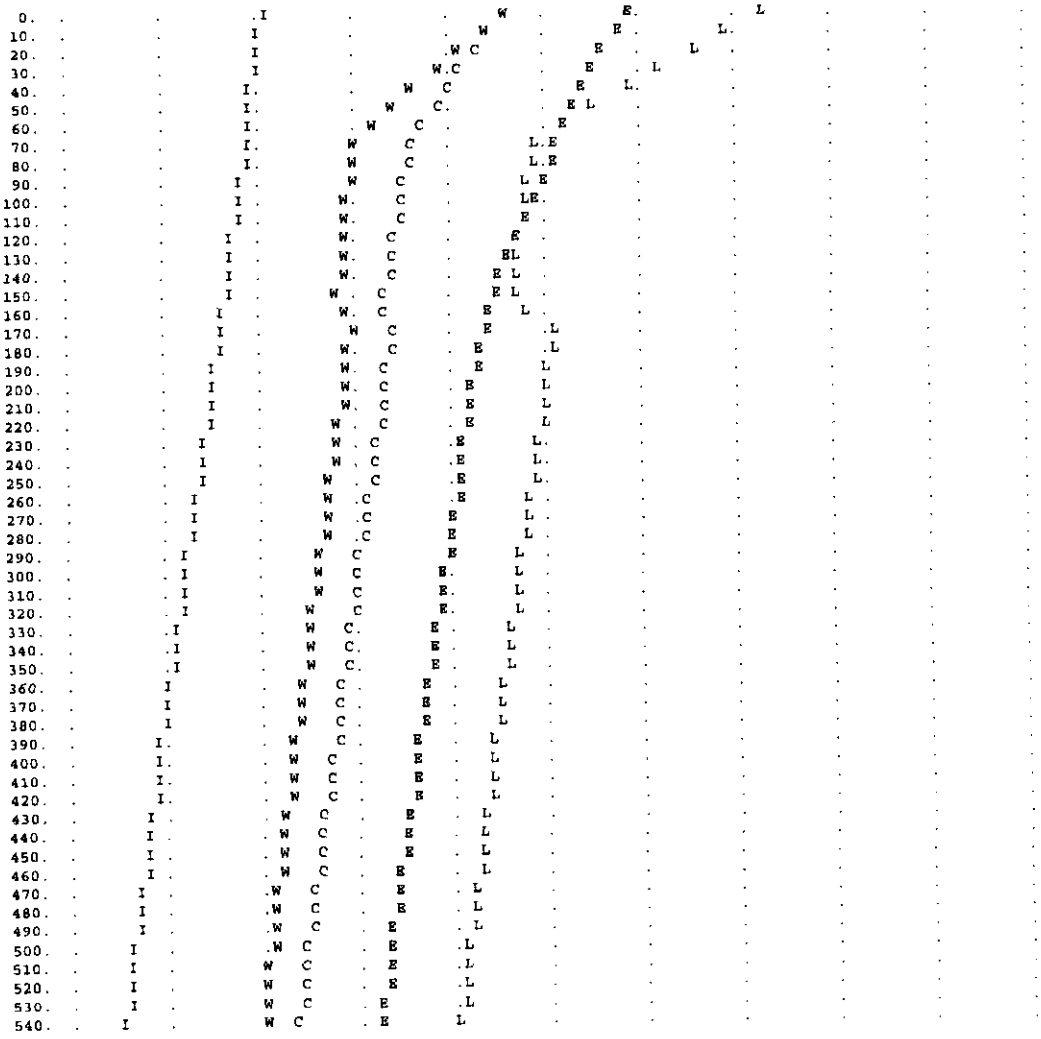
3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1905.70 MAX ELLC= 1900.70

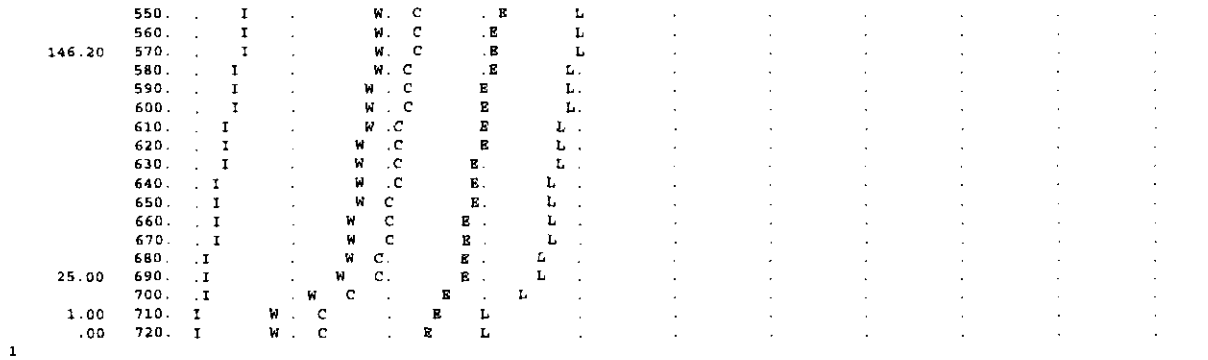
.000	1.63	1896.33	1897.29	.00	1899.59	3.26	.01	.01	1900.70
567.0	.0	567.0	.0	.0	39.1	.0	.7	.3	1900.70
.01	.00	14.49	.00	.000	.014	.000	.000	1894.70	1000.01
.013375	1.	1.	1.	2	12	0	.00	24.05	1025.00

1

PROFILE FOR STREAM N CHANNEL

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA





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THIS RUN EXECUTED 16APR98 08:14:21

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

N CHANNEL w/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	707.600	.00	.00	.00	1898.80	256.00	1901.79	1901.79	1903.30	63.25	9.84	26.01	32.19
*	707.600	.00	.00	.00	1898.80	436.00	1903.06	1903.06	1905.21	75.64	11.77	37.04	50.13
*	707.600	.00	.00	.00	1898.80	567.00	1903.88	1903.88	1906.44	83.41	12.83	44.18	62.08
*	638.600	69.00	.00	.00	1898.40	256.00	1899.71	1900.43	1902.18	145.71	12.61	20.30	21.21
*	638.600	69.00	.00	.00	1898.40	436.00	1900.25	1901.29	1903.80	149.93	15.12	28.84	35.61
	638.600	69.00	.00	.00	1898.40	567.00	1900.62	1901.84	1904.84	153.11	16.50	34.36	45.82
	637.600	1.00	1908.40	1904.40	1898.40	256.00	1899.70	1900.42	1902.16	144.98	12.59	20.33	21.26
	637.600	1.00	1908.40	1904.40	1898.40	436.00	1900.27	1901.29	1903.77	147.23	15.03	29.02	35.93
	637.600	1.00	1908.40	1904.40	1898.40	567.00	1900.61	1901.84	1904.82	152.55	16.48	34.40	45.91
	571.500	66.10	1908.00	1904.00	1898.00	256.00	1899.60	1900.02	1901.23	77.97	10.22	25.05	28.99
	571.500	66.10	1908.00	1904.00	1898.00	436.00	1900.18	1900.89	1902.72	92.54	12.79	34.10	45.32
	571.500	66.10	1908.00	1904.00	1898.00	567.00	1900.56	1901.44	1903.69	99.95	14.19	39.95	56.71
	570.500	1.00	.00	.00	1898.00	256.00	1899.48	1899.95	1901.18	71.37	10.45	24.49	30.30
	570.500	1.00	.00	.00	1898.00	436.00	1900.03	1900.78	1902.67	78.55	13.02	33.48	49.20
	570.500	1.00	.00	.00	1898.00	567.00	1900.38	1901.31	1903.62	81.83	14.45	39.23	62.68
*	546.200	24.30	.00	.00	1897.90	256.00	1900.21	1900.21	1901.10	25.83	7.57	33.82	50.37
	546.200	24.30	.00	.00	1897.90	436.00	1900.43	1901.02	1902.45	53.01	11.40	38.24	59.88
	546.200	24.30	.00	.00	1897.90	567.00	1900.64	1901.51	1903.40	66.47	13.32	42.56	69.55
	496.200	50.00	.00	.00	1897.60	256.00	1899.68	1899.91	1900.86	38.33	8.70	29.41	41.35
	496.200	50.00	.00	.00	1897.60	436.00	1900.11	1900.73	1902.17	54.45	11.51	37.88	59.09
	496.200	50.00	.00	.00	1897.60	567.00	1900.36	1901.21	1903.06	64.70	13.19	42.98	70.49
	446.200	50.00	.00	.00	1897.30	256.00	1899.28	1899.62	1900.61	45.38	9.24	27.71	38.00
	446.200	50.00	.00	.00	1897.30	436.00	1899.80	1900.43	1901.89	55.42	11.58	37.64	58.57
	446.200	50.00	.00	.00	1897.30	567.00	1900.07	1900.91	1902.74	63.42	13.10	43.29	71.20

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	396.200	50.00	.00	.00	1897.00	256.00	1898.94	1899.32	1900.35	49.54	9.53	26.87	36.37
	396.200	50.00	.00	.00	1897.00	436.00	1899.49	1900.13	1901.60	56.29	11.65	37.43	58.11
	396.200	50.00	.00	.00	1897.00	567.00	1899.78	1900.61	1902.42	62.48	13.03	43.52	71.73
	346.200	50.00	.00	.00	1896.70	256.00	1898.59	1899.01	1900.07	52.96	9.75	26.25	35.18
	346.200	50.00	.00	.00	1896.70	436.00	1899.18	1899.82	1901.31	57.01	11.70	37.27	57.74
	346.200	50.00	.00	.00	1896.70	567.00	1899.49	1900.31	1902.11	61.81	12.98	43.69	72.12
	146.200	200.00	.00	.00	1895.60	256.00	1897.49	1897.91	1898.99	54.16	9.83	26.04	34.78
	146.200	200.00	.00	.00	1895.60	436.00	1898.11	1898.72	1900.18	55.06	11.56	37.73	58.76
	146.200	200.00	.00	.00	1895.60	567.00	1898.47	1899.21	1900.91	56.09	12.53	45.24	75.71
	25.000	121.20	.00	.00	1894.90	256.00	1896.77	1897.21	1898.31	56.19	9.96	25.71	34.15
	25.000	121.20	.00	.00	1894.90	436.00	1897.39	1898.03	1899.50	56.37	11.65	37.42	58.07
	25.000	121.20	.00	.00	1894.90	567.00	1897.76	1898.51	1900.22	56.87	12.60	45.01	75.19
*	1.000	24.00	.00	.00	1894.70	256.00	1895.60	1896.22	1897.78	171.79	11.83	21.64	19.53
*	1.000	24.00	.00	.00	1894.70	436.00	1896.04	1896.87	1898.91	145.66	13.60	32.07	36.13
*	1.000	24.00	.00	.00	1894.70	567.00	1896.33	1897.28	1899.61	135.14	14.54	38.99	48.77

.000	1.00	1905.70	1900.70	1894.70	256.00	1895.62	1896.22	1897.74	165.06	11.68	21.91	19.93
.000	1.00	1905.70	1900.70	1894.70	436.00	1896.04	1896.86	1898.89	144.27	13.55	32.17	36.30
.000	1.00	1905.70	1900.70	1894.70	567.00	1896.33	1897.29	1899.59	133.75	14.49	39.12	49.03

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N CHANNEL w/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	707.600	256.00	1901.79	.00	.00	-1.11	8.70	.00
*	707.600	436.00	1903.06	1.27	.00	-1.14	8.70	.00
*	707.600	567.00	1903.88	.82	.00	-1.12	8.71	.00
*	638.600	256.00	1899.71	.00	-2.08	.00	15.59	69.00
*	638.600	436.00	1900.25	.54	-2.81	.00	15.59	69.00
	638.600	567.00	1900.61	.36	-3.27	.00	15.59	69.00
	637.600	256.00	1899.70	.00	-.01	.00	15.59	1.00
	637.600	436.00	1900.27	.56	.02	.00	15.59	1.00
	637.600	567.00	1900.61	.34	-.01	.00	15.59	1.00
	571.500	256.00	1899.60	.00	-.10	.00	15.59	66.10
	571.500	436.00	1900.18	.58	-.08	.00	15.59	66.10
	571.500	567.00	1900.56	.38	-.04	.00	15.60	66.10
	570.500	256.00	1899.48	.00	-.12	.00	16.49	1.00
	570.500	436.00	1900.03	.55	-.15	.00	16.50	1.00
	570.500	567.00	1900.38	.35	-.18	.00	16.50	1.00
*	546.200	256.00	1900.21	.00	.73	.00	19.25	24.30
	546.200	436.00	1900.43	.22	.40	.00	20.15	24.30
	546.200	567.00	1900.64	.21	.26	.00	20.99	24.30
	496.200	256.00	1899.68	.00	-.53	.00	18.31	50.00
	496.200	436.00	1900.11	.43	-.32	.00	20.08	50.00
	496.200	567.00	1900.36	.25	-.28	.00	21.07	50.00
	446.200	256.00	1899.28	.00	-.40	.00	17.94	50.00
	446.200	436.00	1899.80	.52	-.31	.00	20.03	50.00
	446.200	567.00	1900.07	.27	-.29	.00	21.13	50.00
	396.200	256.00	1898.94	.00	-.35	.00	17.75	50.00
	396.200	436.00	1899.49	.56	-.31	.00	19.99	50.00
	396.200	567.00	1899.78	.29	-.29	.00	21.17	50.00
	346.200	256.00	1898.59	.00	-.34	.00	17.61	50.00
	346.200	436.00	1899.18	.59	-.31	.00	19.95	50.00
	346.200	567.00	1899.49	.31	-.29	.00	21.20	50.00
	146.200	256.00	1897.49	.00	-1.10	.00	17.56	200.00
	146.200	436.00	1898.11	.62	-1.07	.00	20.05	200.00
	146.200	567.00	1898.47	.36	-1.02	.00	21.49	200.00
	25.000	256.00	1896.77	.00	-.72	.00	17.48	121.20
	25.000	436.00	1897.39	.62	-.72	.00	19.98	121.20
	25.000	567.00	1897.76	.37	-.72	.00	21.45	121.20

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.000	256.00	1895.60	.00	-1.17	.00	24.02	24.00
*	1.000	436.00	1896.04	.44	-1.35	.00	24.03	24.00
*	1.000	567.00	1896.33	.29	-1.43	.00	24.04	24.00
	.000	256.00	1895.62	.00	.02	.00	24.02	1.00
	.000	436.00	1896.04	.42	.00	.00	24.03	1.00
	.000	567.00	1896.33	.29	.00	.00	24.05	1.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 707.600 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 707.600 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 707.600 PROFILE= 3 CRITICAL DEPTH ASSUMED

WARNING SECNO= 638.600 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 638.600 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 546.200 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 546.200 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 546.200 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 1.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

```
 WARNING SECNO=      1.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

Paper Copy I
"N" Channel

500-year flood event

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    16APR98    TIME   08:15:31  *
*****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*        (916) 756-1104              *
**************************************
```


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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX    XXXXX
X     X  X        X                    X
X     X  X        X     X              X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

1 PAGE 1

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THIS RUN EXECUTED 16APR98 08:15:31

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************
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THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT 96

AC

T1 FEMA 500-YEAR HEC-2 ANALYSIS
T2 BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3 N CHANNEL W/DIVERSION AT NLVDB

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2		1	0				1907.6	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1									

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150

```
QT         1      1173
NC      .014      .014      .014        .3        .1
  1661.9
X1    707.6         8      1000   1009.51        69        69        69
GR   1909.3      1000    1898.8   1000.01    1898.8    1004.3    1904.6   1004.31    1904.8    1005.1
GR   1898.8    1005.11    1898.8    1009.5    1909.3   1009.51
NC                                     .5        .3
  Upstream end Donovan Culvert
  1592.8
X1    638.6         8      1000   1016.51         1         1         1
GR   1904.4      1000    1898.4   1000.01    1898.4    1007.8    1904.4   1007.81    1904.4    1008.7
GR   1898.4    1008.71    1898.4    1016.5    1904.4   1016.51
  1591.8
X1    637.6         8      1000   1016.51      66.1      66.1      66.1
BT       -8      1000    1908.4    1904.4   1000.01    1908.4    1904.4    1007.8    1908.4    1904.4
BT             1007.81    1908.4    1904.4    1008.7    1908.4    1904.4   1008.71    1908.4    1904.4
BT              1016.5    1908.4    1904.4   1016.51    1908.4    1904.4
GR   1904.4      1000    1898.4   1000.01    1898.4    1007.8    1904.4   1007.81    1904.4    1008.7
GR   1898.4    1008.71    1898.4    1016.5    1904.4   1016.51
  1525.7
```

1 PAGE 2

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```
X1    571.5         8      1000   1016.51         1         1         1
BT       -8      1000      1908      1904   1000.01      1908      1904    1007.8      1908      1904
BT             1007.81      1908      1904    1008.7      1908      1904   1008.71      1908      1904
BT              1016.5      1908      1904   1016.51      1908      1904
GR     1904      1000      1898   1000.01      1898    1007.8      1904   1007.81      1904    1008.7
GR     1898    1008.71      1898    1016.5      1904   1016.51
  1524.7
X1    570.5         8      1000   1016.51      24.3      24.3      24.3
GR     1904      1000      1898   1000.01      1898    1007.8      1898   1007.81      1898    1008.7
GR     1898    1008.71      1898    1016.5      1904   1016.51
  Downstream end Donovan Culvert
  UPRR culvert flow of 852 cfs enters the channel from the left bank
```

```
   n values were increased by 20% from 0.014 to 0.017 to account for
   the effects of inflow

QT        1       1457
NC     .017       .017       .017         .3         .1
   1500.4
X1   546.2          4       1000       1038       50.0       50.0       50.0
GR  1904.9       1000     1897.9       1014     1897.9       1024     1904.9       1038


QT        1       1741
   1450.4
X1   496.2          4       1000       1038       50.0       50.0       50.0
GR  1904.6       1000     1897.6       1014     1897.6       1024     1904.6       1038

QT        1       2025
   1400.4
X1   446.2          4       1000       1038       50.0       50.0       50.0
GR  1904.3       1000     1897.3       1014     1897.3       1024     1904.3       1038

   1350.4

X1   396.2          4       1000       1038       50.0       50.0       50.0
GR  1904.0       1000     1897.0       1014     1897.0       1024     1904.0       1038

   1300.4

X1   346.2          4       1000       1038      200.0      200.0      200.0
GR  1903.7       1000     1896.7       1014     1896.7       1024     1903.7       1038

    1100

X1   146.2          4       1000       1038      121.2      121.2      121.2
GR  1902.6       1000     1895.6       1014     1895.6       1024     1902.6       1038
   978.8
1
   16APR98      08:15:31                                                                  PAGE    3


X1       25          4       1000       1038       24.0       24.0       24.0
GR  1901.9       1000     1894.9       1014     1894.9       1024     1901.9       1038


NC     .014       .014       .014         .5         .3
   954.8
X1         1          8       1000    1025.01          1          1          1
GR  1900.7       1000     1894.7    1000.01     1894.7     1012.0     1900.7    1012.01     1900.7     1012.8
GR  1894.7    1013.01     1894.7     1025.0     1900.7    1025.01
   953.8

X1         0          8       1000    1025.01
BT        -8       1000     1905.7     1900.7    1000.01     1905.7     1900.7    1012.00     1905.7     1900.7
BT           1012.01     1905.7     1900.7    1012.8      1905.7     1900.7    1013.01     1905.7     1900.7
BT              1025     1905.7     1900.7    1025.01     1905.7     1900.7
GR  1900.7       1000     1894.7    1000.01     1894.7     1012.0     1900.7    1012.01     1900.7     1012.8
GR  1894.7    1013.01     1894.7     1025.0     1900.7    1025.01

1
   16APR98      08:15:31                                                                  PAGE    4

     SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      QLOSS  L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA  R-BANK ELEV
     TIME       VLOB       VCH        VROB        XNL      XNCH        XNR       WTN     ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR    ITRIAL       IDC     ICONT      CORAR    TOPWID     ENDST


 *PROF 1
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600
 3720 CRITICAL DEPTH ASSUMED
    707.600      8.27   1907.07    1907.07    1907.60    1911.00       3.93        .00        .00    1909.30
     1173.0         .0     1173.0         .0         .0       73.8         .0         .0         .0    1909.30
        .00        .00      15.90        .00       .000       .014       .000       .000    1898.80    1000.00
    .009278         0.         0.         0.          0         10          0        .00       9.51    1009.51


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

    638.600      3.62   1902.02    1903.95        .00    1908.75       6.74        .84       1.40    1904.40
     1173.0         .0     1173.0         .0         .0       56.3         .0         .1         .0    1904.40
        .00        .00      20.83        .00       .000       .014       .000       .000    1898.40    1000.00
    .016652         69.        69.        69.         11         14          0        .00      15.60    1016.51


 *SECNO 637.600

 3265 DIVIDED FLOW
```

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.40 MAX ELLC= 1904.40

637.600	3.62	1902.02	1904.12	.00	1908.73	6.71	.02	.01	1904.40
1173.0	.0	1173.0	.0	.0	56.4	.0	.1	.0	1904.40
.00	.00	20.79	.00	.000	.014	.000	.000	1898.40	1000.00
.016561	1.	1.	1.	2	9	0	.00	15.60	1016.51

*SECNO 571.500

3265 DIVIDED FLOW

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.00 MAX ELLC= 1904.00

571.500	4.05	1902.05	1903.72	.00	1907.38	5.33	.93	.41	1904.00
1173.0	.0	1173.0	.0	.0	63.3	.0	.2	.0	1904.00
.00	.00	18.53	.00	.000	.014	.000	.000	1898.00	1000.00
.012180	66.	66.	66.	3	9	0	.00	15.61	1016.51

*SECNO 570.500

570.500	3.77	1901.77	1903.38	.00	1907.28	5.51	.01	.09	1904.00
1173.0	.0	1173.0	.0	.0	62.3	.0	.2	.0	1904.00
.00	.00	18.84	.00	.000	.014	.000	.000	1898.00	1000.00
.008859	1.	1.	1.	8	11	0	.00	16.50	1016.51

CCHV= .300 CEHV= .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

546.200	4.47	1902.37	1903.83	.00	1906.96	4.59	.23	.09	1904.90
1457.0	.0	1457.0	.0	.0	84.7	.0	.2	.1	1904.90
.00	.00	17.20	.00	.000	.017	.000	.000	1897.90	1005.06
.009699	24.	24.	24.	5	14	0	.00	27.89	1032.94

*SECNO 496.200

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

496.200	5.65	1903.25	1904.12	.00	1906.49	3.23	.34	.14	1904.60
1741.0	.0	1741.0	.0	.0	120.7	.0	.4	.1	1904.60
.00	.00	14.43	.00	.000	.017	.000	.000	1897.60	1002.68
.005293	50.	50.	50.	4	11	0	.00	32.64	1035.32

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 446.200

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

446.200	6.99	1904.29	1904.29	.00	1906.56	2.27	.19	.30	1904.30
2025.0	.0	2025.0	.0	.0	167.6	.0	.5	.1	1904.30
.00	.00	12.08	.00	.000	.017	.000	.000	1897.30	1000.02
.002945	50.	50.	50.	20	11	0	.00	37.96	1037.98

*SECNO 396.200

396.200	6.70	1903.70	1904.01	.00	1906.29	2.60	.16	.10	1904.00
2025.0	.0	2025.0	.0	.0	156.5	.0	.7	.2	1904.00
.01	.00	12.94	.00	.000	.017	.000	.000	1897.00	1000.62
.003546	50.	50.	50.	4	5	0	.00	36.77	1037.38

*SECNO 346.200

346.200	6.51	1903.21	1903.69	.00	1906.04	2.83	.19	.07	1903.70
2025.0	.0	2025.0	.0	.0	149.9	.0	.9	.2	1903.70
.01	.00	13.50	.00	.000	.017	.000	.000	1896.70	1000.98

```
    .003979       50.       50.       50.        8         8         0       .00     36.05   1037.02


*SECNO 146.200
   146.200       6.26   1901.86   1902.59       .00   1905.06      3.20       .86       .11   1902.60
    2025.0         .0    2025.0        .0         .0     141.0        .0       1.6        .4   1902.60
       .01        .00     14.36       .00       .000      .017      .000      .000   1895.60   1001.48
    .004698       200.      200.      200.        8         8         0       .00     35.04   1036.52


*SECNO 25.000
    25.000       6.15   1901.05   1901.91       .00   1904.42      3.37       .59       .05   1901.90
    2025.0         .0    2025.0        .0         .0     137.5        .0       1.9         .5   1901.90
       .01        .00     14.73       .00       .000      .017      .000      .000   1894.90   1001.68
    .005032       121.      121.      121.        5         8         0       .00     34.64   1036.32


CCHV=      .500 CEHV=      .300
1
   16APR98       08:15:31                                                                          PAGE     7

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

     1.000       5.21   1899.91   1900.77       .00   1903.96      4.04       .13       .34   1900.70
    2025.0         .0    2025.0        .0         .0     125.5        .0       2.0         .5   1900.70
       .01        .00     16.14       .00       .000      .014      .000      .000   1894.70   1000.00
    .005857       24.       24.       24.        9         5         0       .00     24.19   1025.01


*SECNO  .000

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF  1900.700 EGLC=  1903.745 EGC=  1903.753 WSEL=  1900.562

3265 DIVIDED FLOW

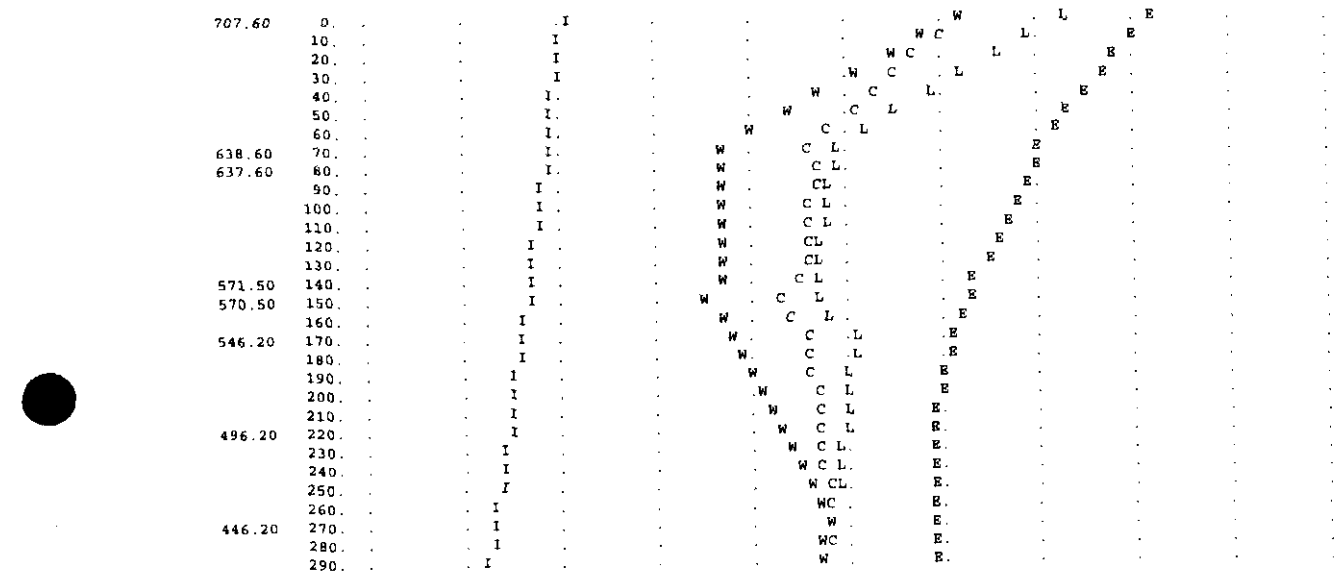

3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

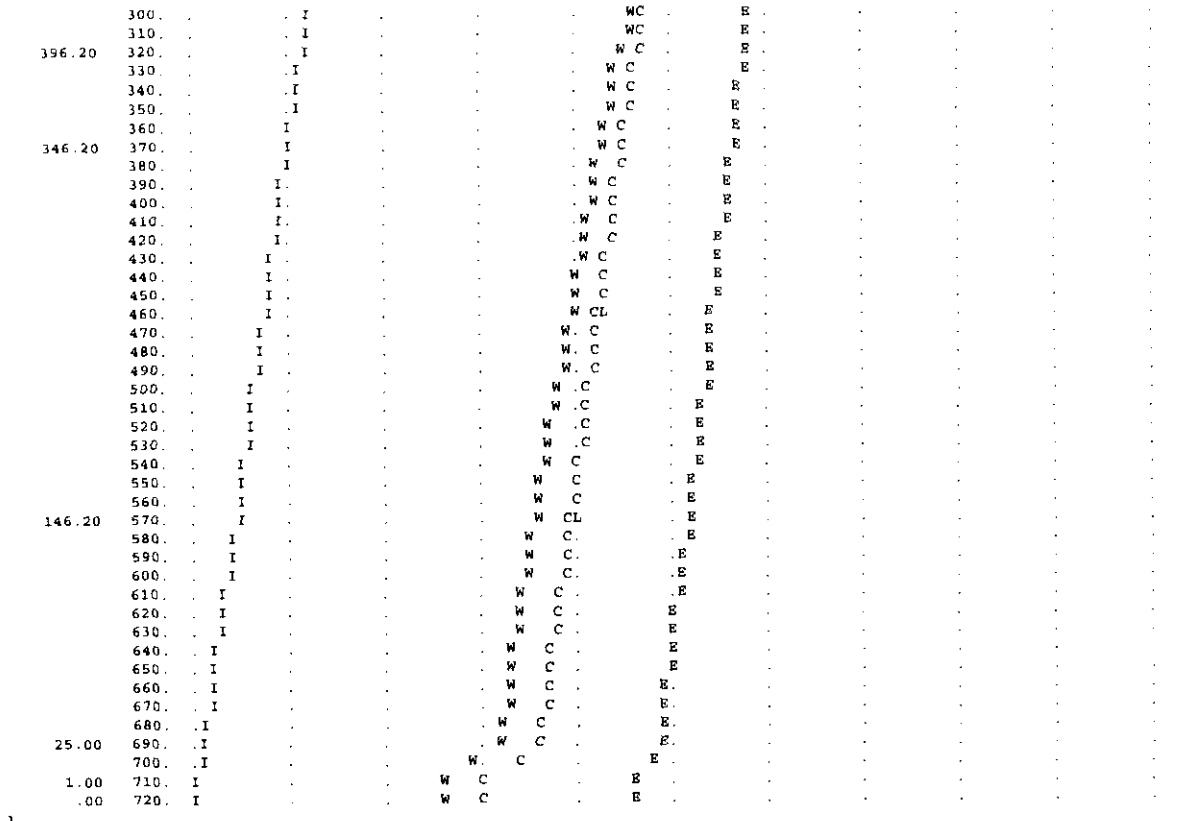
7185 MINIMUM SPECIFIC ENERGY
      .000       5.22   1899.92   1900.70       .00   1903.95      4.03       .01       .00   1900.70
    2025.0         .0    2025.0        .0         .0     125.7        .0       2.0         .5   1900.70
       .01        .00     16.21       .00       .000      .014      .000      .000   1894.70   1000.00
    .005832         1.        1.        1.         0        18         0       .00     24.19   1025.01


1
 PROFILE FOR STREAM  N CHANNEL W/DIVERSION AT


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
     SECNO  CUMDIS
```





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THIS RUN EXECUTED 16APR98 08:15:31

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

N CHANNEL W/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	707.600	.00	.00	.00	1898.80	1173.00	1907.07	1907.07	1911.00	92.78	15.90	73.75	121.78
	638.600	69.00	.00	.00	1898.40	1173.00	1902.02	1903.95	1908.75	166.52	20.83	56.31	90.90
	637.600	1.00	1908.40	1904.40	1898.40	1173.00	1902.02	1904.12	1908.73	165.61	20.79	56.43	91.15
	571.500	66.10	1908.00	1904.00	1898.00	1173.00	1902.05	1903.72	1907.38	121.80	18.53	63.30	106.29
	570.500	1.00	.00	.00	1898.00	1173.00	1901.77	1903.38	1907.28	88.59	18.84	62.26	124.63
	546.200	24.30	.00	.00	1897.90	1457.00	1902.37	1903.83	1906.96	96.99	17.20	84.71	147.94
*	496.200	50.00	.00	.00	1897.60	1741.00	1903.25	1904.12	1906.49	52.93	14.43	120.67	239.31
*	446.200	50.00	.00	.00	1897.30	2025.00	1904.29	1904.29	1906.56	29.45	12.08	167.64	373.13
	396.200	50.00	.00	.00	1897.00	2025.00	1903.70	1904.01	1906.29	35.46	12.94	156.50	340.08
	346.200	50.00	.00	.00	1896.70	2025.00	1903.21	1903.69	1906.04	39.79	13.50	149.95	321.02
	146.200	200.00	.00	.00	1895.60	2025.00	1901.86	1902.59	1905.06	46.98	14.36	141.01	295.45
	25.000	121.20	.00	.00	1894.90	2025.00	1901.05	1901.91	1904.42	50.32	14.73	137.47	285.46
	1.000	24.00	.00	.00	1894.70	2025.00	1899.91	1900.77	1903.96	58.57	16.14	125.49	264.59
*	.000	1.00	1905.70	1900.70	1894.70	2025.00	1899.92	1900.70	1903.95	58.32	16.11	125.69	265.17

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N CHANNEL W/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	707.600	1173.00	1907.07	.00	.00	-.53	9.51	.00
	638.600	1173.00	1902.02	.00	-5.05	.00	15.60	69.00
	637.600	1173.00	1902.02	.00	.00	.00	15.60	1.00
	571.500	1173.00	1902.05	.00	.03	.00	15.61	66.10
	570.500	1173.00	1901.77	.00	-.28	.00	16.50	1.00
	546.200	1457.00	1902.37	.00	.60	.00	27.89	24.30
*	496.200	1741.00	1903.25	.00	.88	.00	32.64	50.00
*	446.200	2025.00	1904.29	.00	1.04	.00	37.96	50.00
	396.200	2025.00	1903.70	.00	-.60	.00	36.77	50.00
	346.200	2025.00	1903.21	.00	-.49	.00	36.05	50.00
	146.200	2025.00	1901.86	.00	-1.34	.00	35.04	200.00
	25.000	2025.00	1901.05	.00	-.81	.00	34.64	121.20
	1.000	2025.00	1899.91	.00	-1.14	.00	24.19	24.00
*	.000	2025.00	1899.92	.00	.00	.00	24.19	1.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 707.600 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 496.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 446.200 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 446.200 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 446.200 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

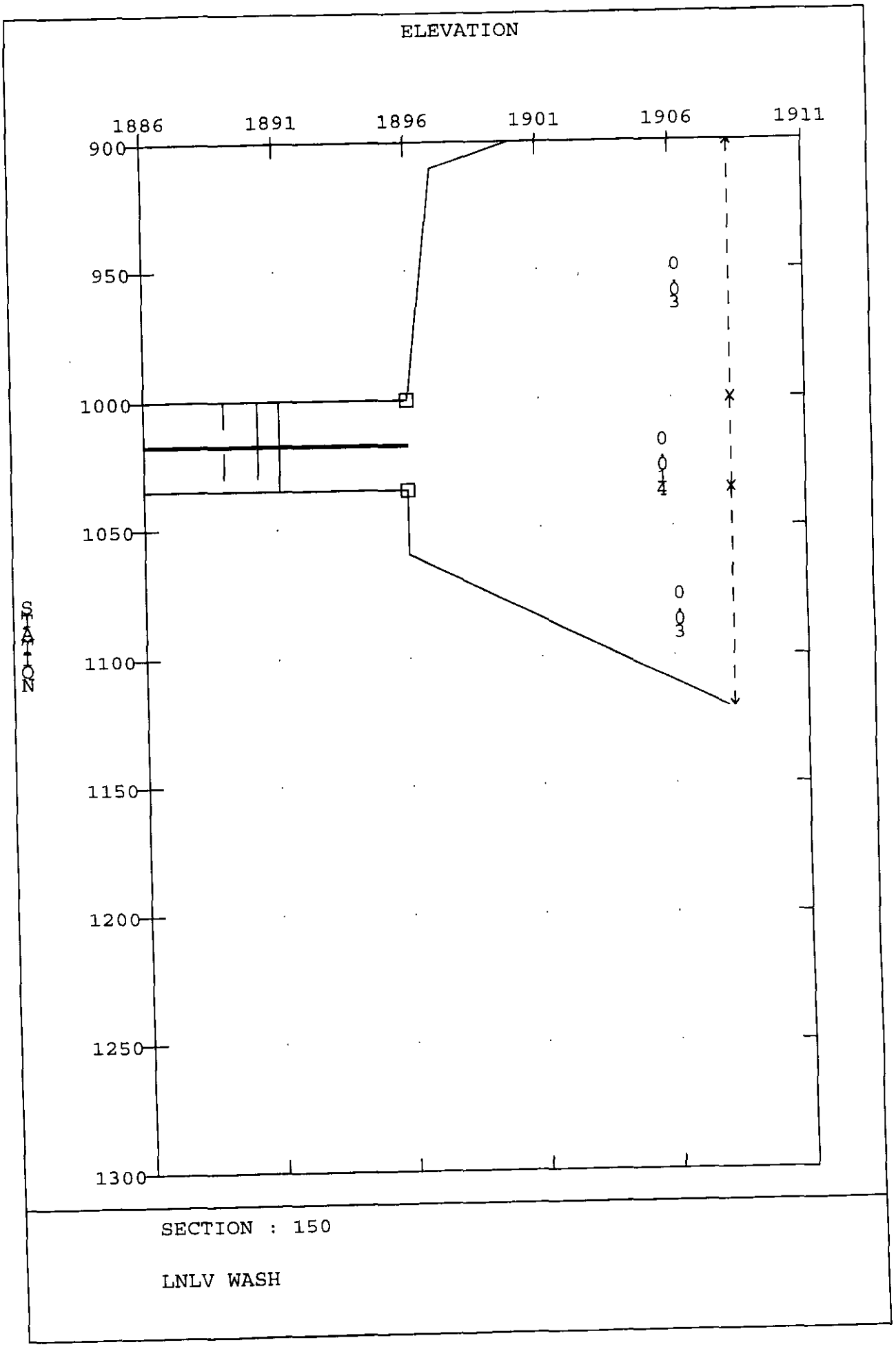
CAUTION SECNO= .000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

UPPER LAS VEGAS WASH
with Diversion

Cross Section Label Key

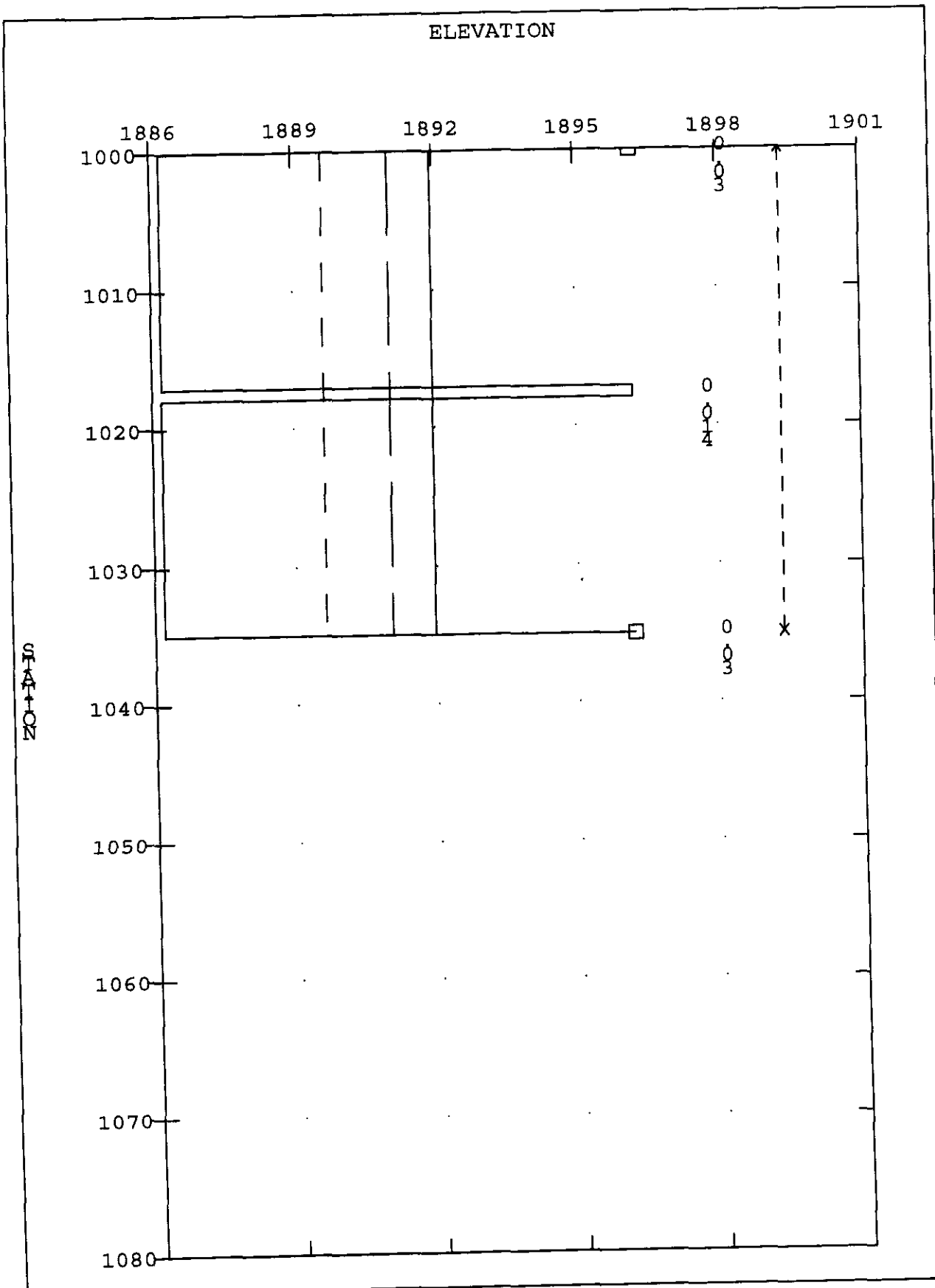
Station	Label	Station	Label	Station	Label	Station	Label
150	A	11614	AA	29486	BA	55870	CA
243.6	B	12202	AB	30067	BB	56010	CB
244.6	--	13094	AC	30650	--	56230	CC
450	--	14167	AD	30680	BC	56420	--
544	C	14368	AF	30765	BD	56487	CD
600	--	15114	AG	30935	BE	59059	CE
700	--	15667	AH	31235	BF	60826	CF
1200	D	16546	AI	31500	BG	62524	CG
1700	E	17058	AJ	32044	BH	63598	CH
2000	--	17612	AK	33671	BI	65055	CI
2200	F	18436	AL	35645	BJ	66061	CJ
3724	G	18462	--	36822	BK	66660	CK
3823	--	18472	--	38410	BL	66814	CL
4020	--	18619	--	39519	BM	68187	CM
4060	H	18710	AM	40616	BN	69560	CN
4115	--	19020	AN	42138	BO	71045	CO
4188	--	19215	AO	43231	BP	72532	CP
4189	--	19802	AP	44345	BQ	73765	CQ
4246	I	20595	AQ	45725	BR	74997	CR
4247	--	21291	AR	46746	BS		
4360	I	22138	AS	48046	BT		
4831	J	23230	AT	49654	BU		
4920	--	24530	AU	50964	BV		
5005	--	25616	AV	52020	BW		
5105	K	26383	AW	53183	BX		
5200	--	27000	AX	54519	BY		
5500	L	27303	AY	55570	BZ		
5852	--	28903	AZ				
5853	--						
5973	M						
5974	--						
6092	N						
6370	O						
6828	P						
7265	Q						
7730	R						
8323	S						
8673	T						
8754	--						
8755	--						
8860	U						
8861	--						
9120	V						
9237	W						
9429	X						
10155	Y						
10962	Z						

Cross Section Plots
LNLVW16B



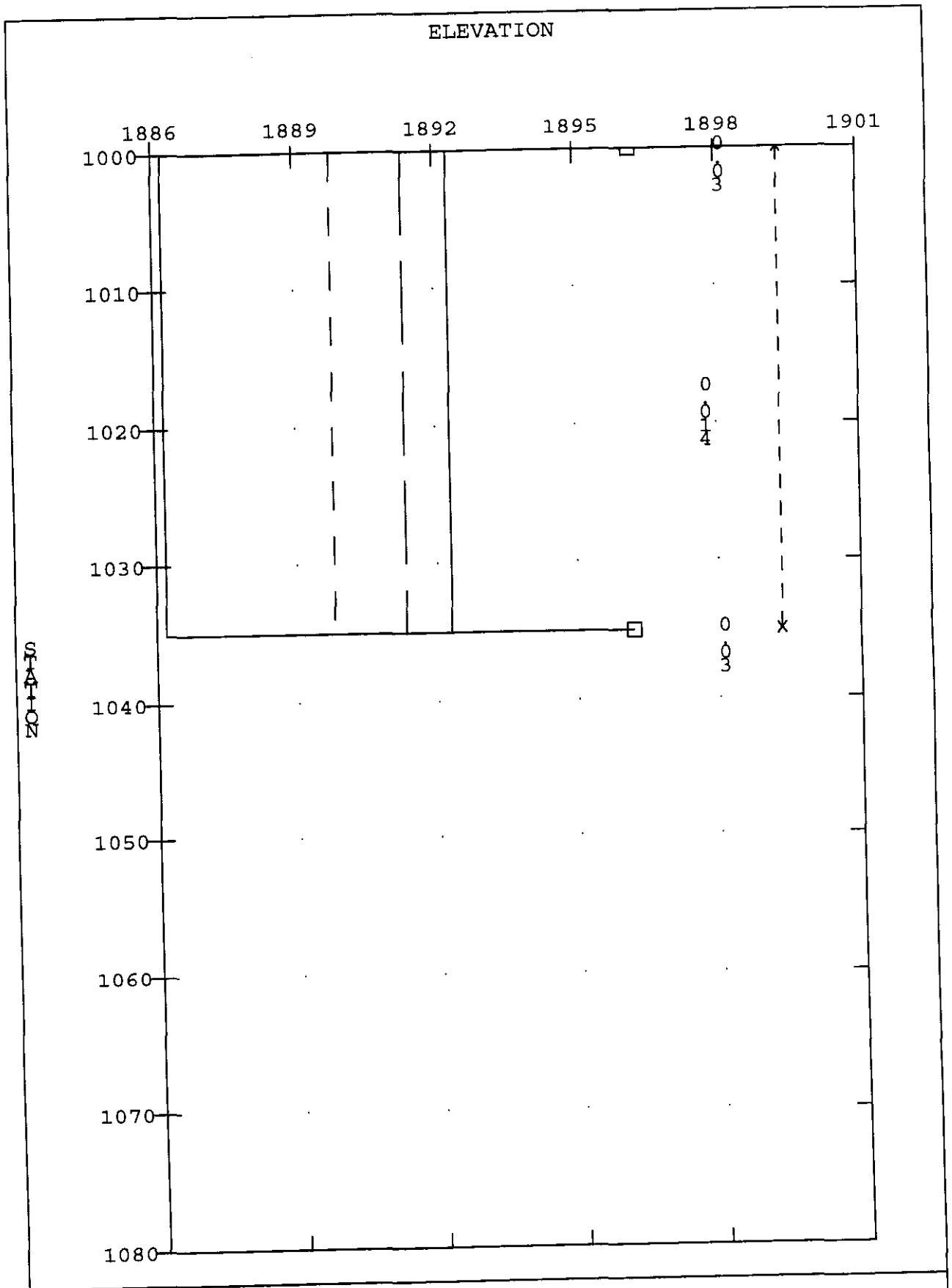
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LNLV WASH



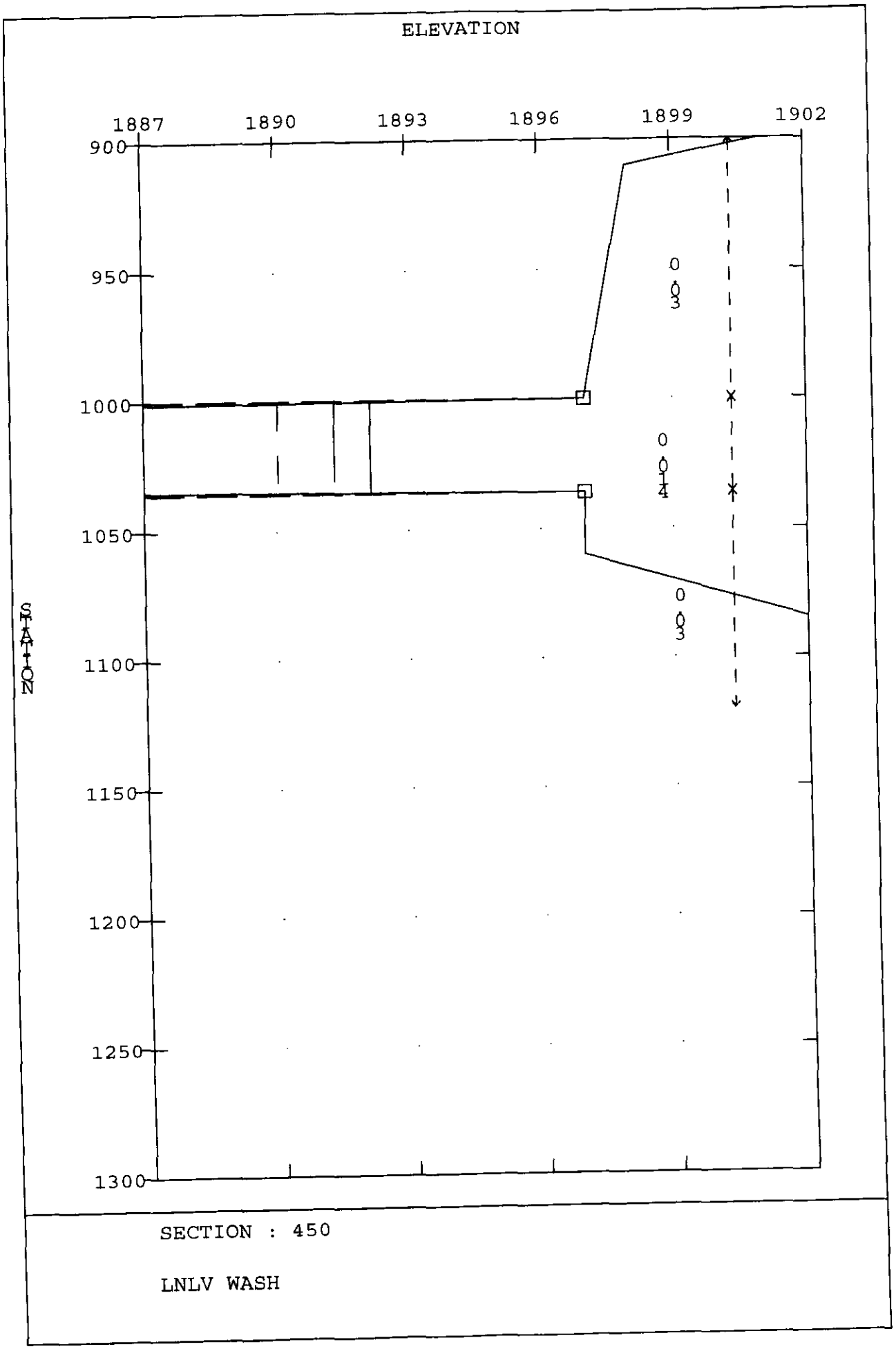
SECTION : 243.6

LNLV WASH



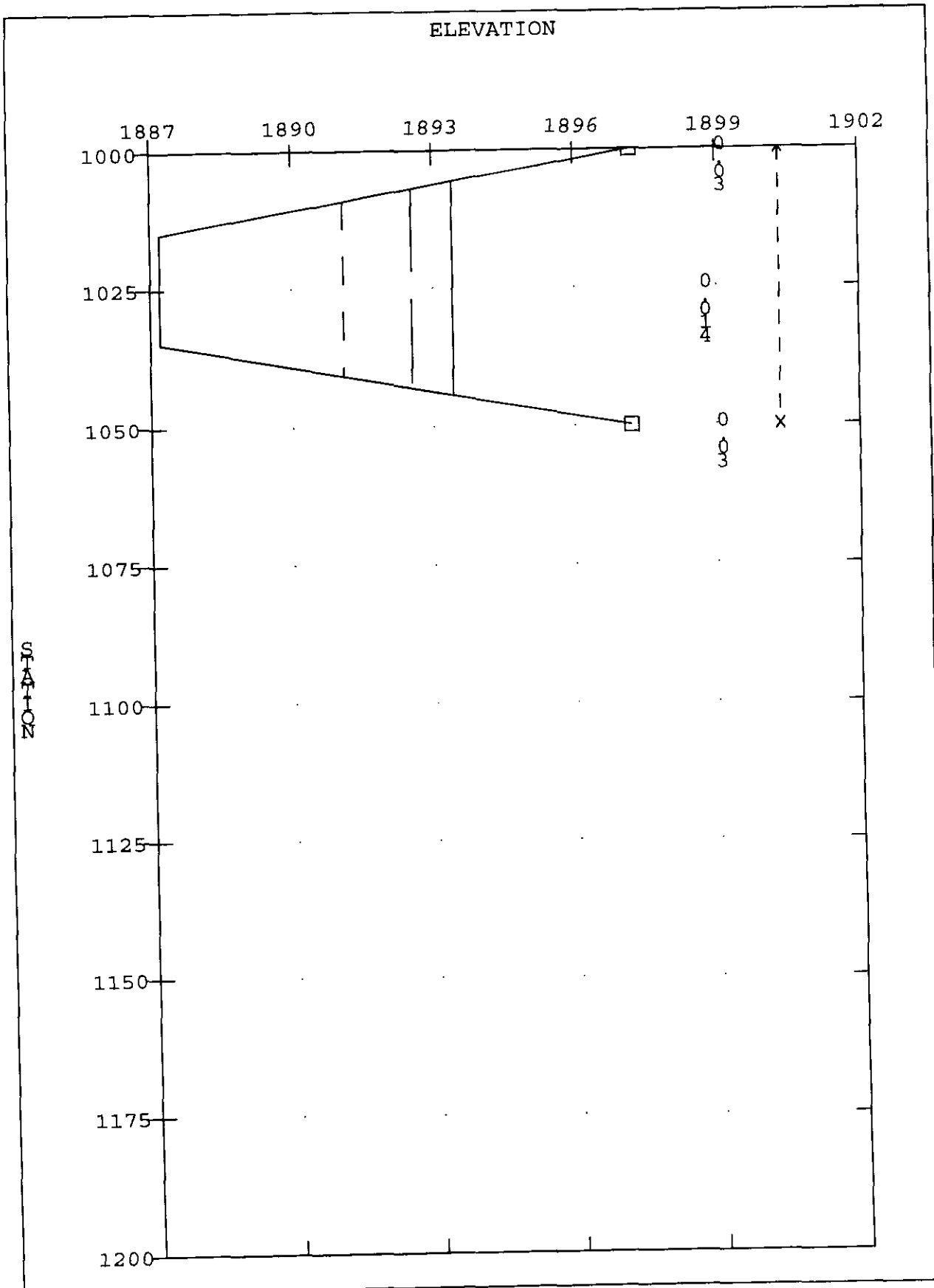
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LNLV WASH



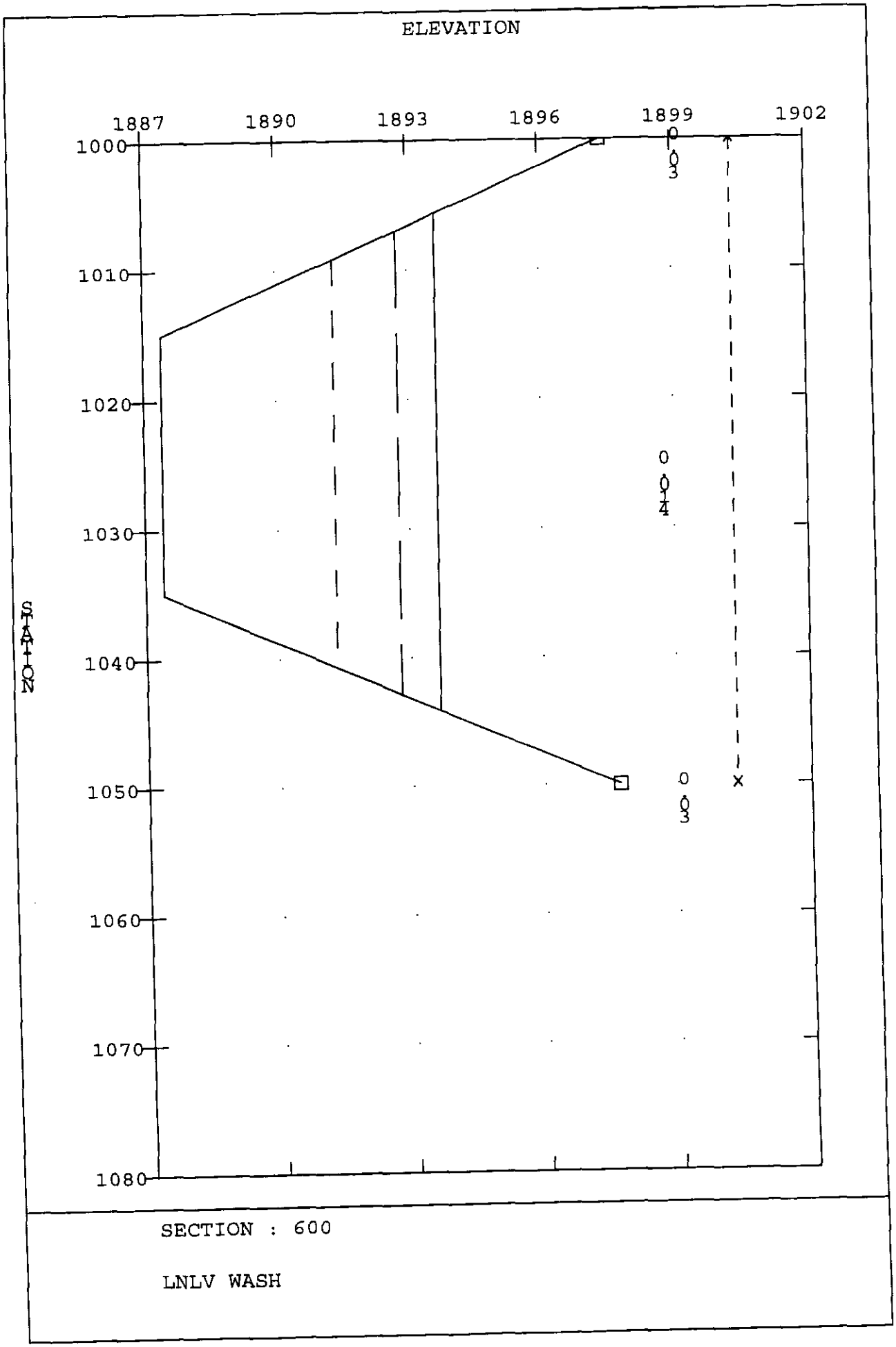
SECTION : 450

LNLV WASH



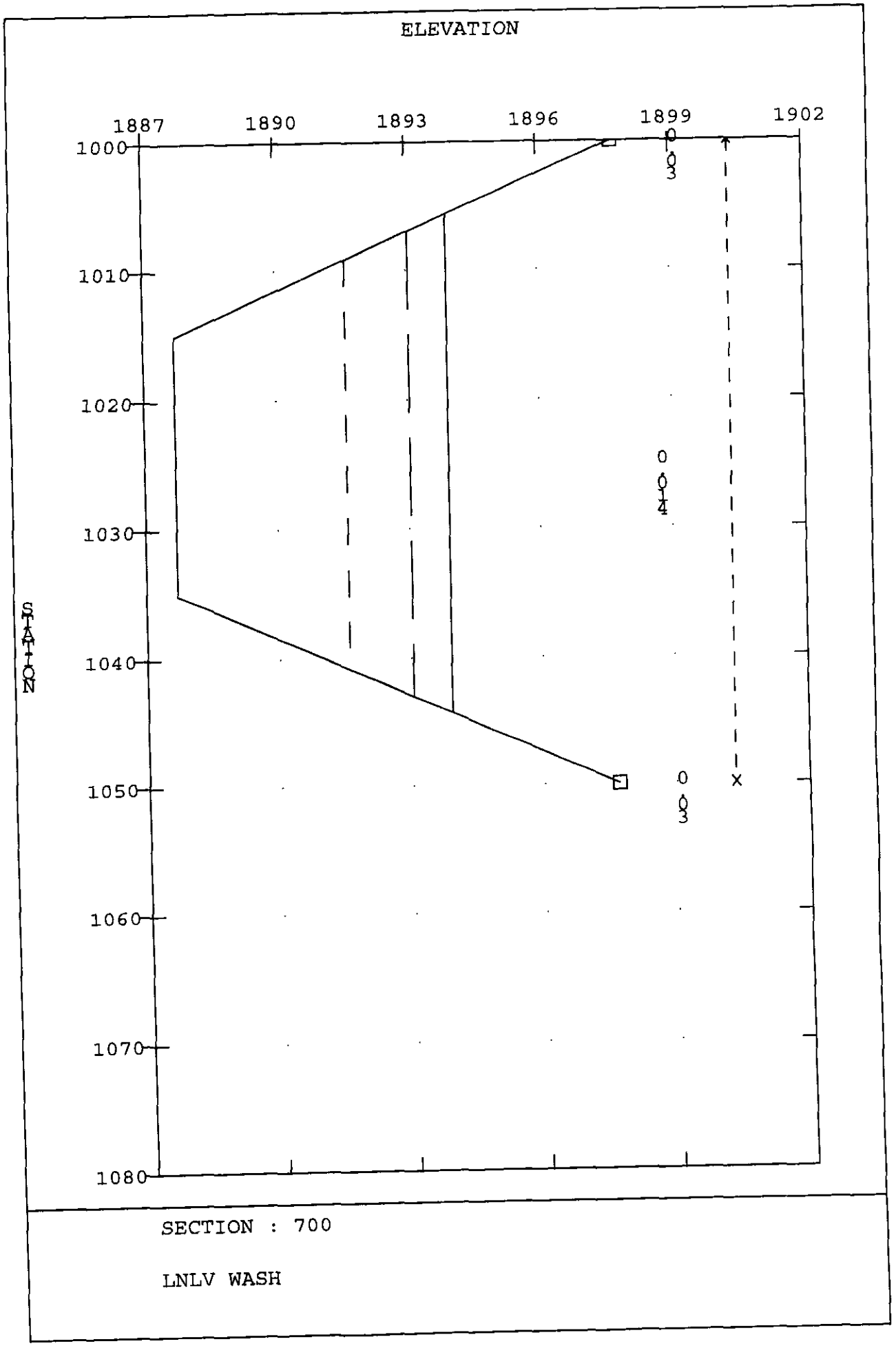
SECTION : 544

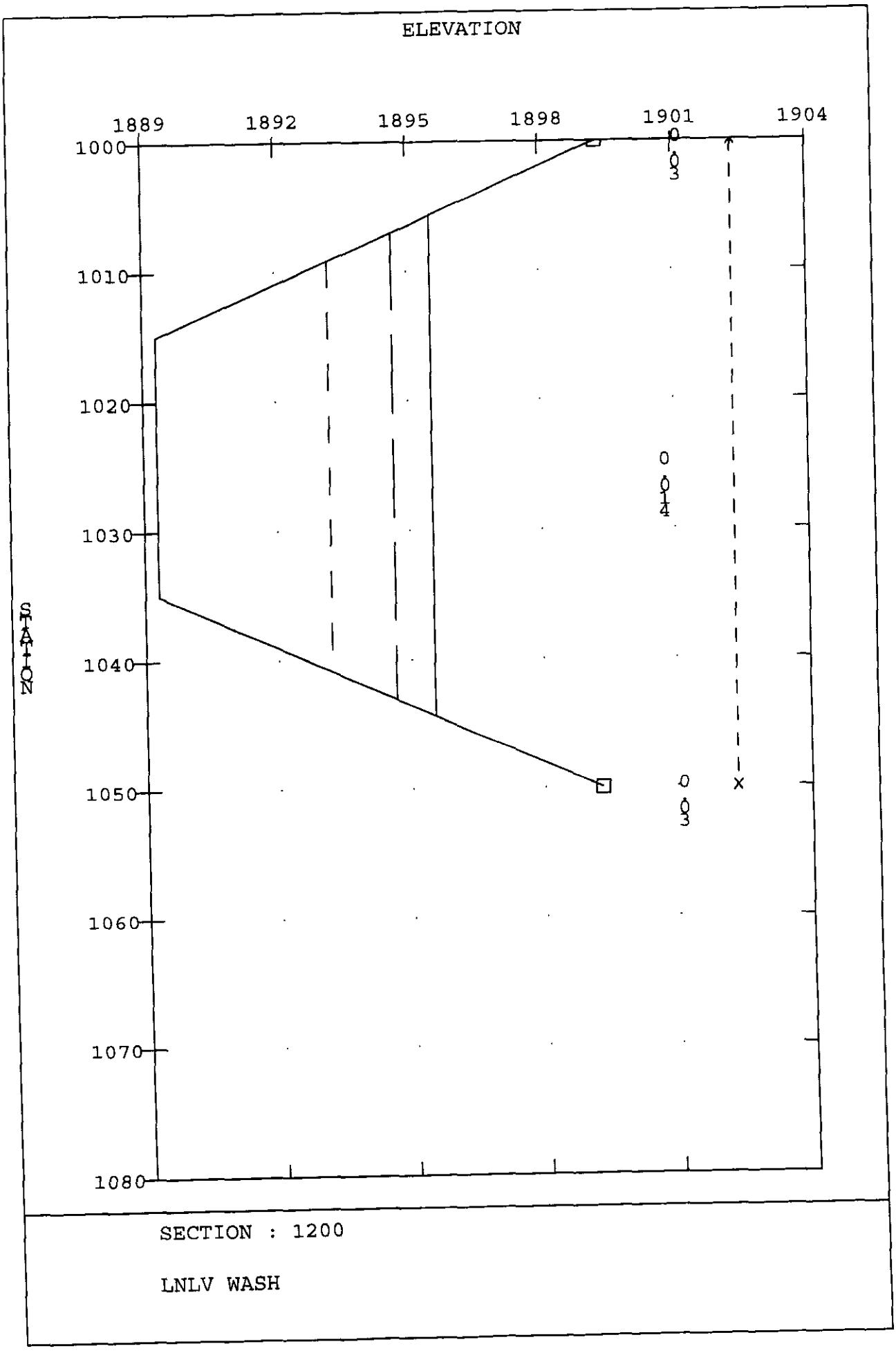
LNLV WASH

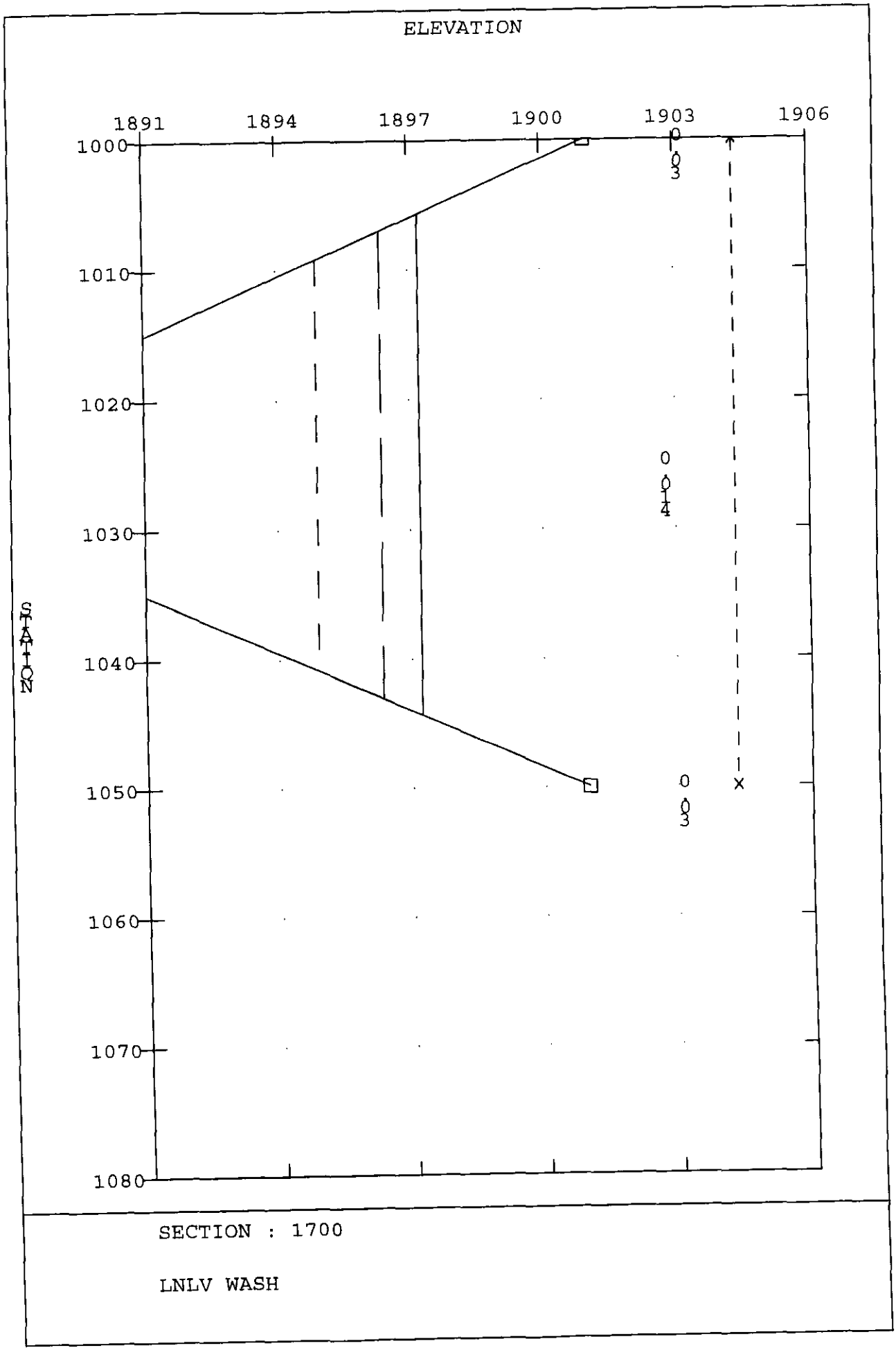


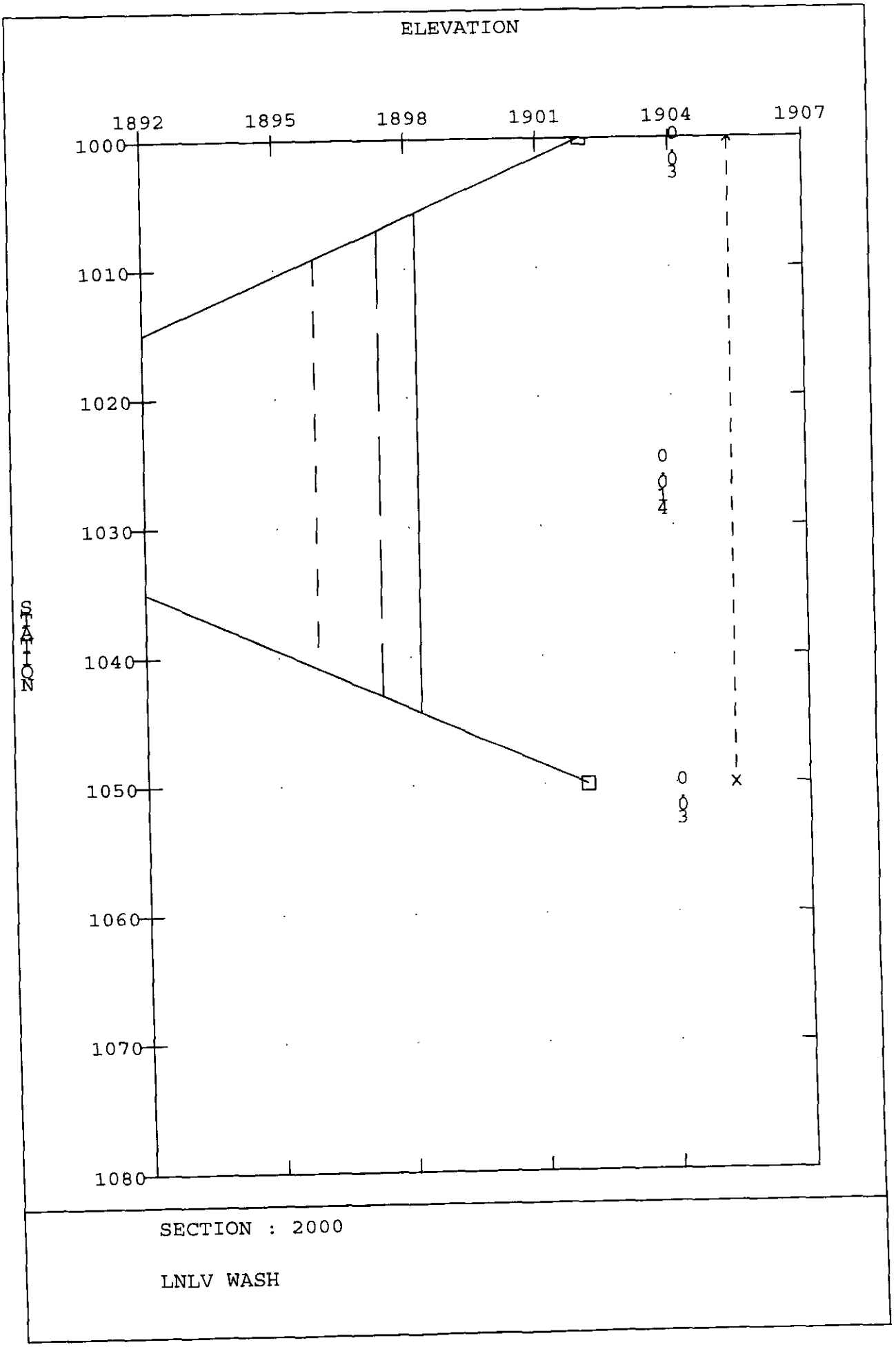
SECTION : 600

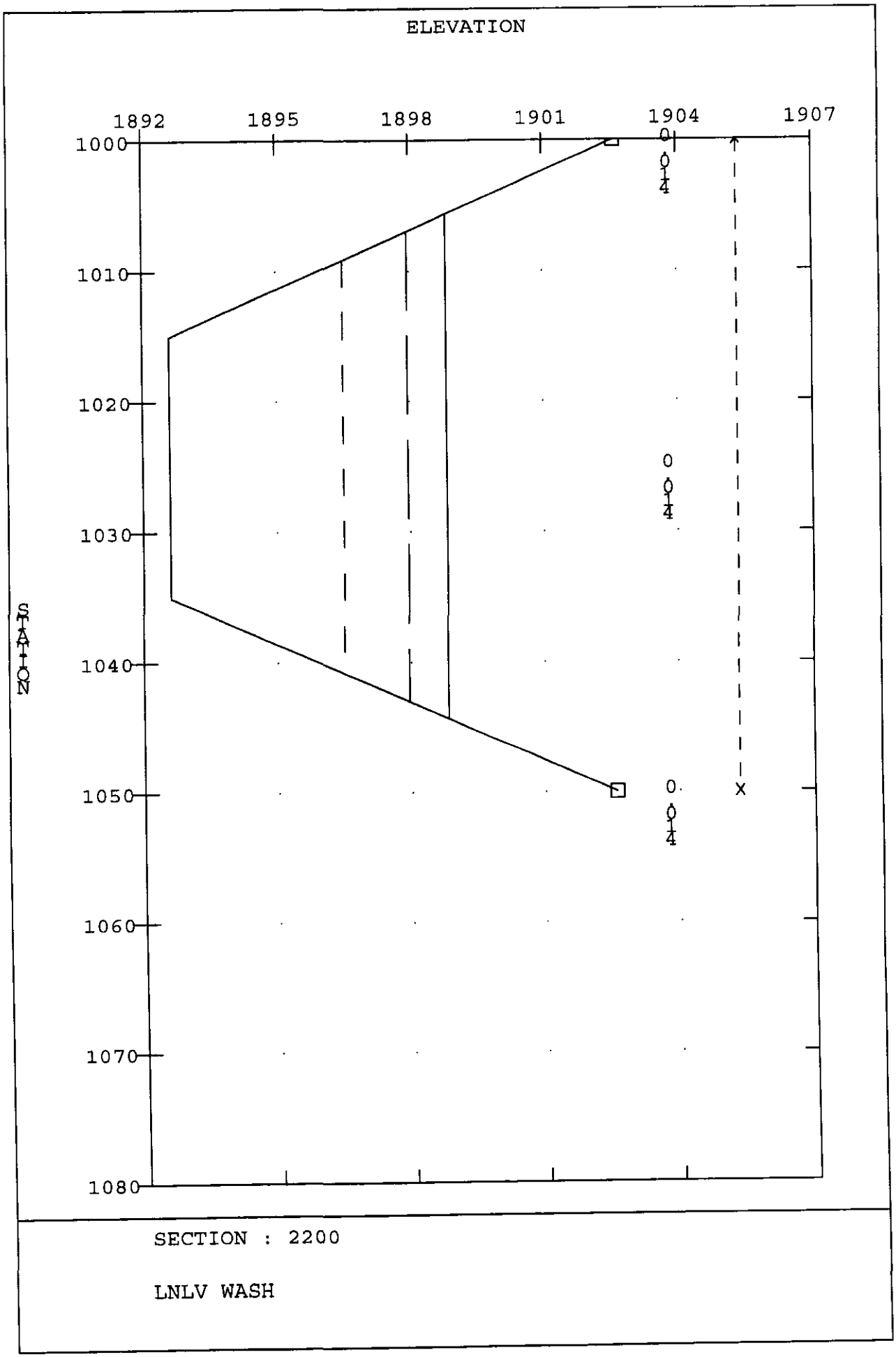
LNLV WASH


ELEVATION
1887
1890
1893
1896
1899
1902
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 700
LNLV WASH


ELEVATION
1889
1892
1895
1898
1901
1904
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 1200
LNLV WASH

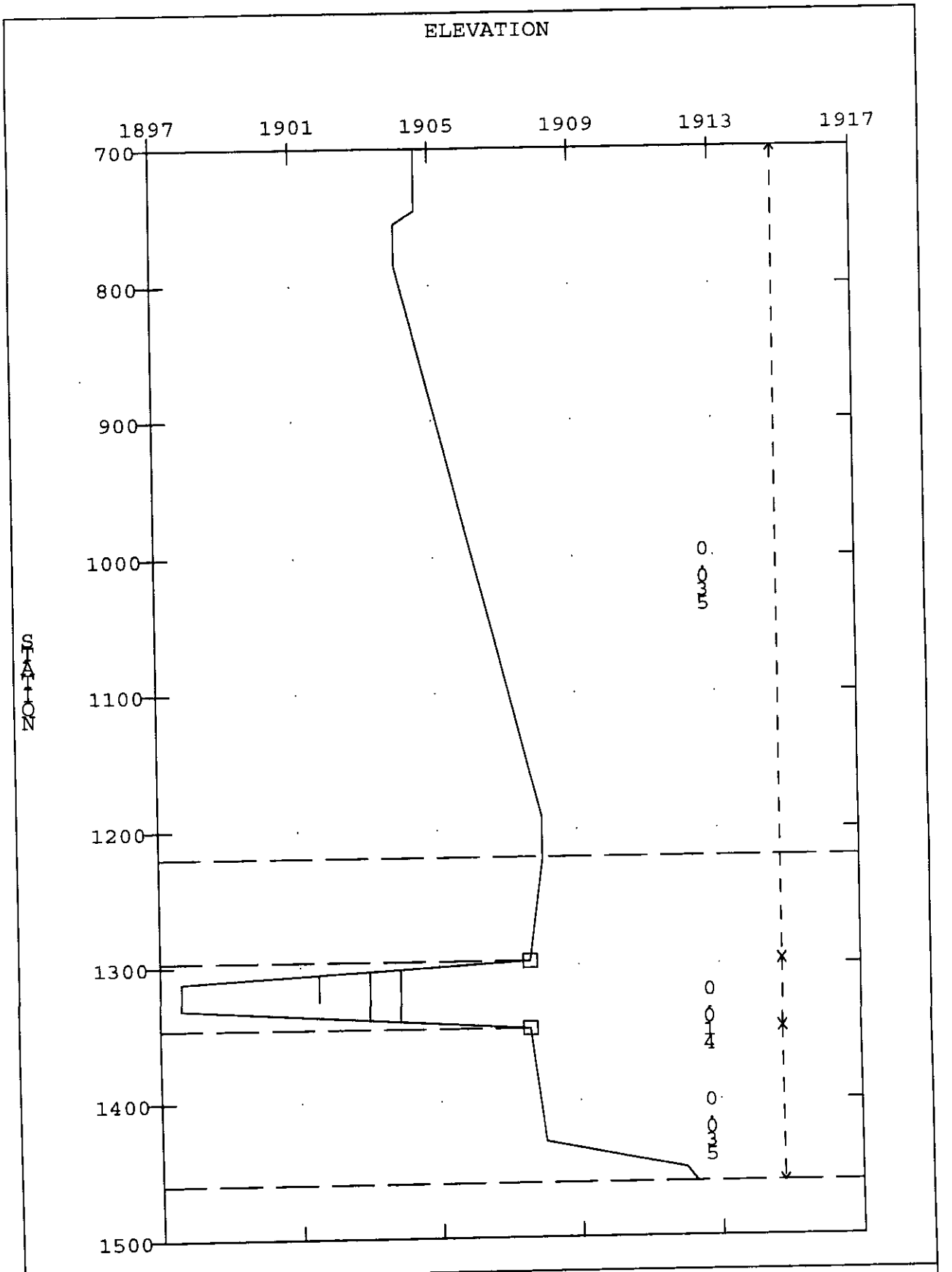

ELEVATION
1891
1894
1897
1900
1903
1906
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 1700
LNLV WASH


ELEVATION
1892
1895
1898
1901
1904
1907
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 2000
LNLV WASH



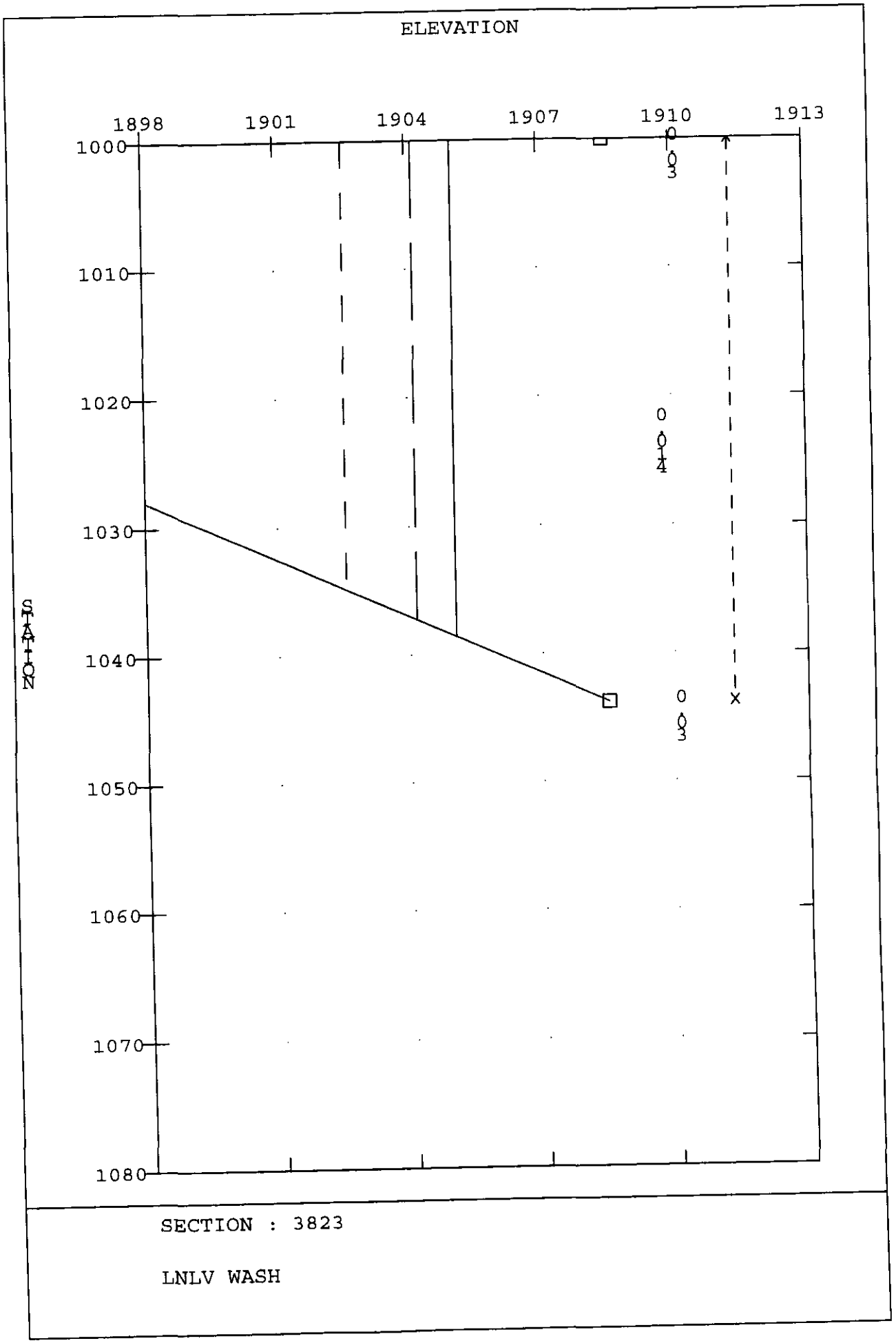
SECTION : 2200

LNLV WASH



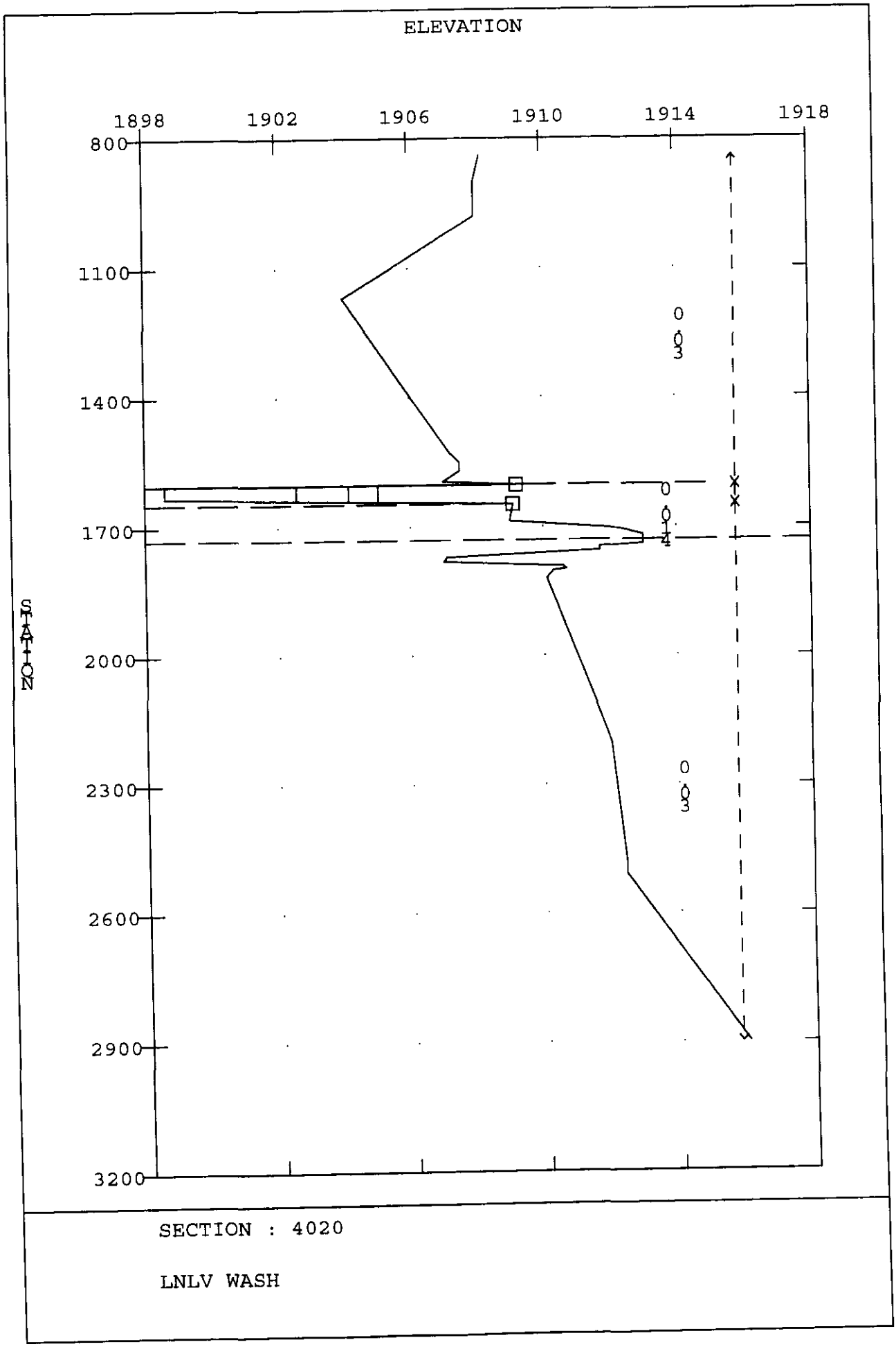
SECTION : 3724

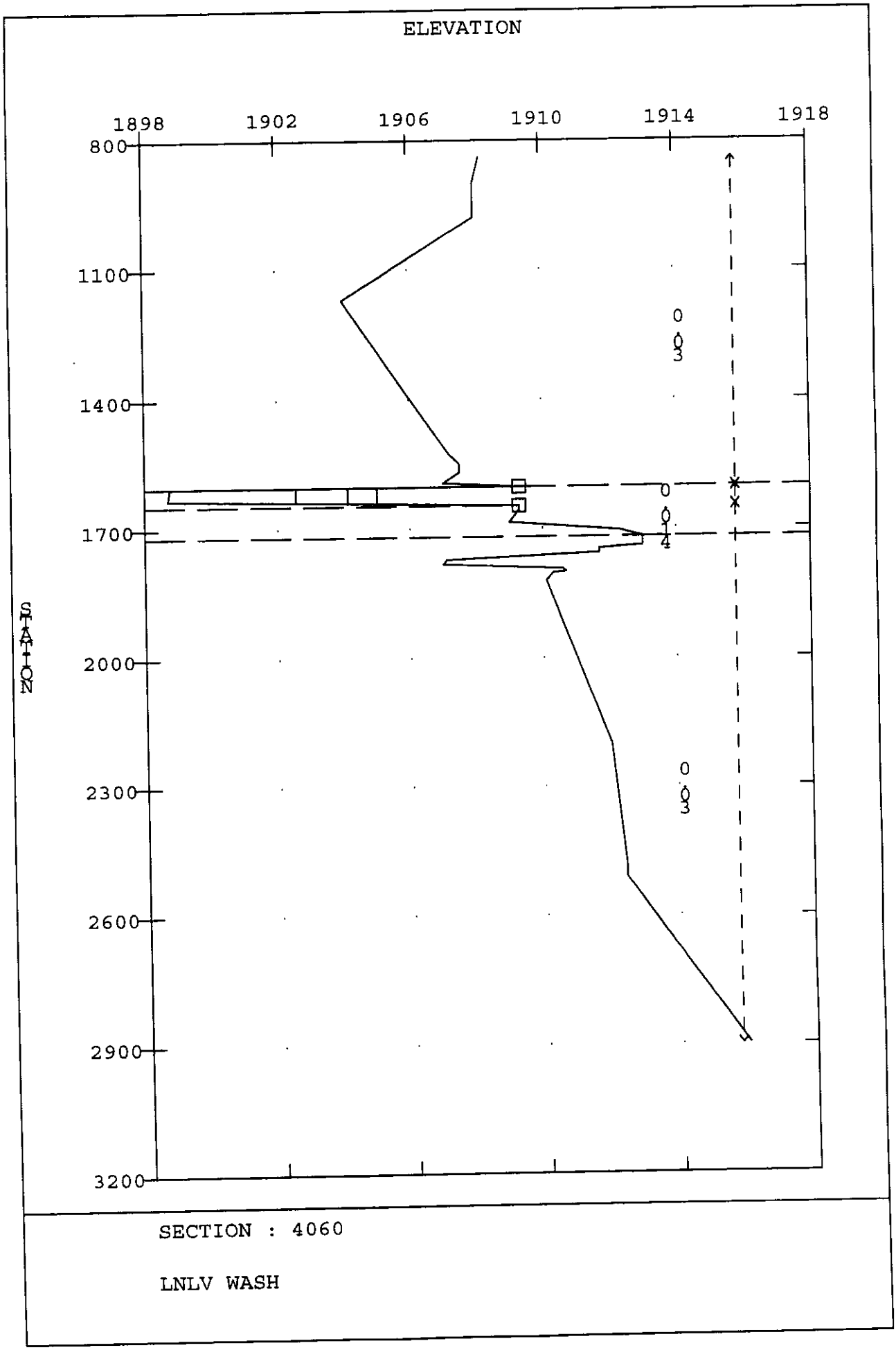
LNLV WASH



SECTION : 3823

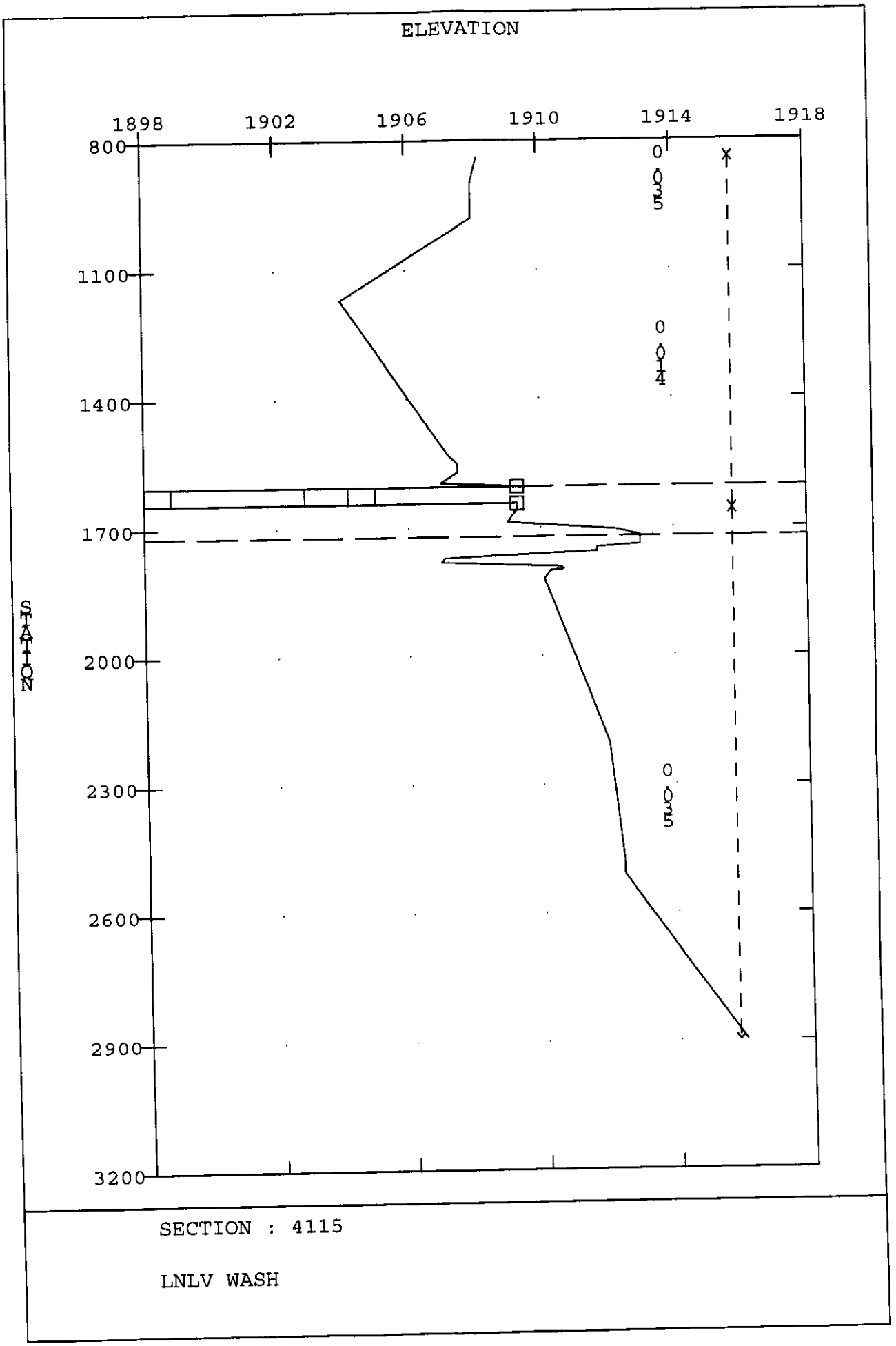
LNLV WASH

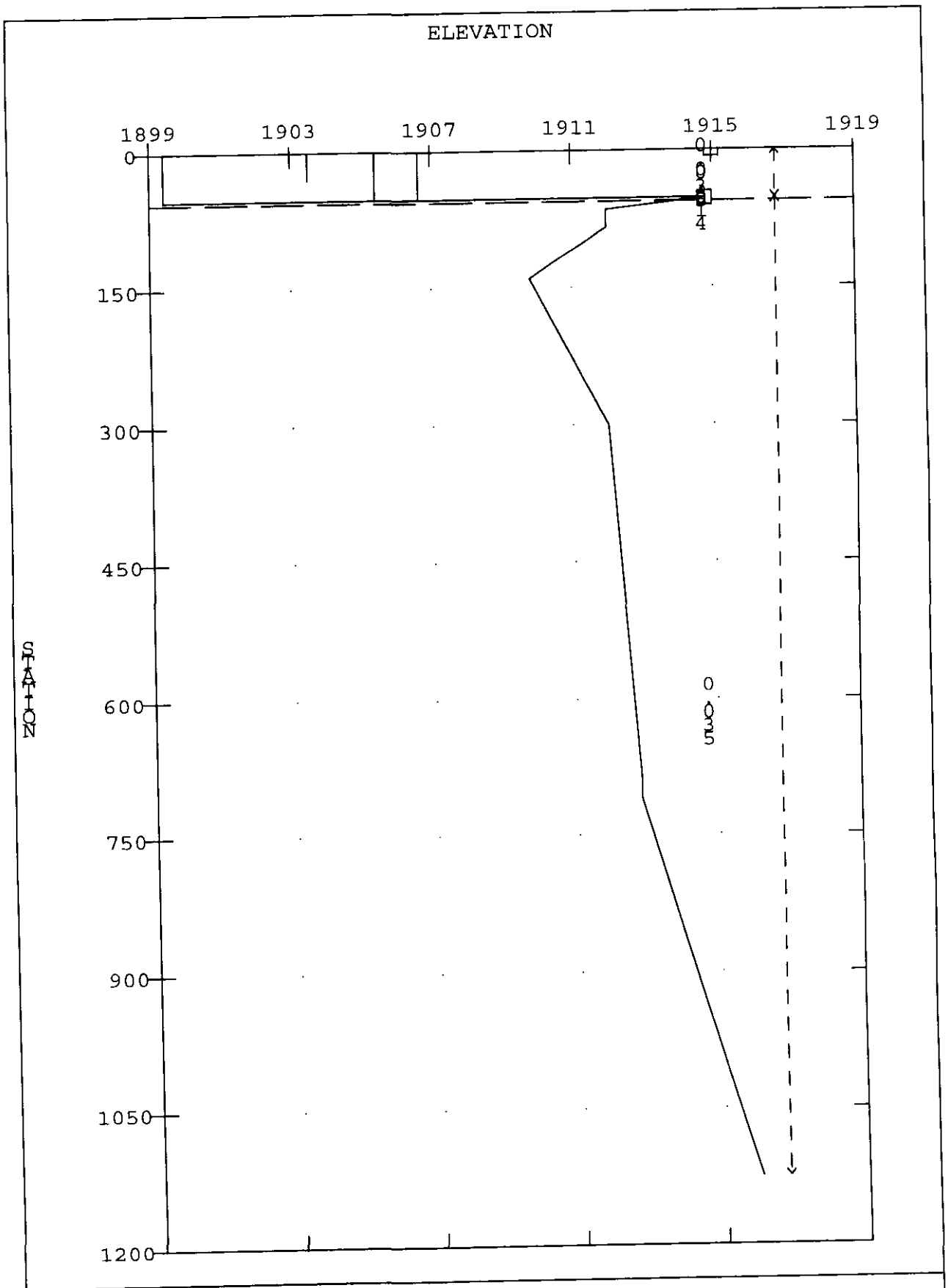

ELEVATION
1898
1902
1906
1910
1914
1918
800
1100
1400
1700
2000
2300
2600
2900
3200
STATION
SECTION : 4020
LNLV WASH



SECTION : 4060

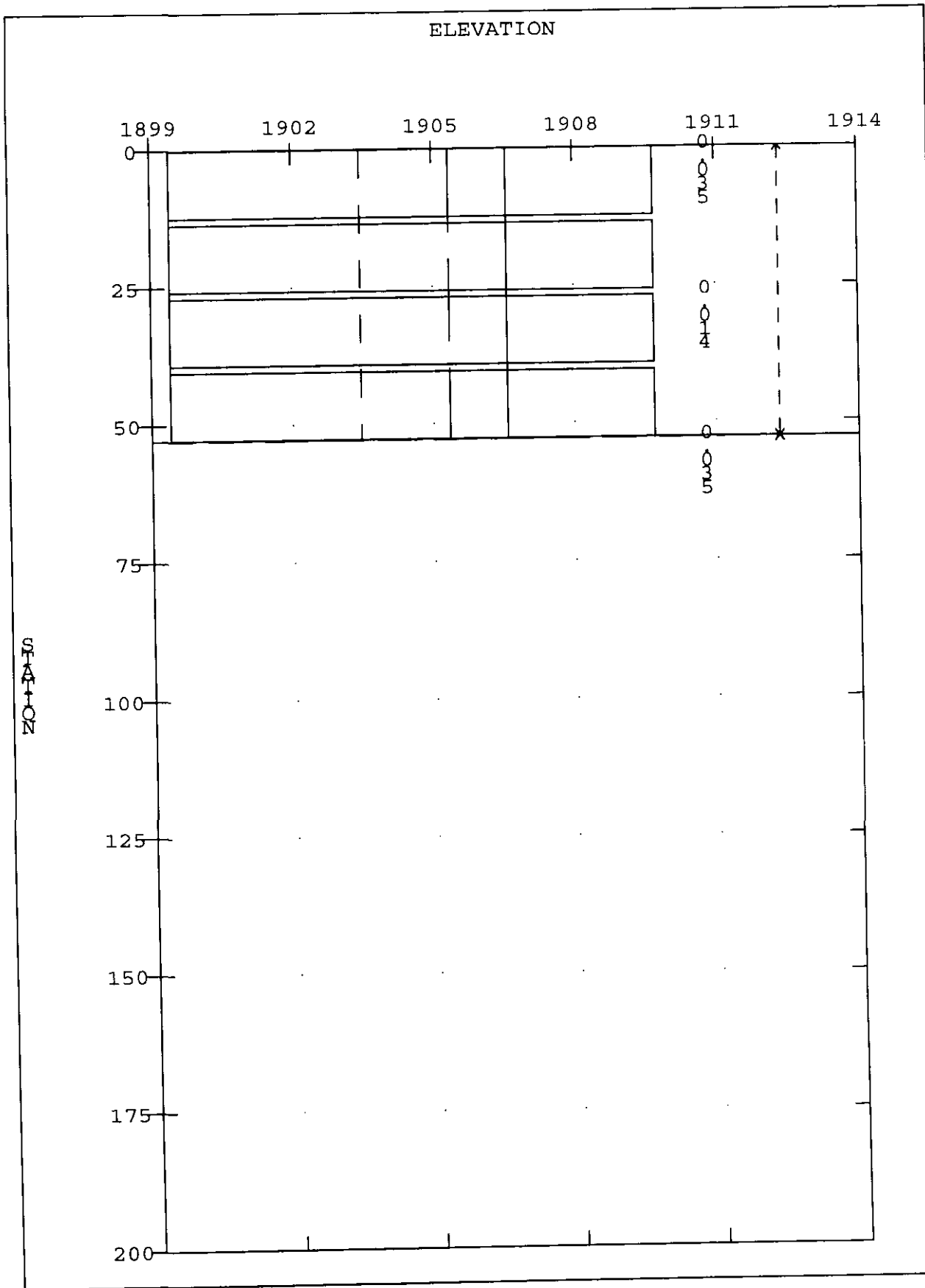
LNLV WASH


ELEVATION
1898
1902
1906
1910
1914
1918
800
1100
1400
1700
2000
2300
2600
2900
3200
STATION
0
0
0
SECTION : 4115
LNLV WASH



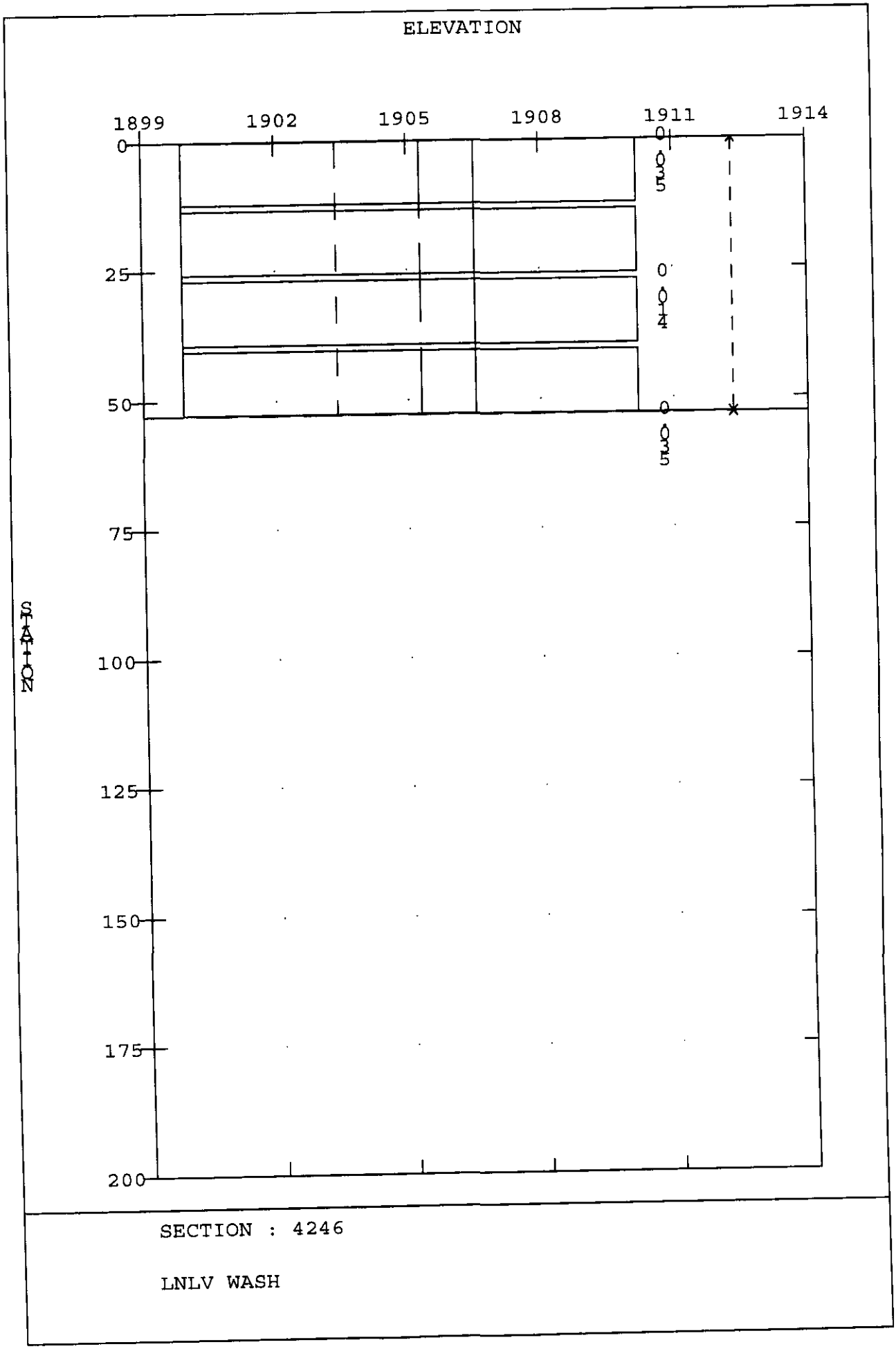
SECTION : 4188

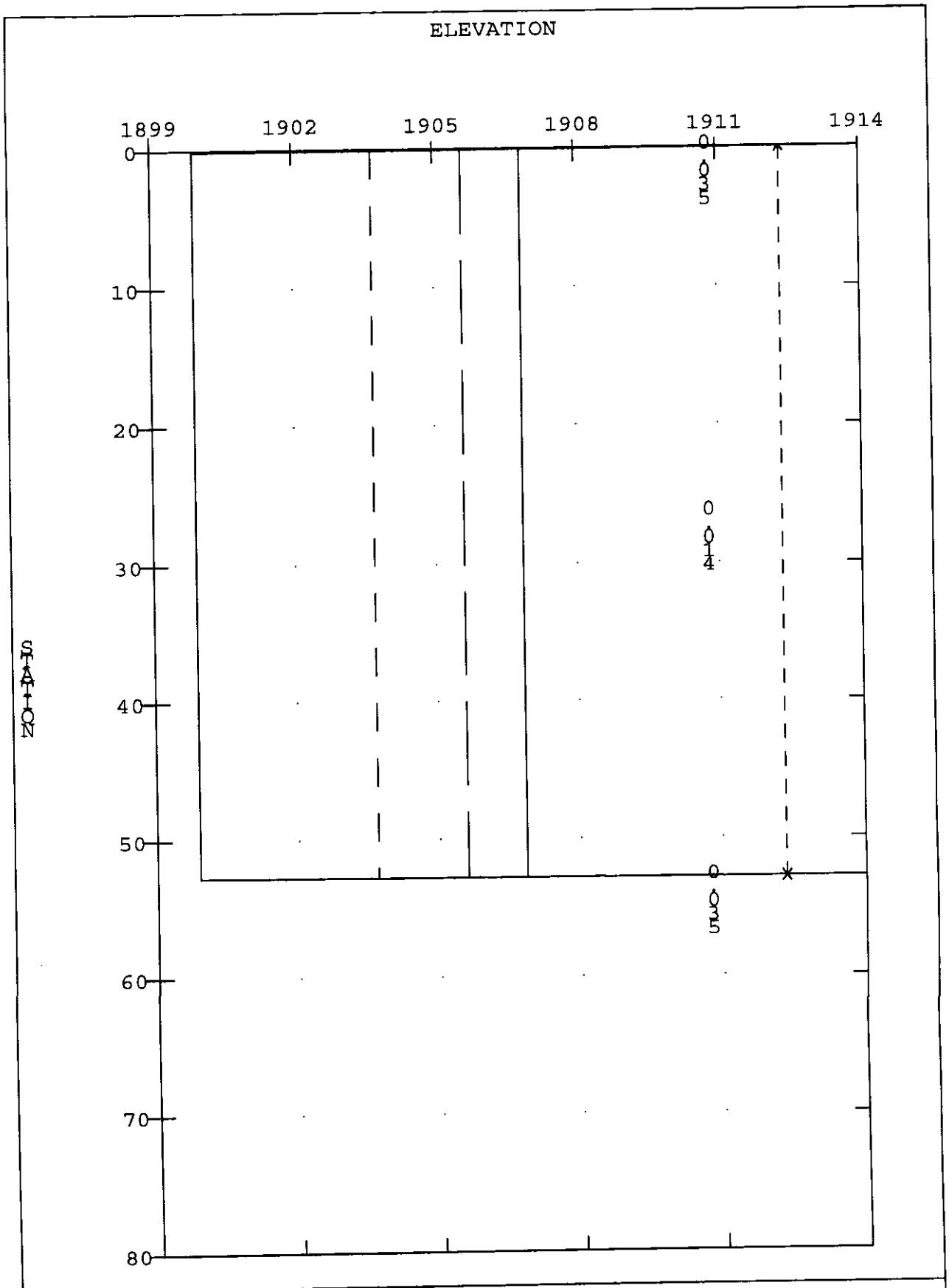
LNLV WASH

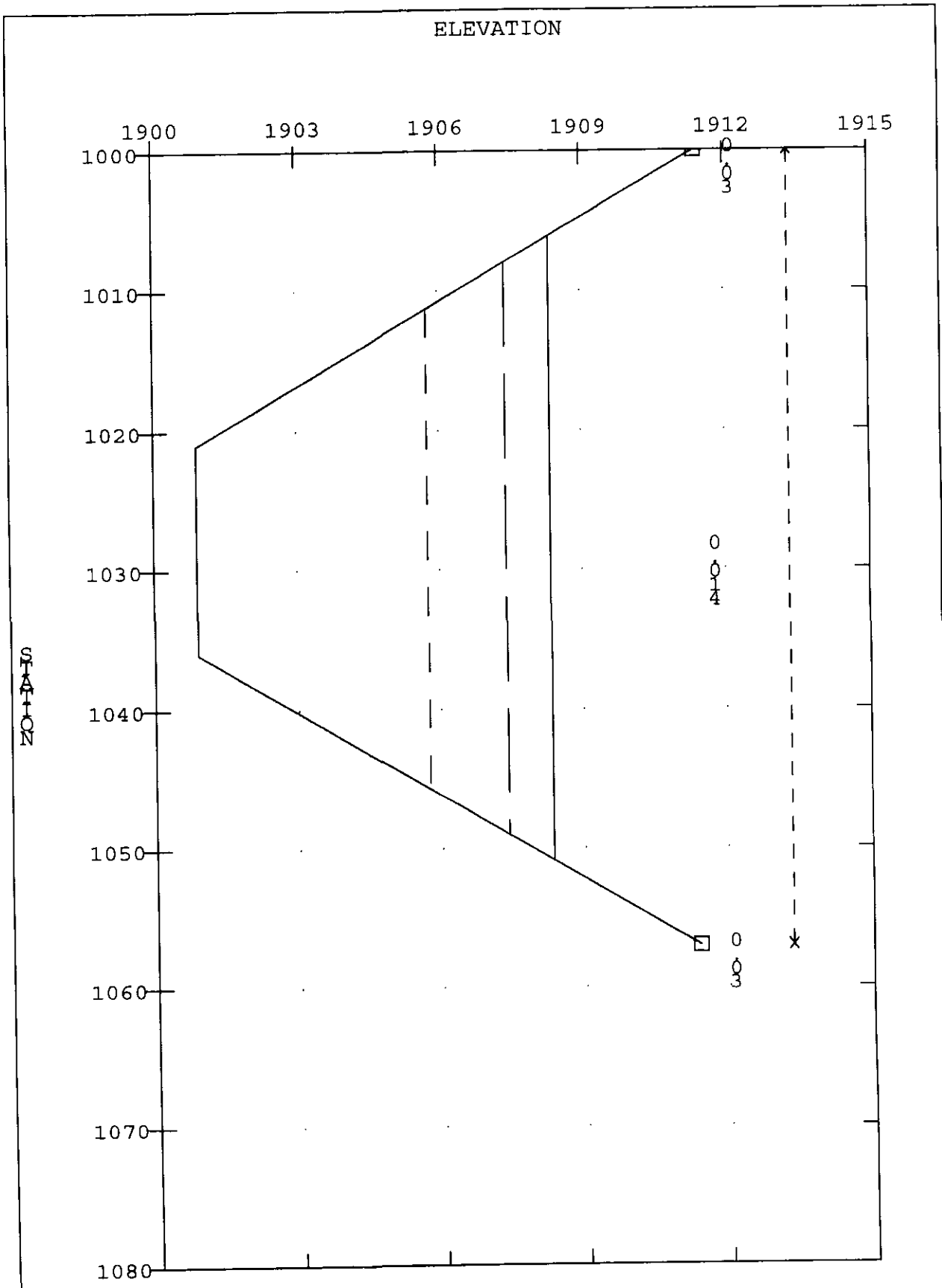


SECTION : 4189

LNLV WASH

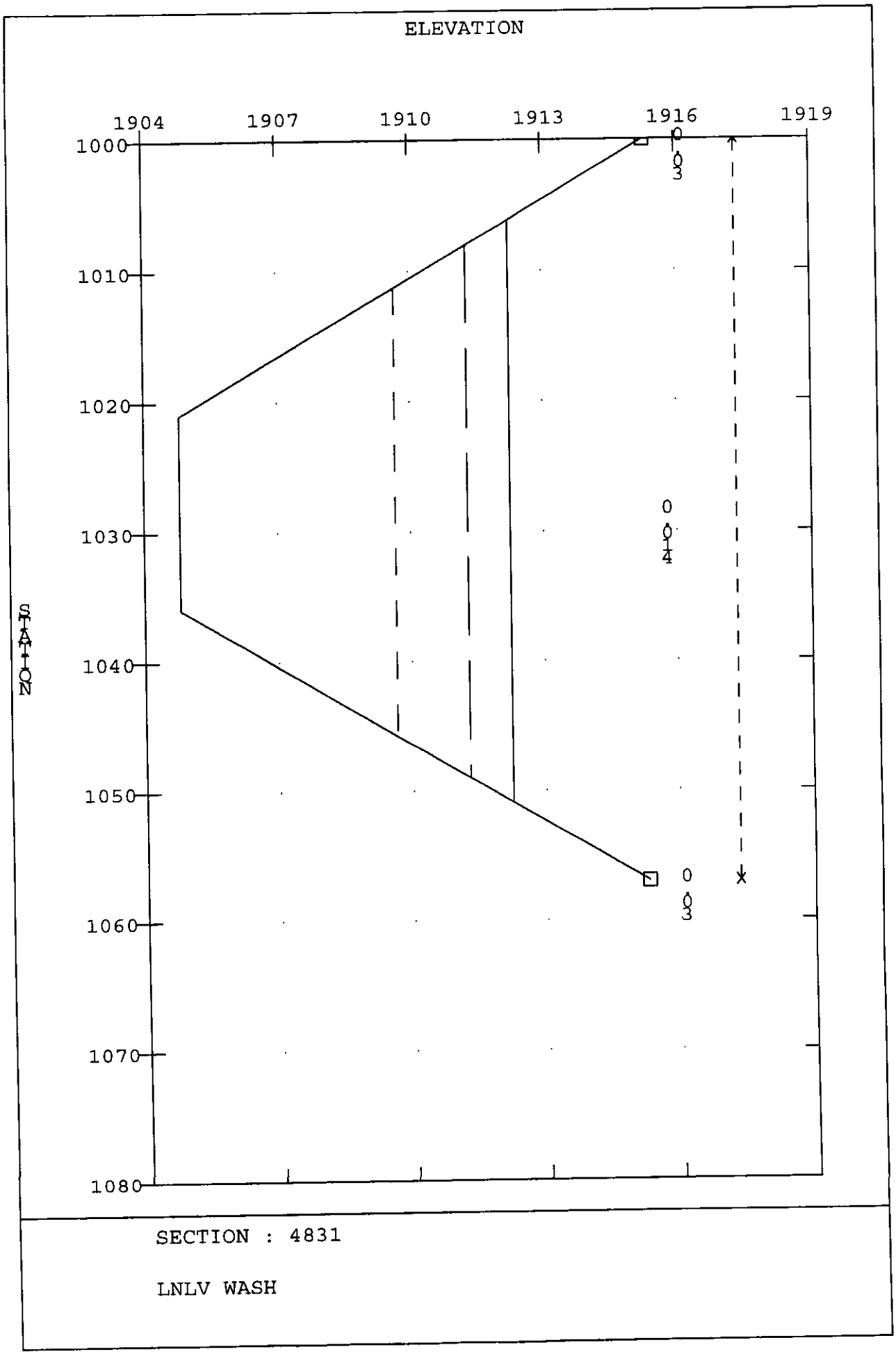

ELEVATION
1899
1902
1905
1908
1911
1914
0
25
50
75
100
125
150
175
200
STATION
0
0
3
5
0
0
1
4
0
0
3
5
SECTION : 4246
LNLV WASH


ELEVATION
1899
1902
1905
1908
1911
1914
0
10
20
30
40
50
60
70
80
STATION
0
0
0
SECTION : 4247
LNLV WASH



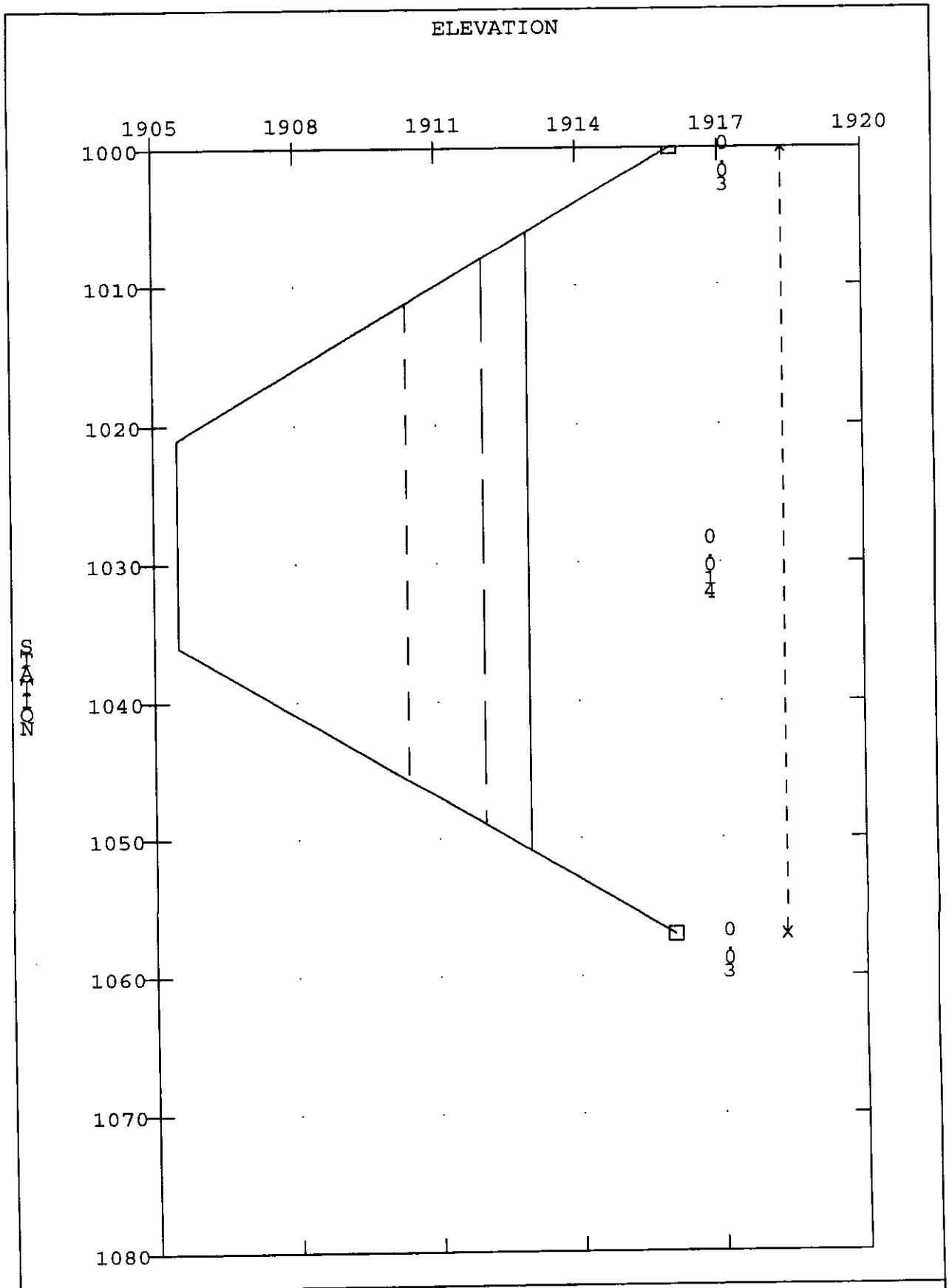
SECTION : 4360

LNLV WASH



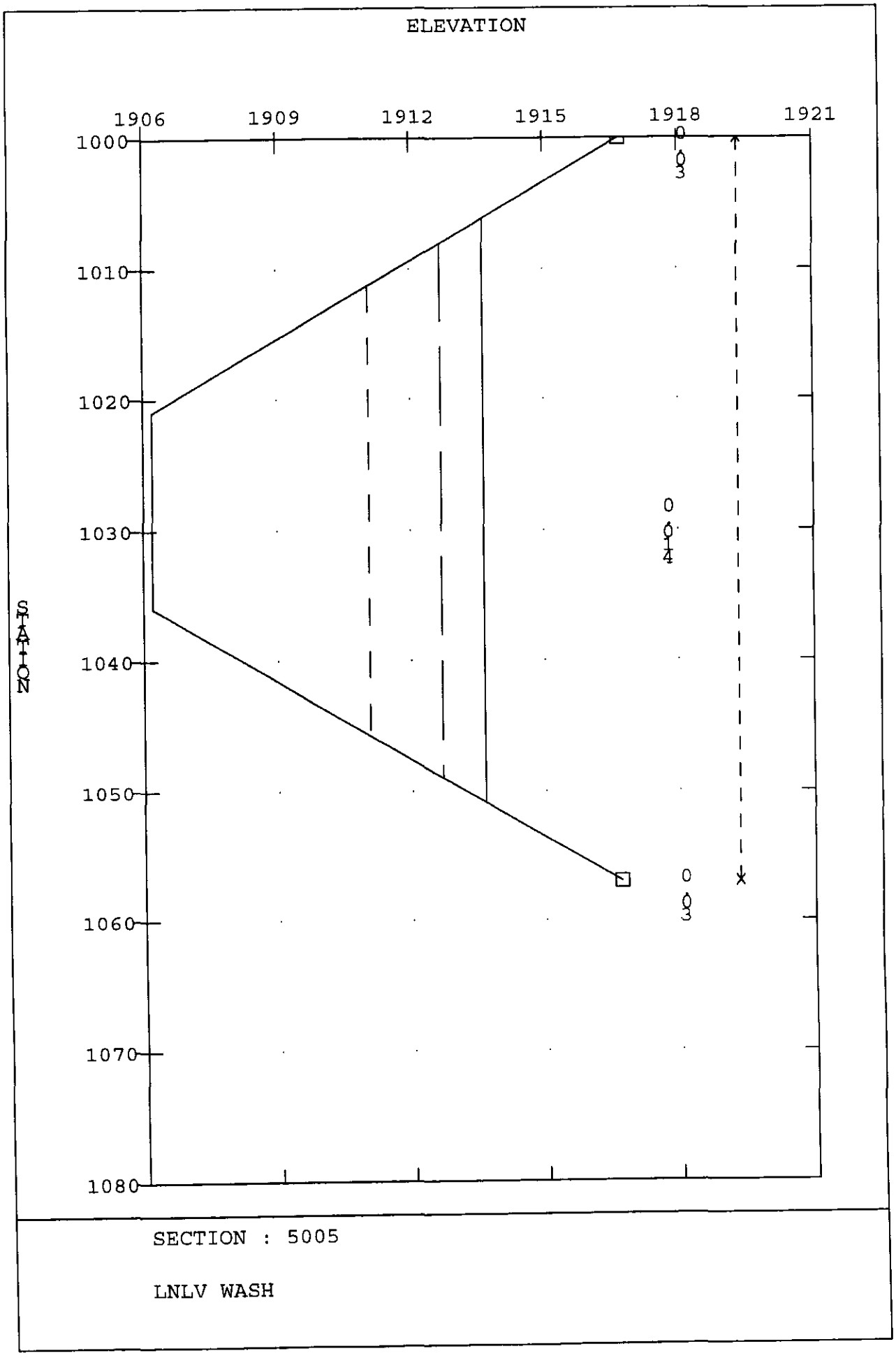
SECTION : 4831

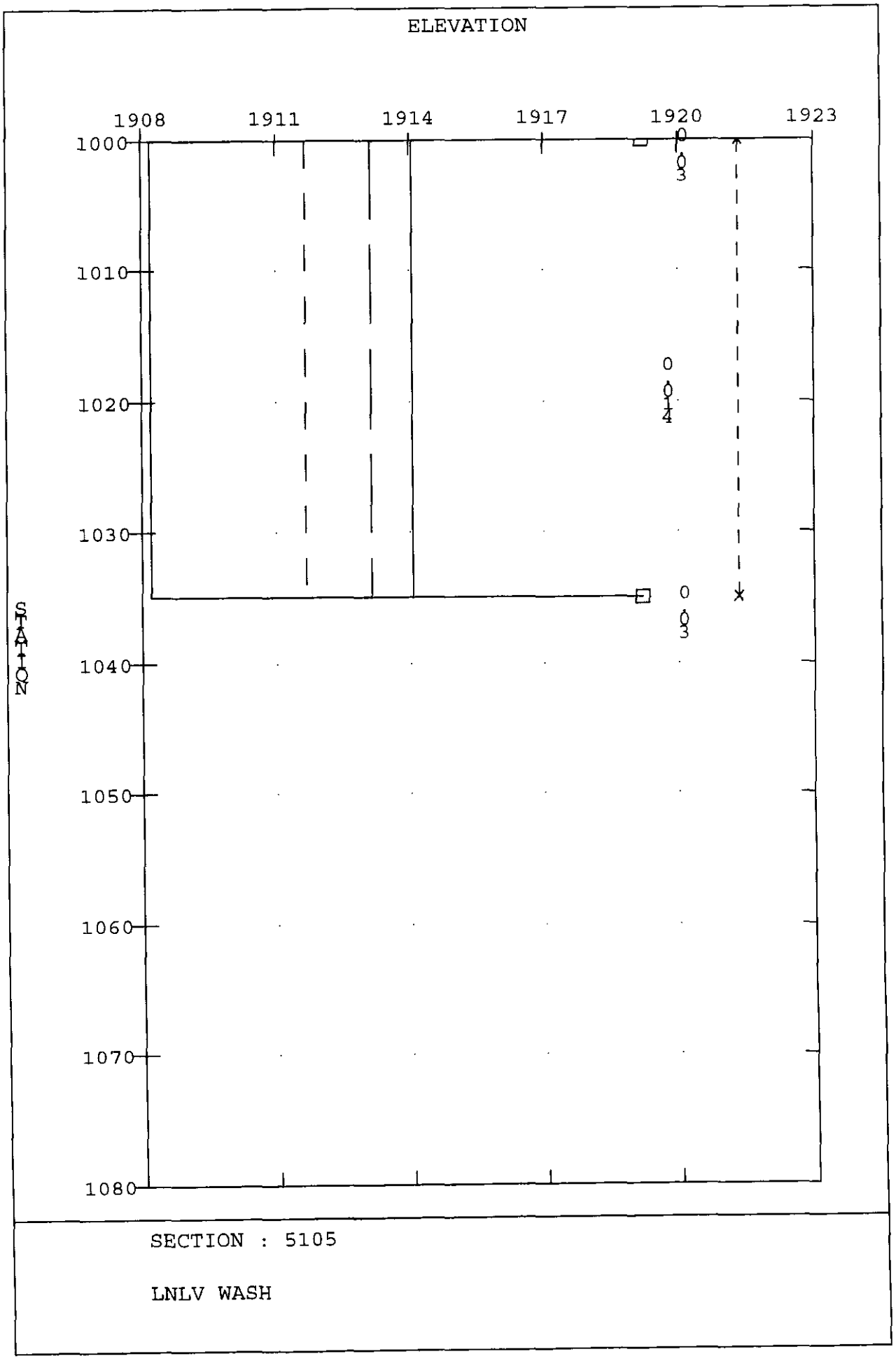
LNLV WASH



SECTION : 4920

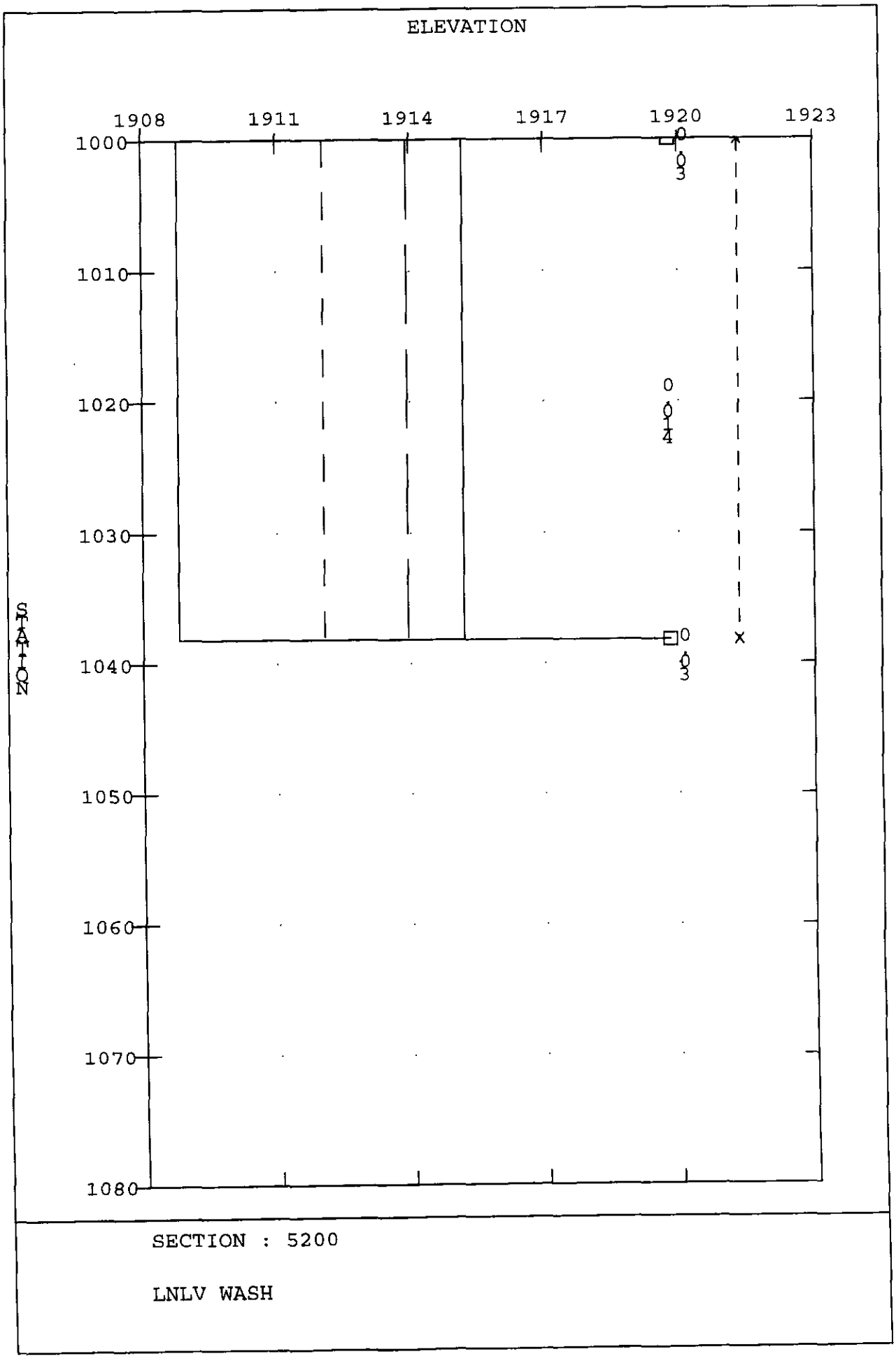
LNLV WASH


ELEVATION
1906
1909
1912
1915
1918
1921
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 5005
LNLV WASH



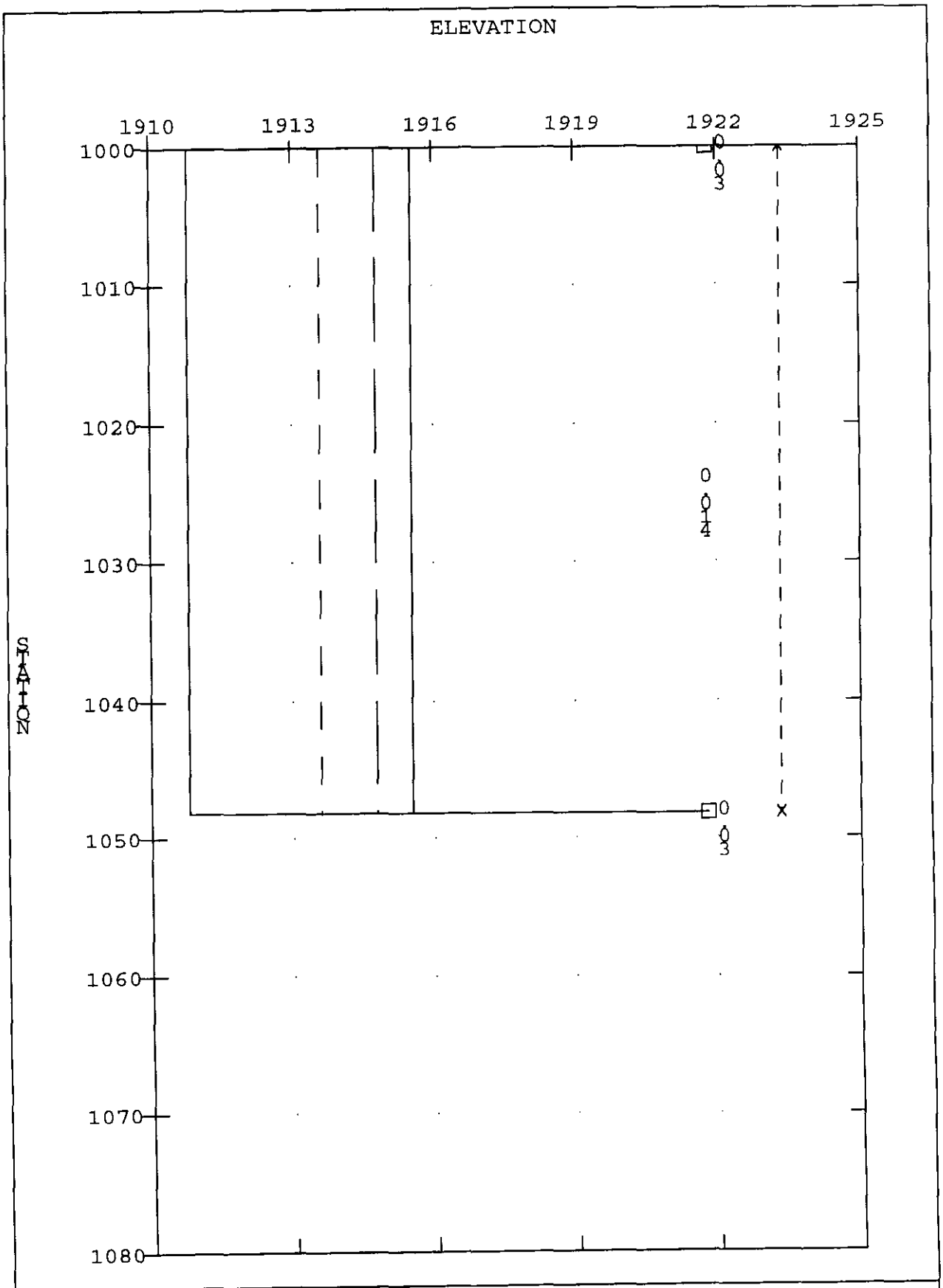
SECTION : 5105

LNLV WASH



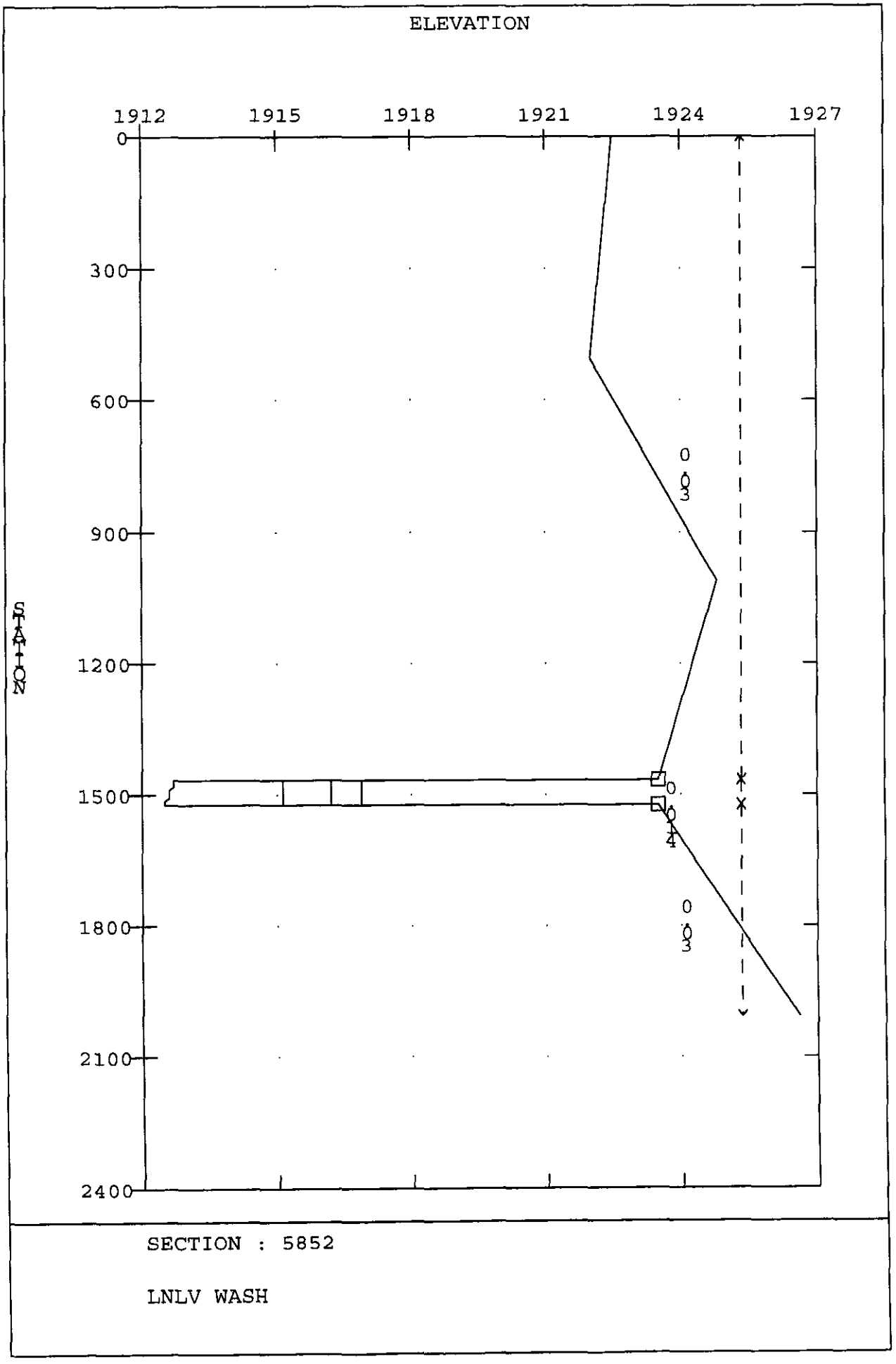
SECTION : 5200

LNLV WASH



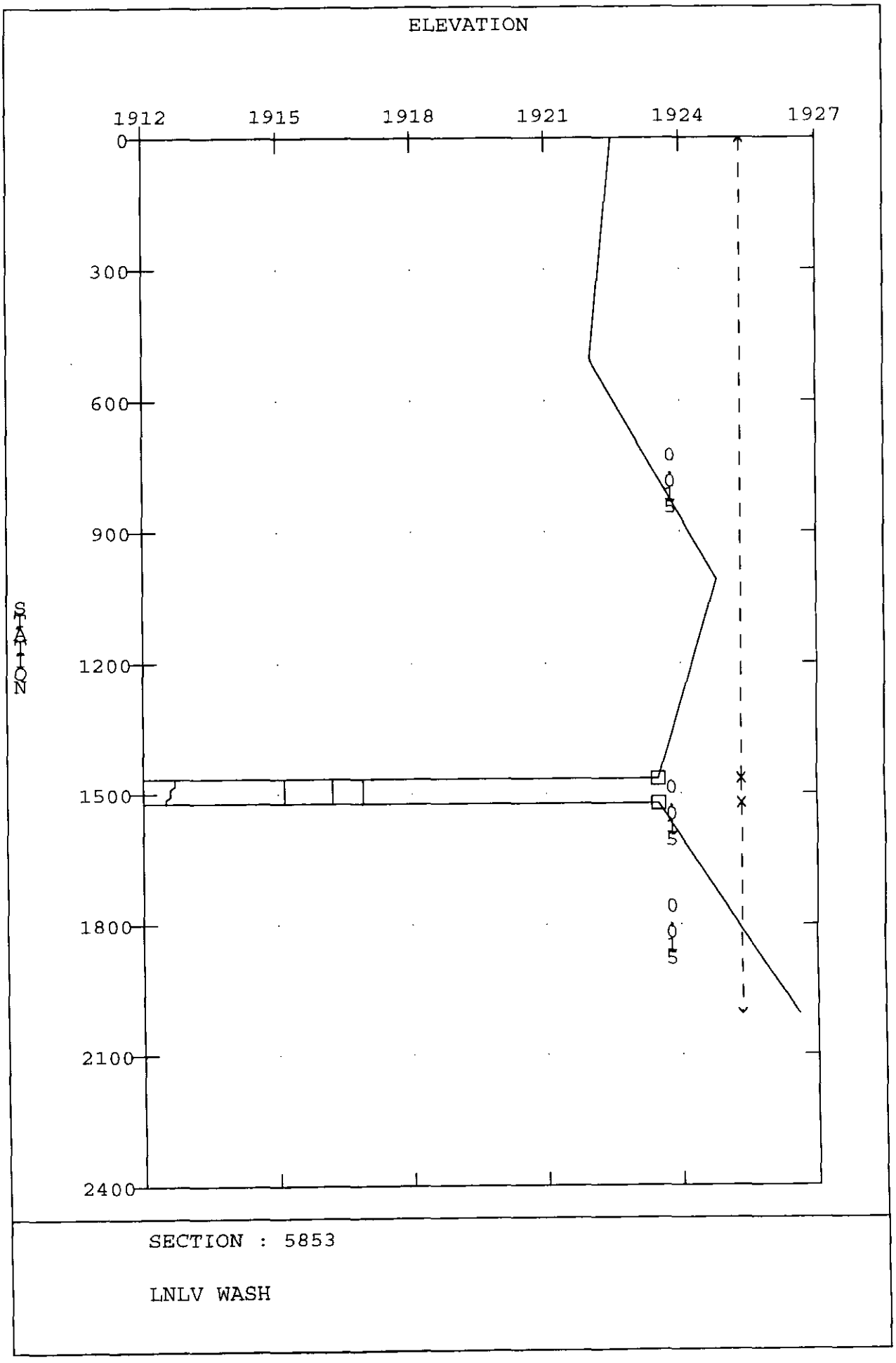
SECTION : 5500

LNLV WASH



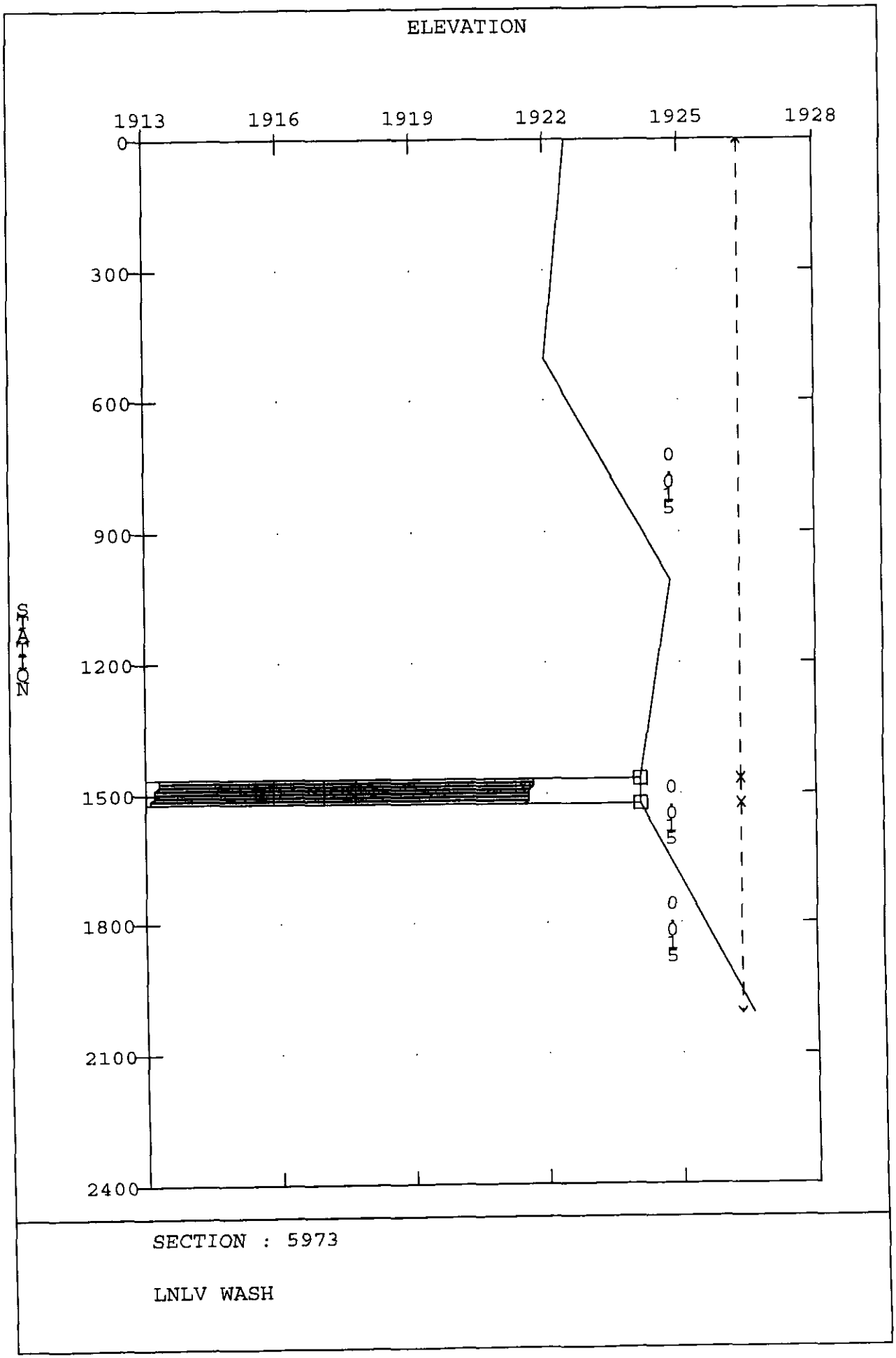
SECTION : 5852

LNLV WASH



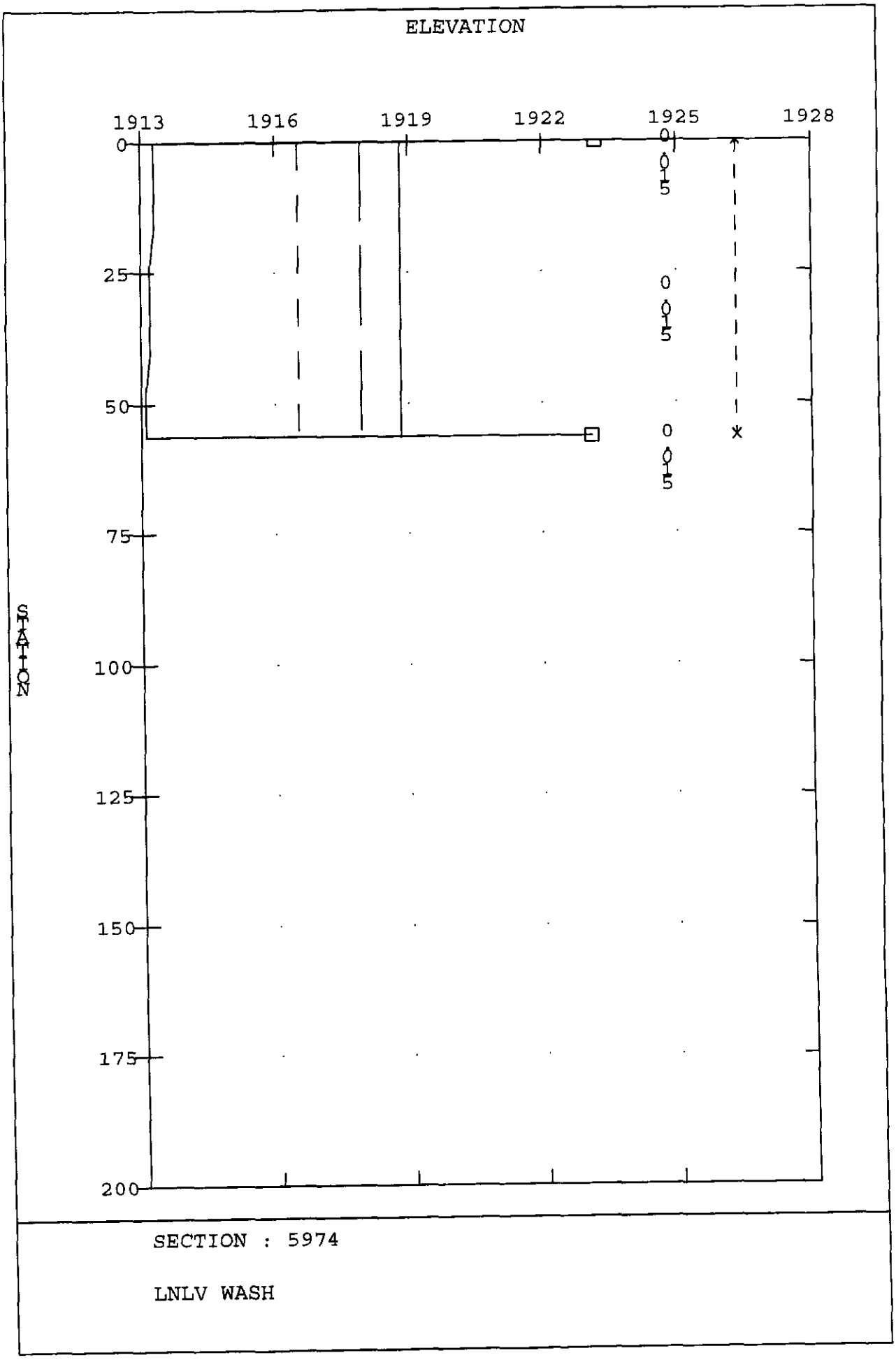
SECTION : 5853

LNLV WASH



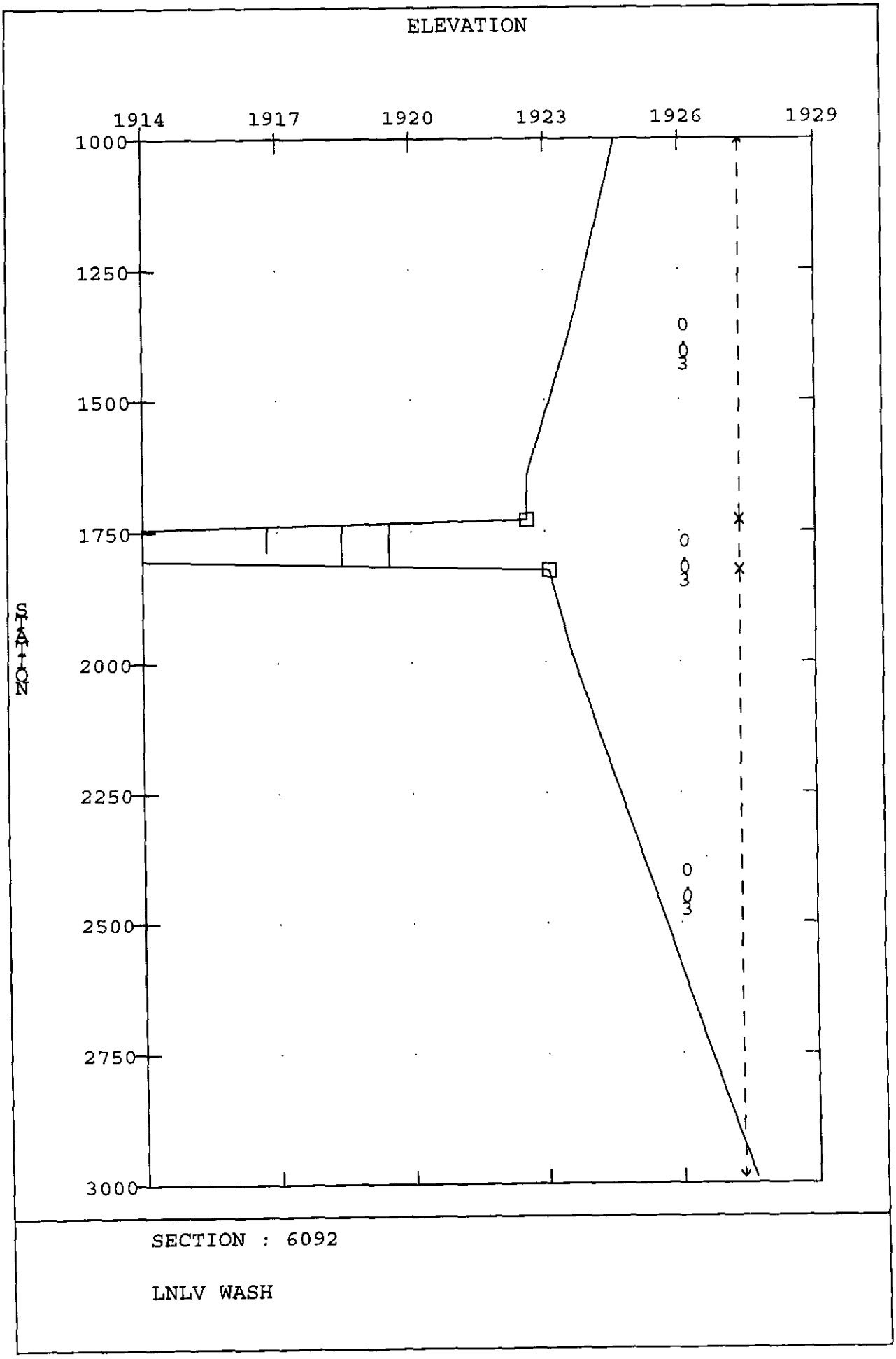
SECTION : 5973

LNLV WASH



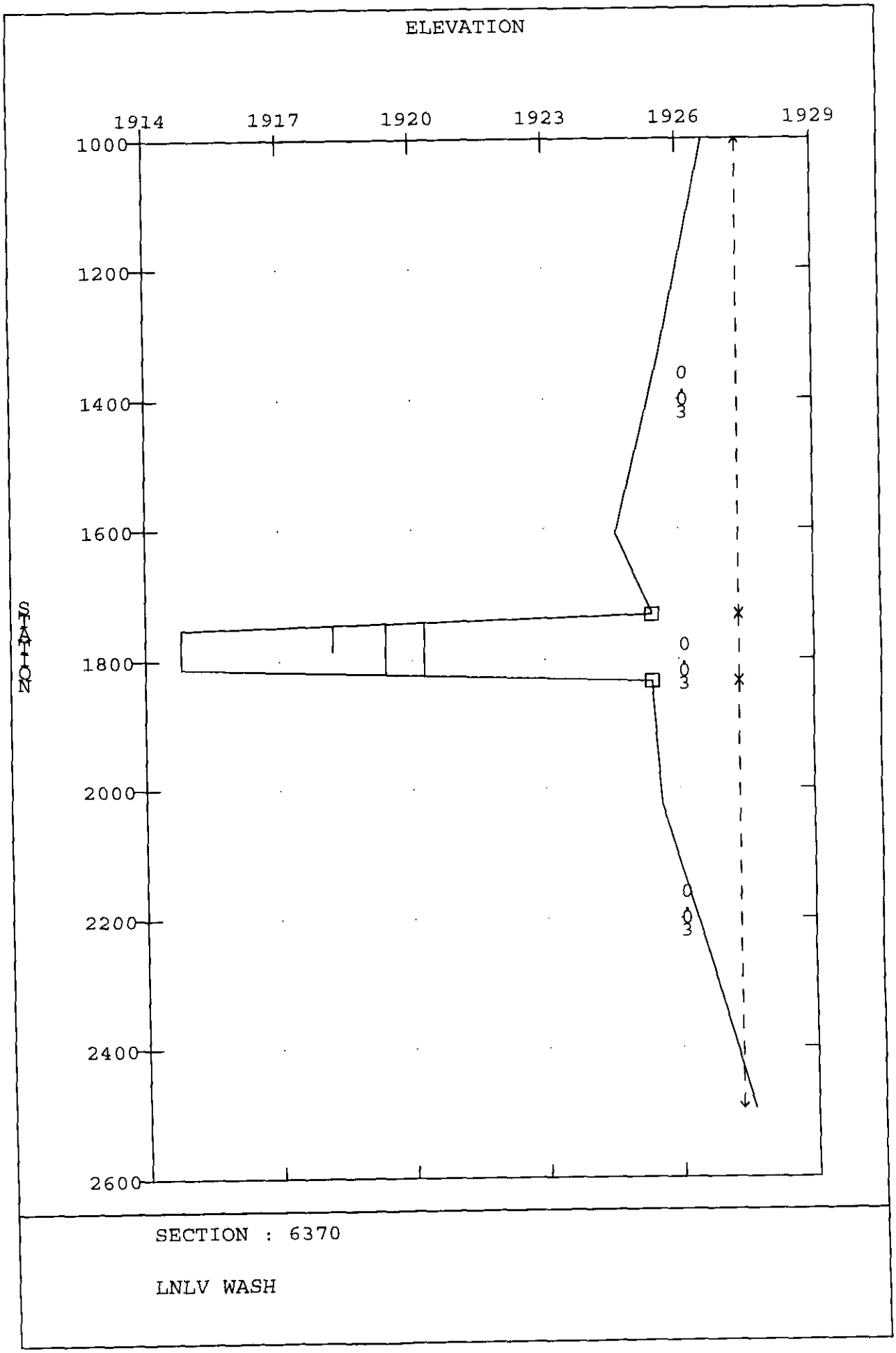
SECTION : 5974

LNLV WASH



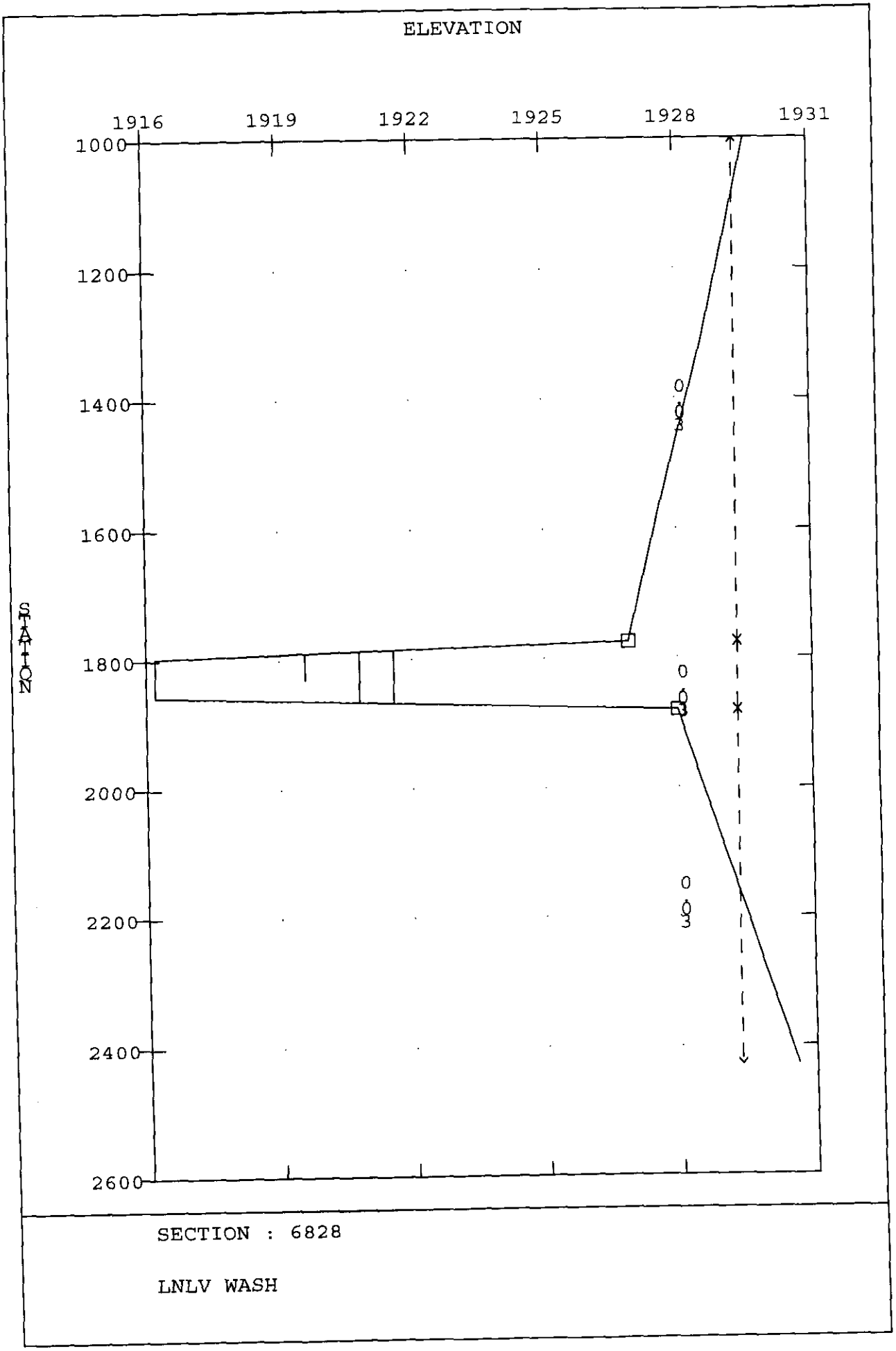
SECTION : 6092

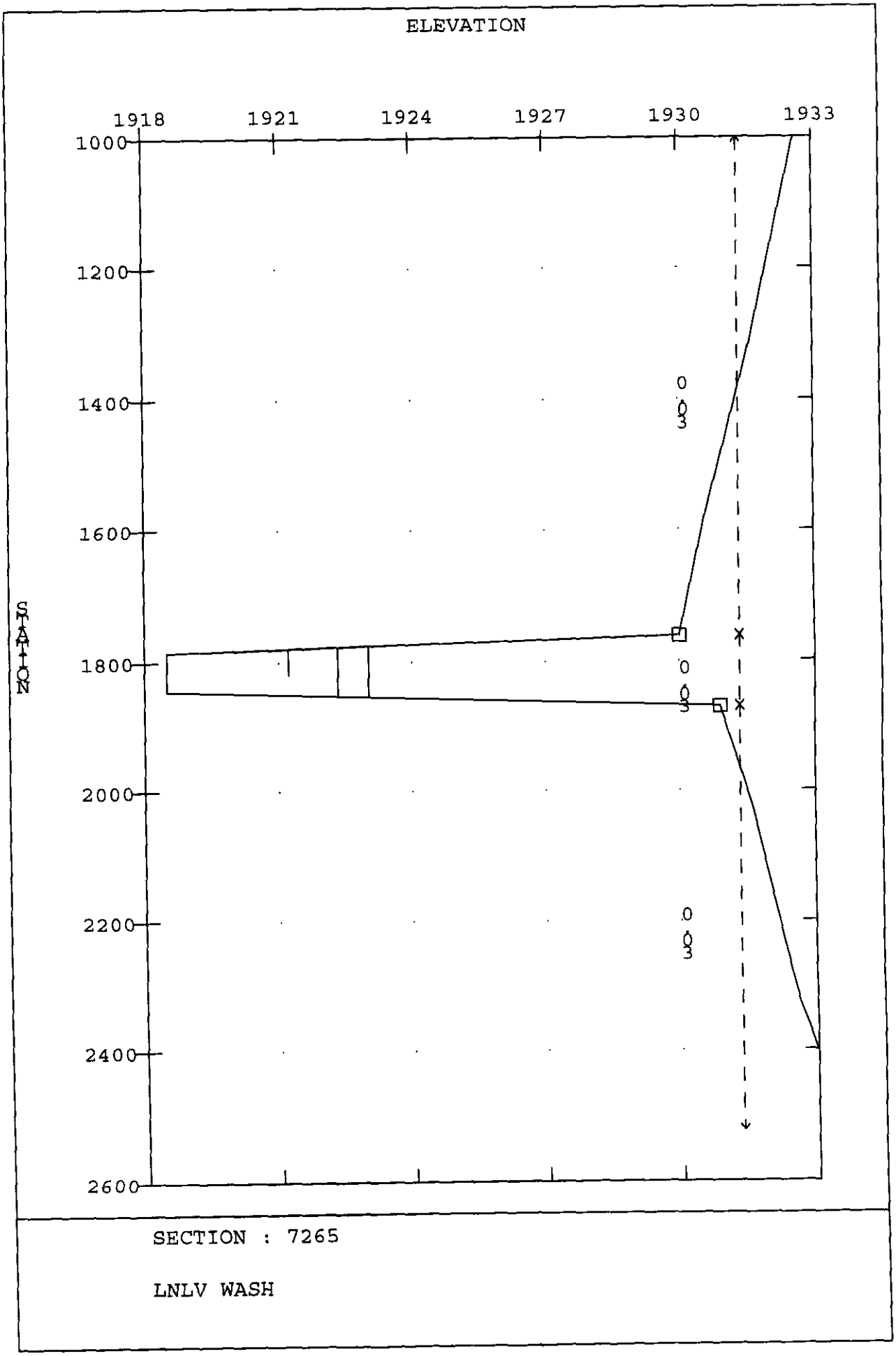
LNLV WASH



SECTION : 6370

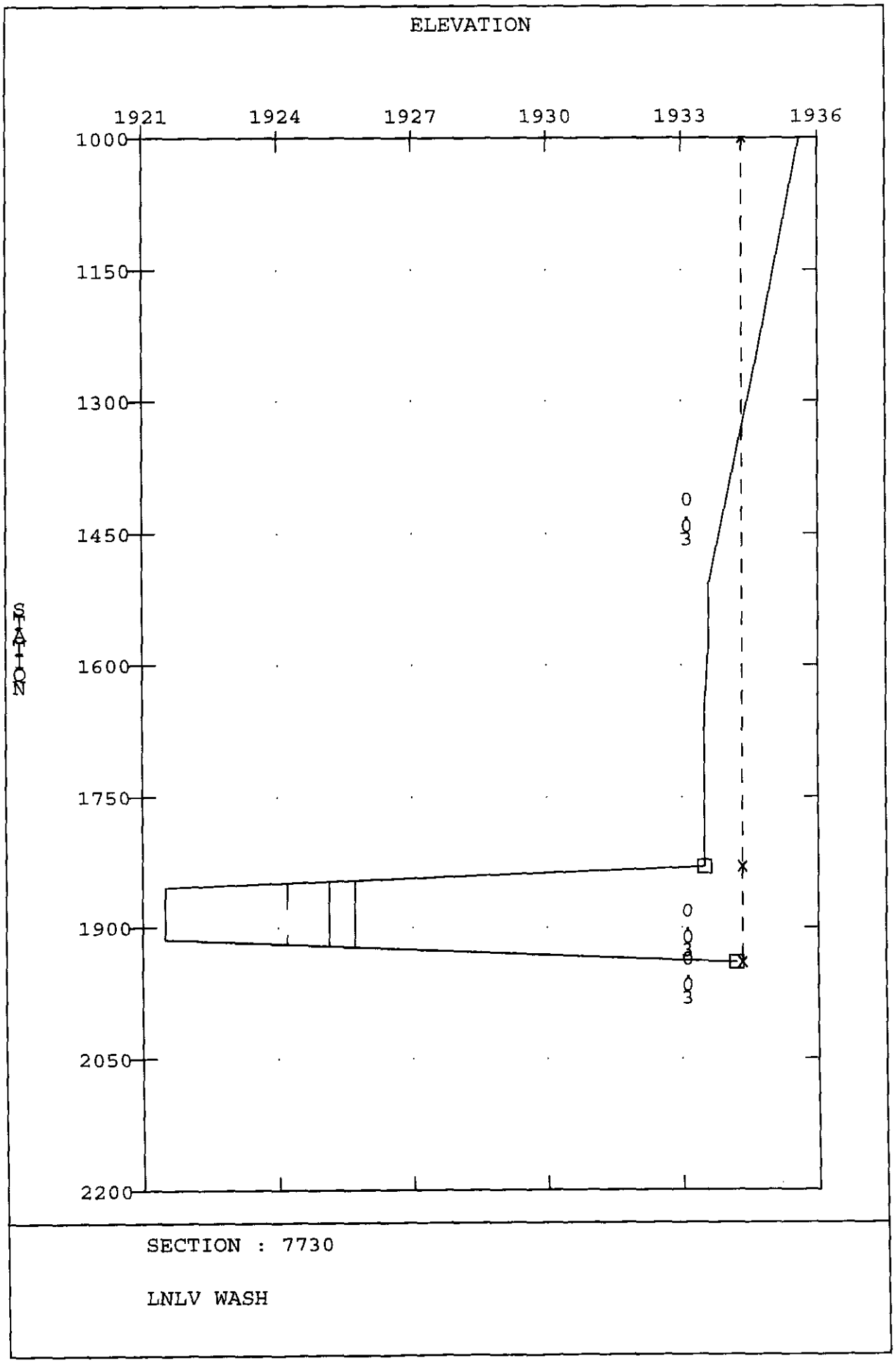
LNLV WASH

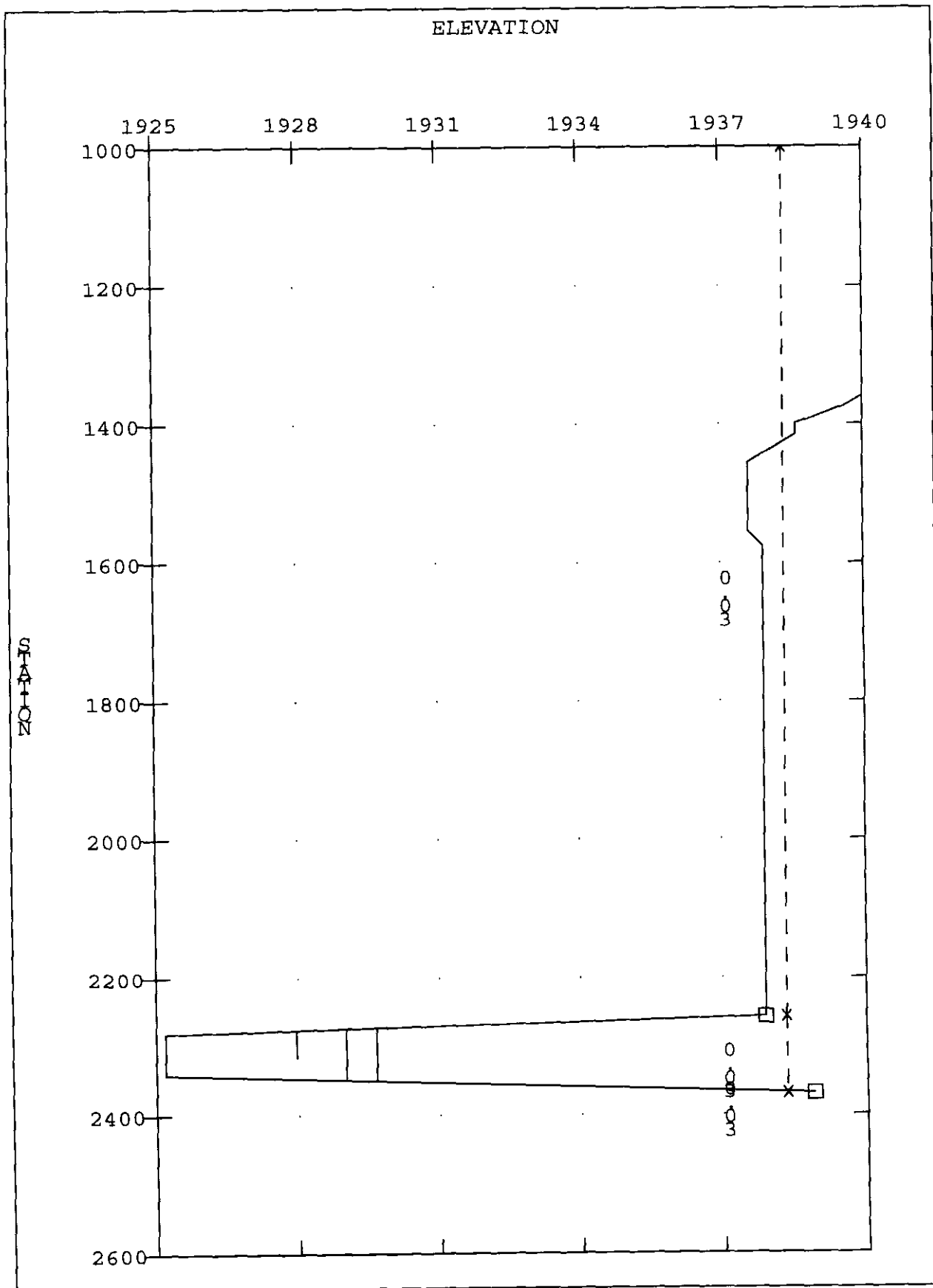

ELEVATION
1916
1919
1922
1925
1928
1931
1000
1200
1400
1600
1800
2000
2200
2400
2600
STATION
0
0
0
SECTION : 6828
LNLV WASH



SECTION : 7265

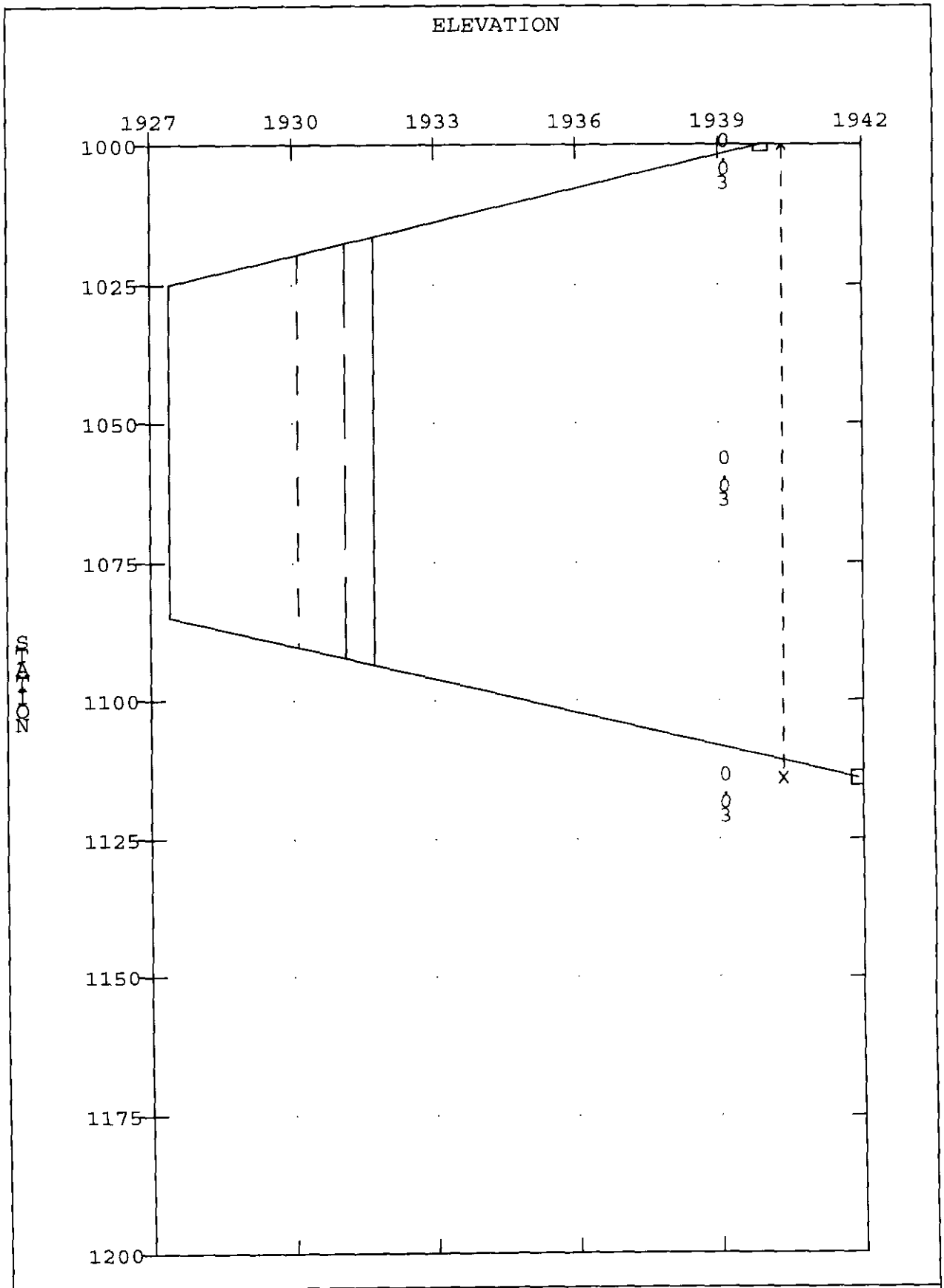
LNLV WASH


ELEVATION
1921
1924
1927
1930
1933
1936
1000
1150
1300
1450
1600
1750
1900
2050
2200
STATION
SECTION : 7730
LNLV WASH



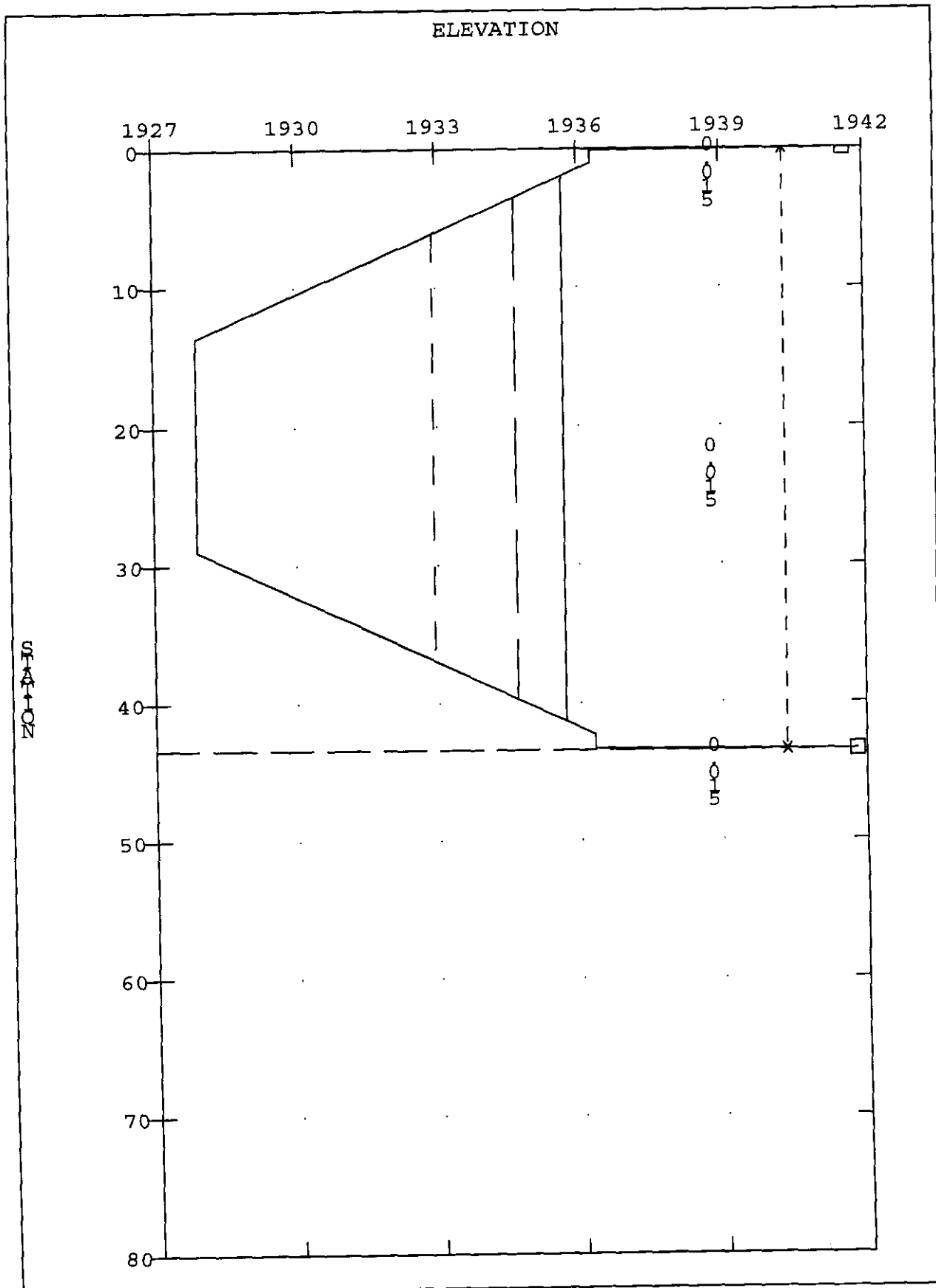
SECTION : 8323

LNLV WASH



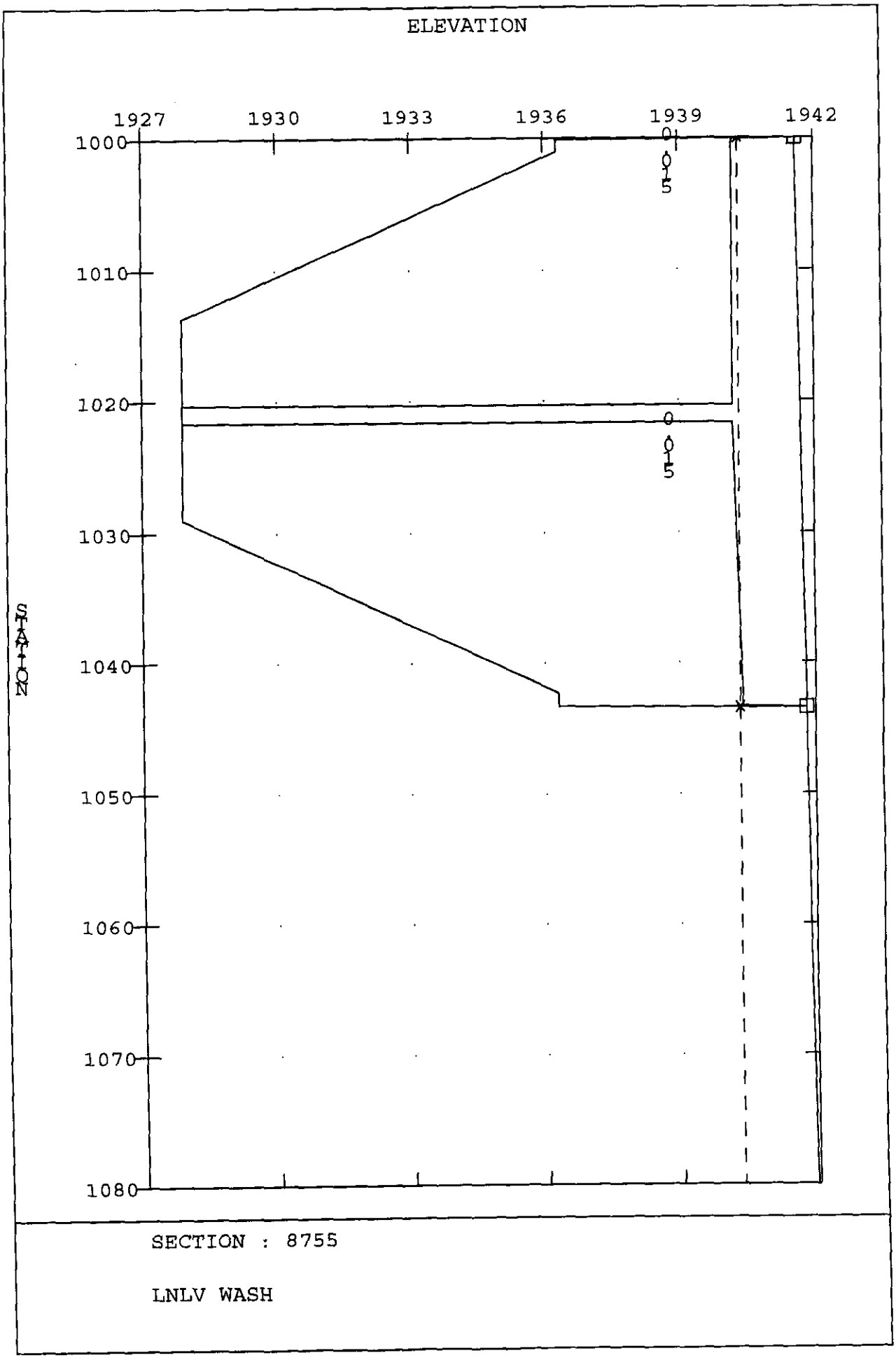
SECTION : 8673

LNLV WASH



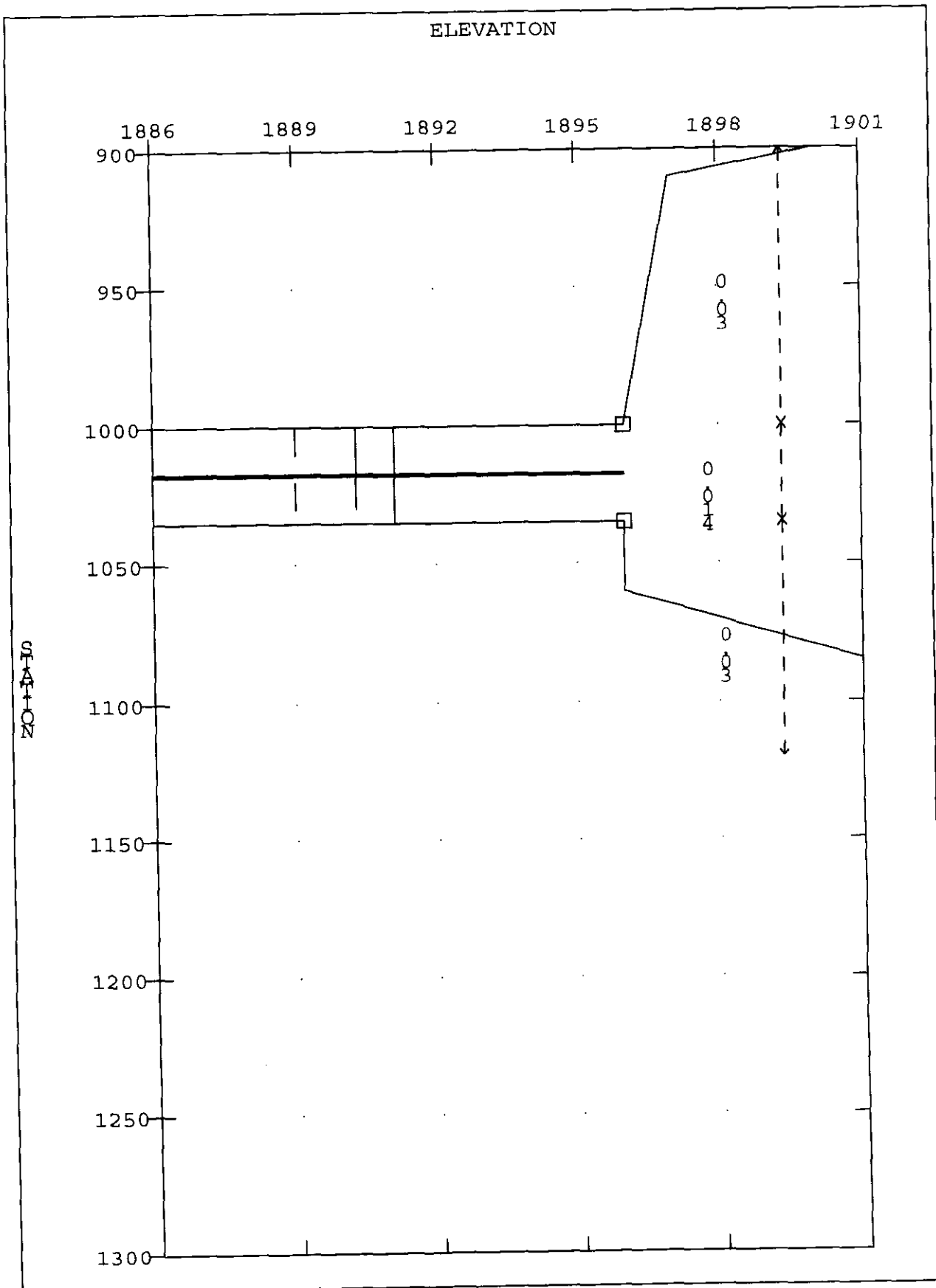
SECTION : 8754

LNLV WASH



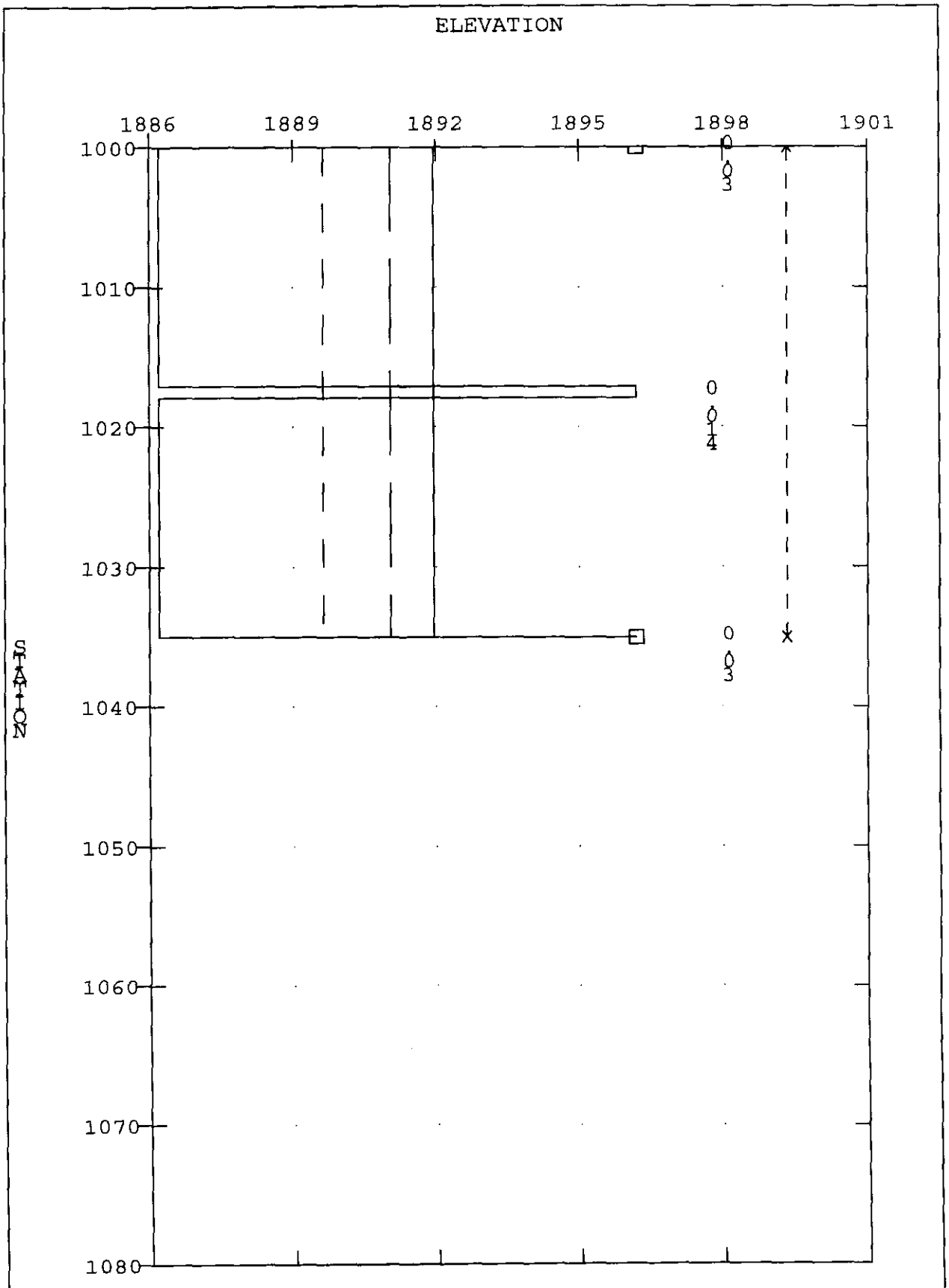
SECTION : 8755

LNLV WASH



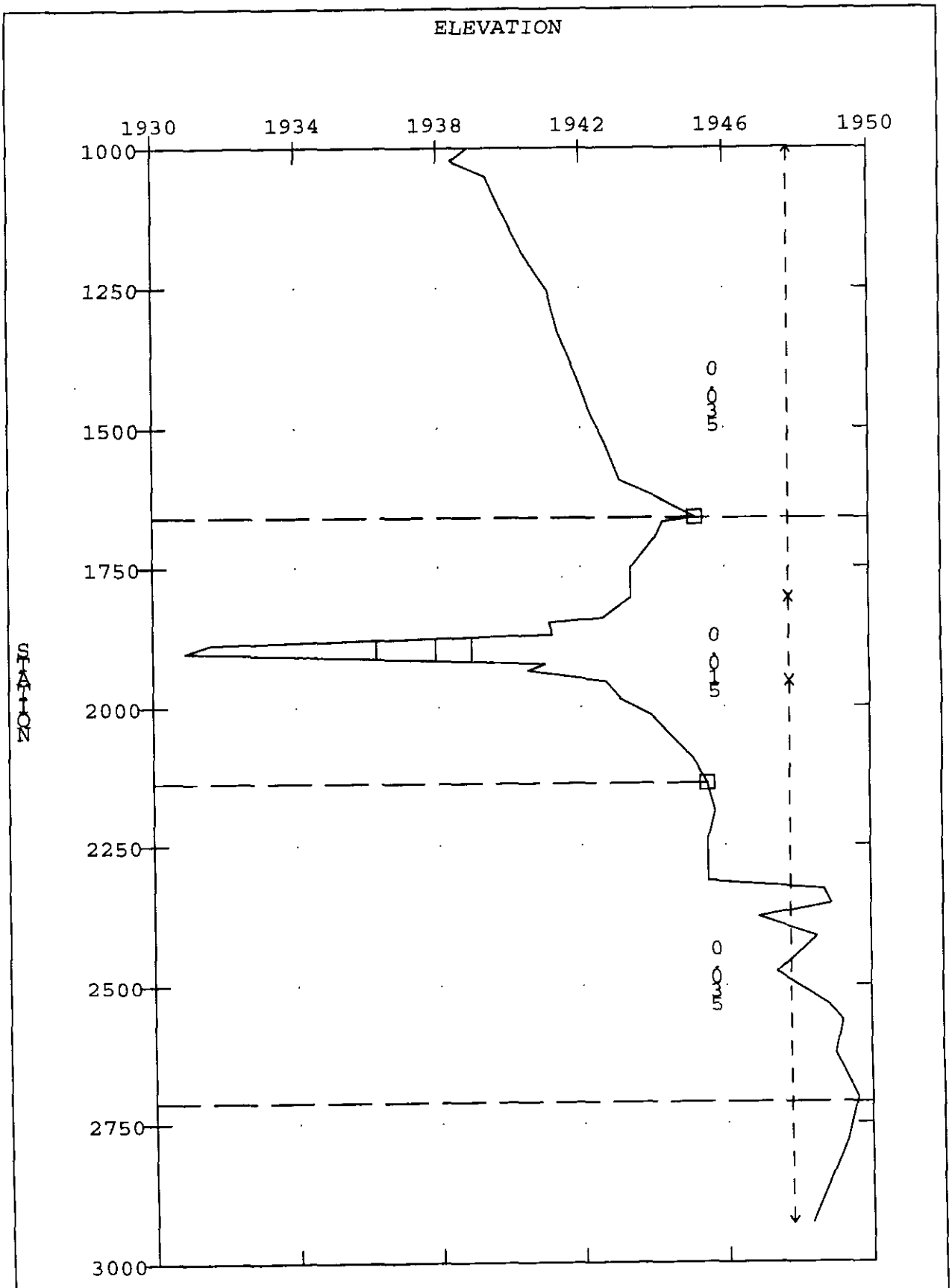
SECTION : 8860

LNLV WASH



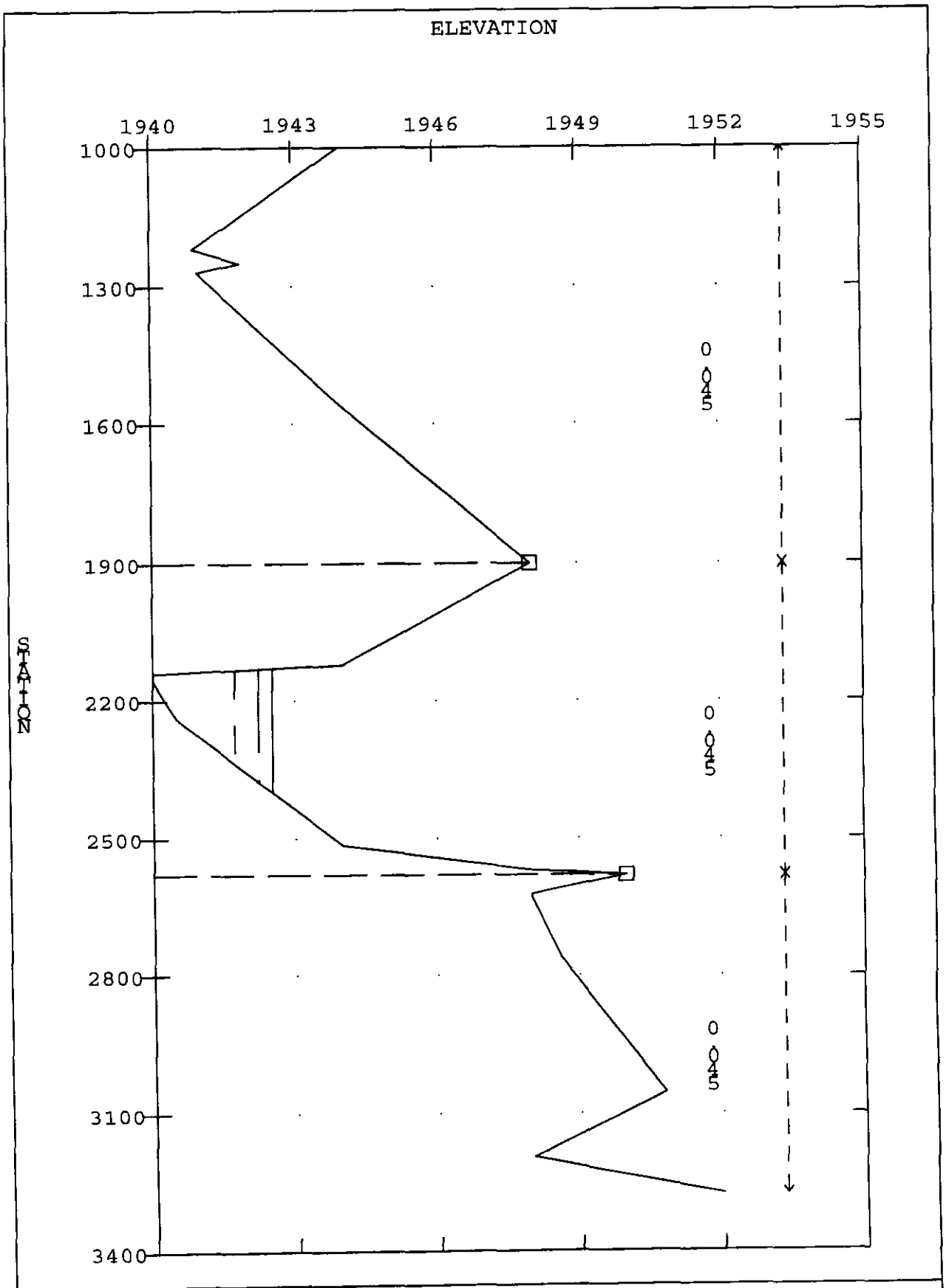
SECTION : 8861

LNLV WASH



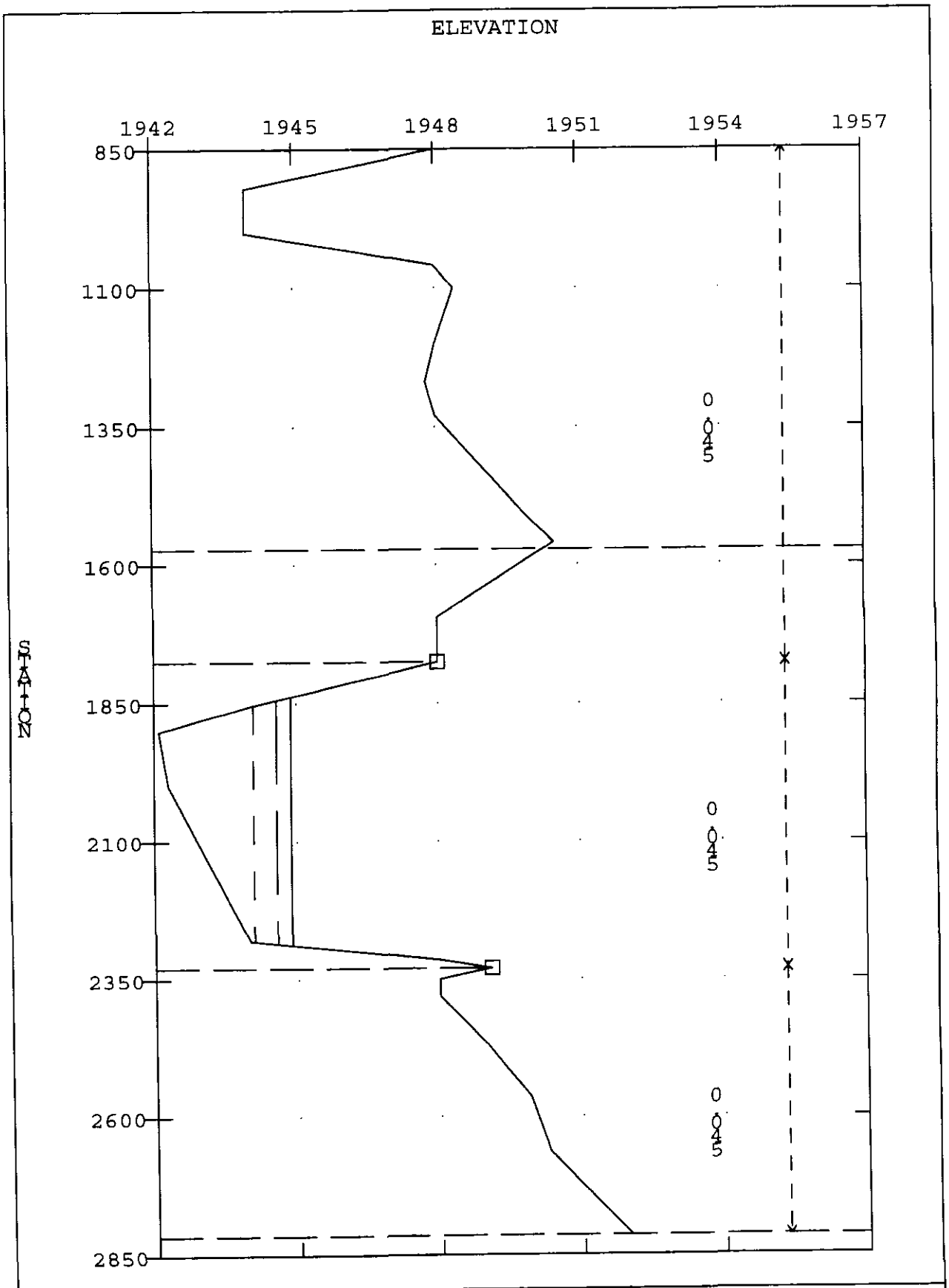
SECTION : 9120

LNLV WASH



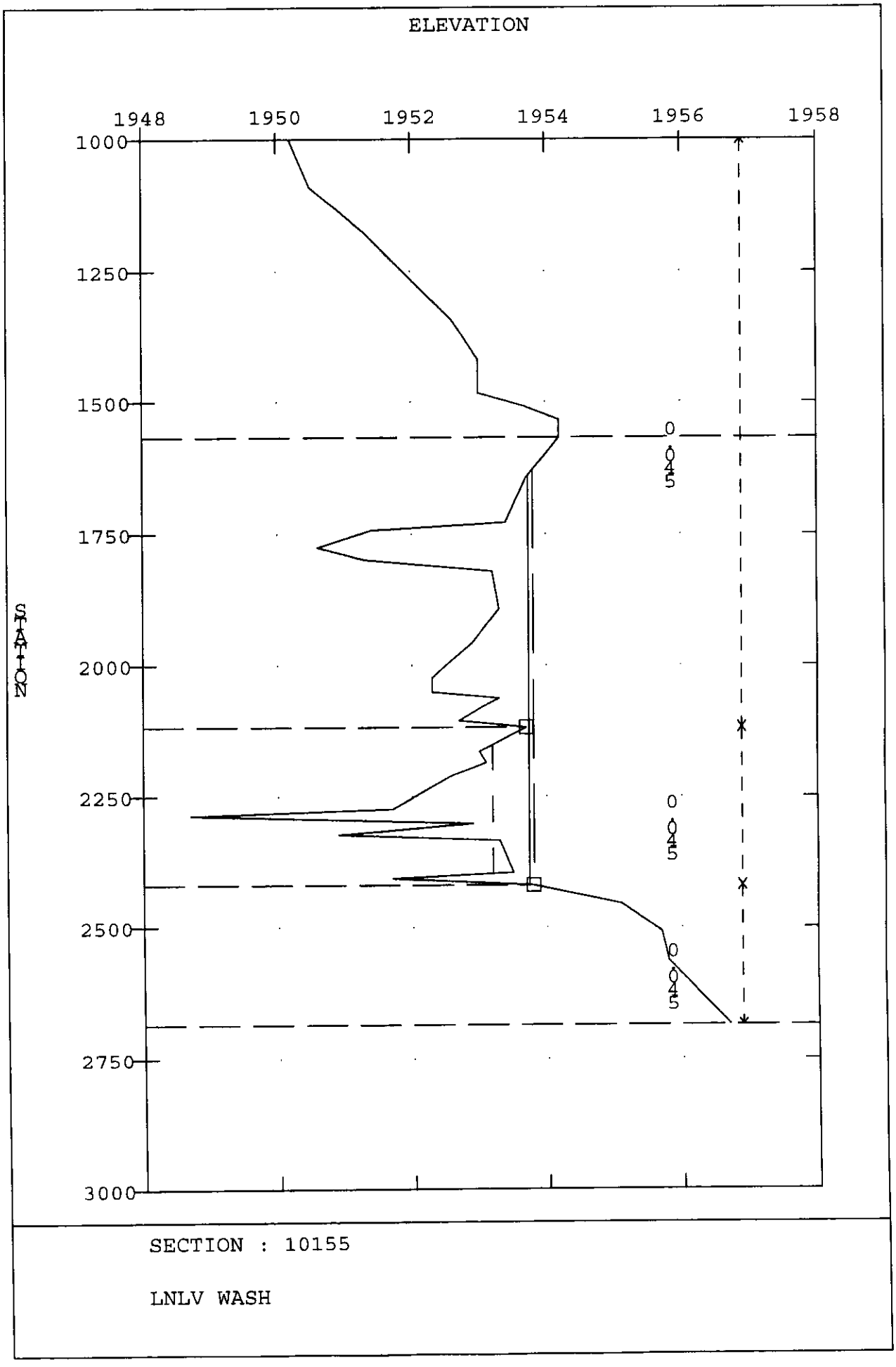
SECTION : 9237

LNLV WASH



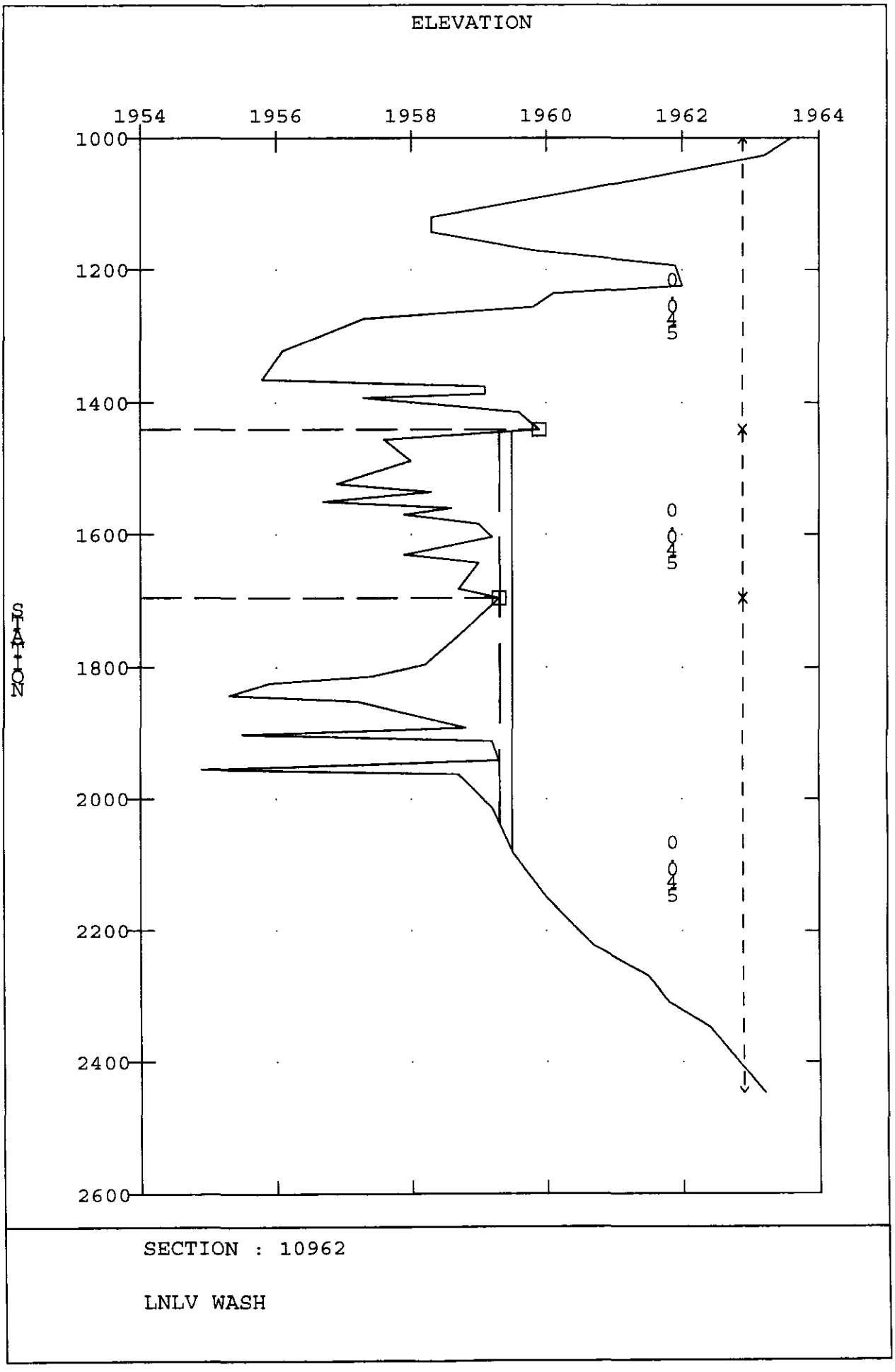
SECTION : 9429

LNLV WASH



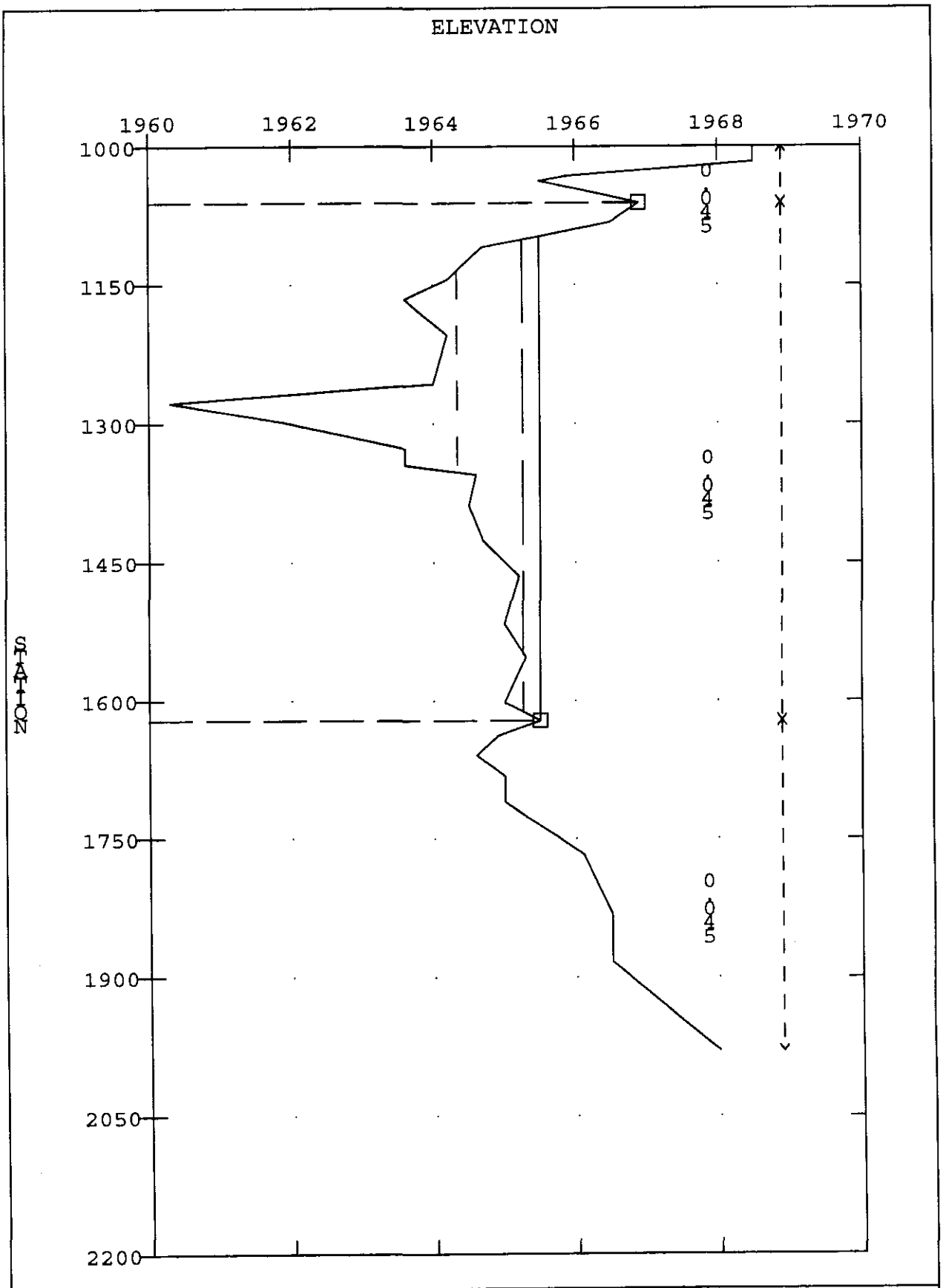
SECTION : 10155

LNLV WASH



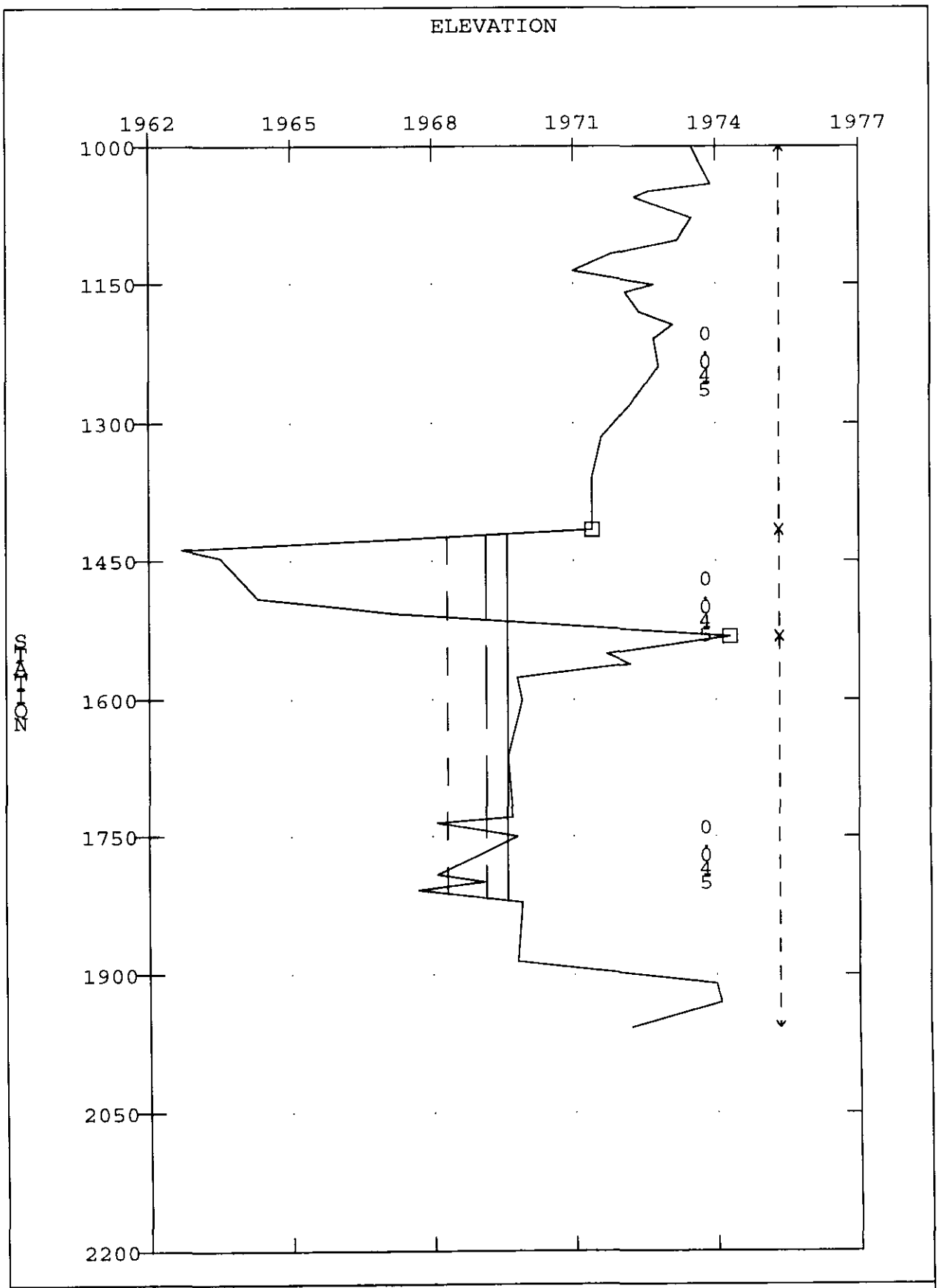
SECTION : 10962

LNLV WASH



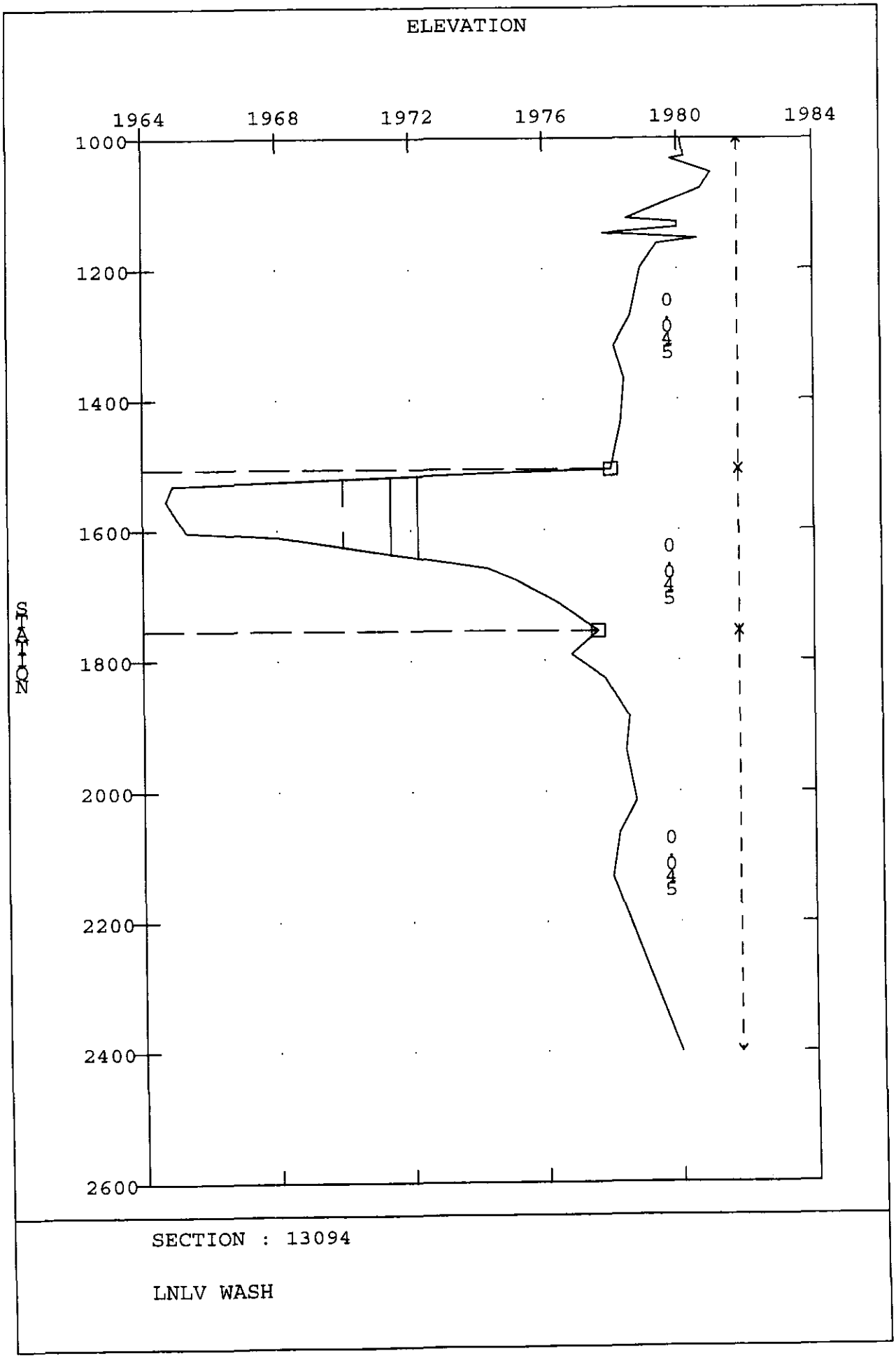
SECTION : 11614

LNLV WASH



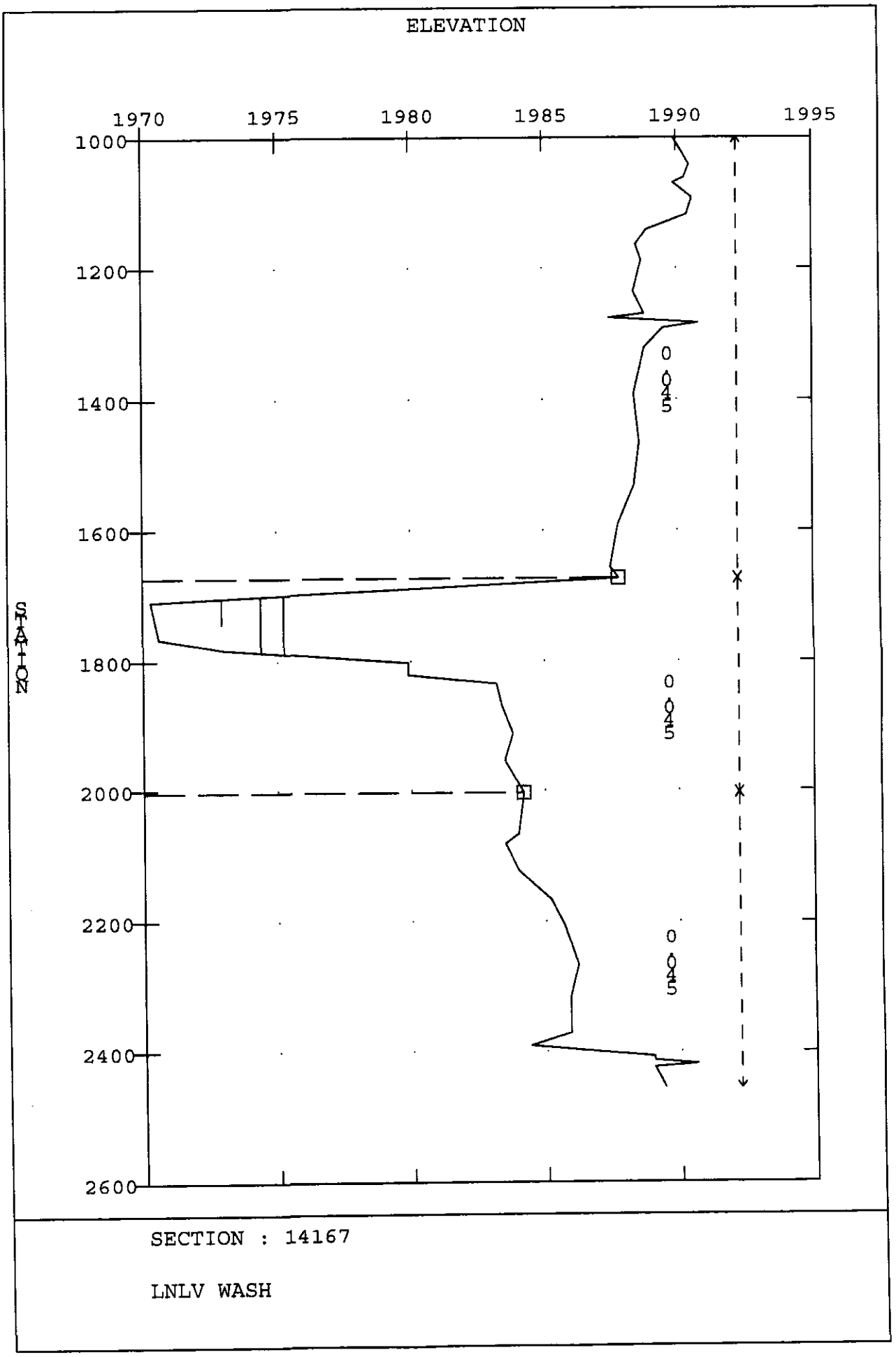
SECTION : 12202

LNLV WASH



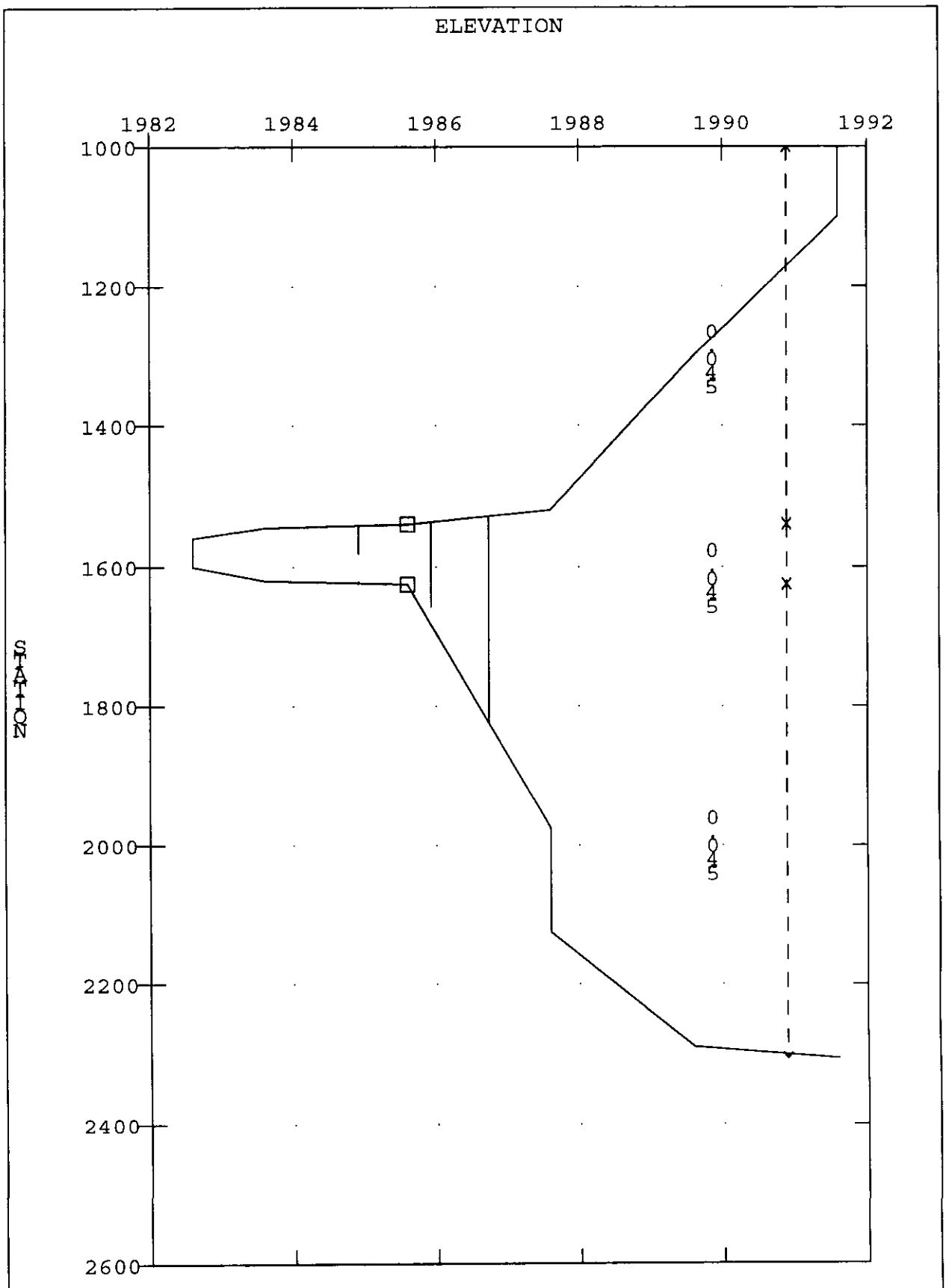
SECTION : 13094

LNLV WASH



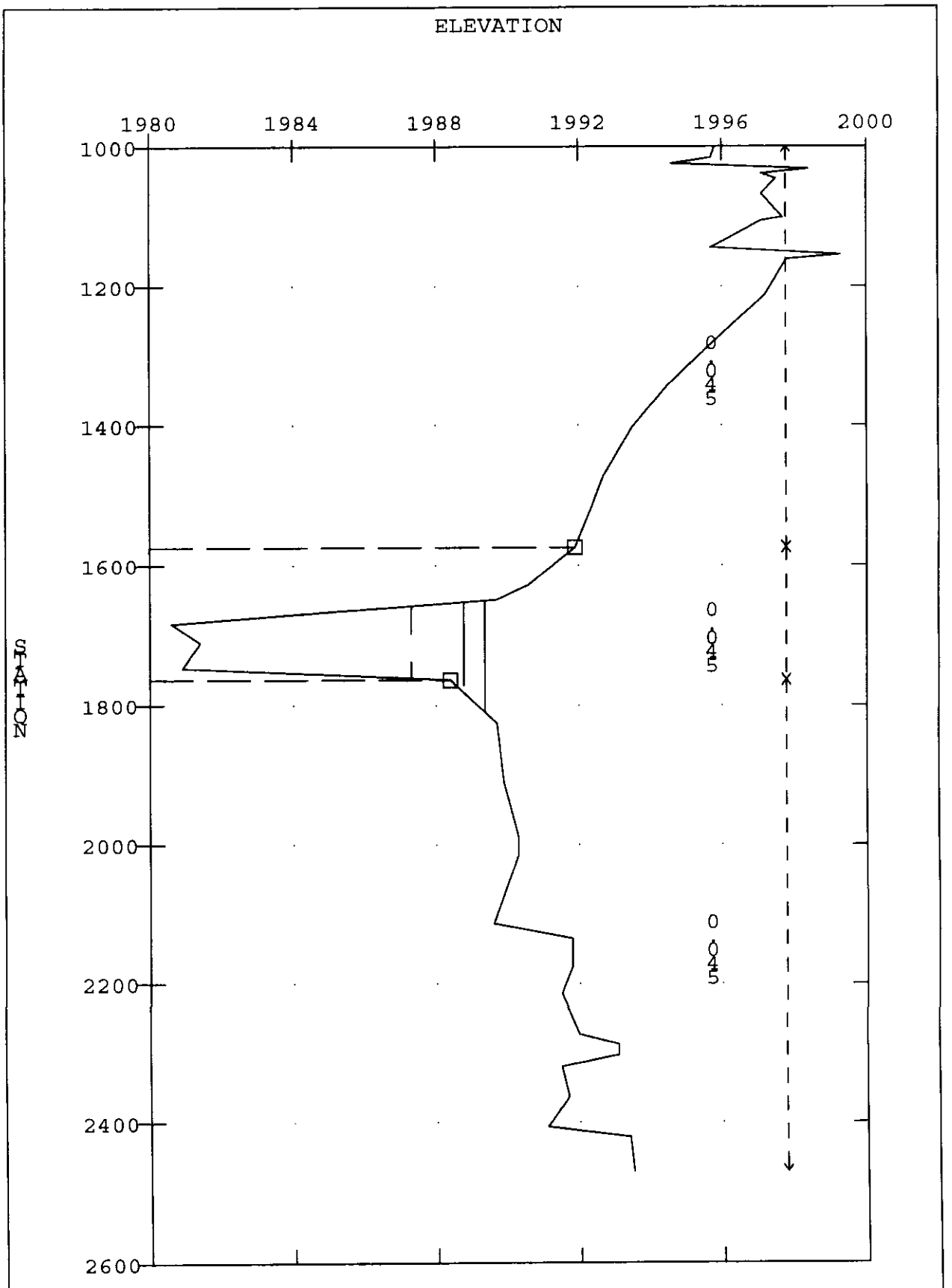
SECTION : 14167

LNLV WASH



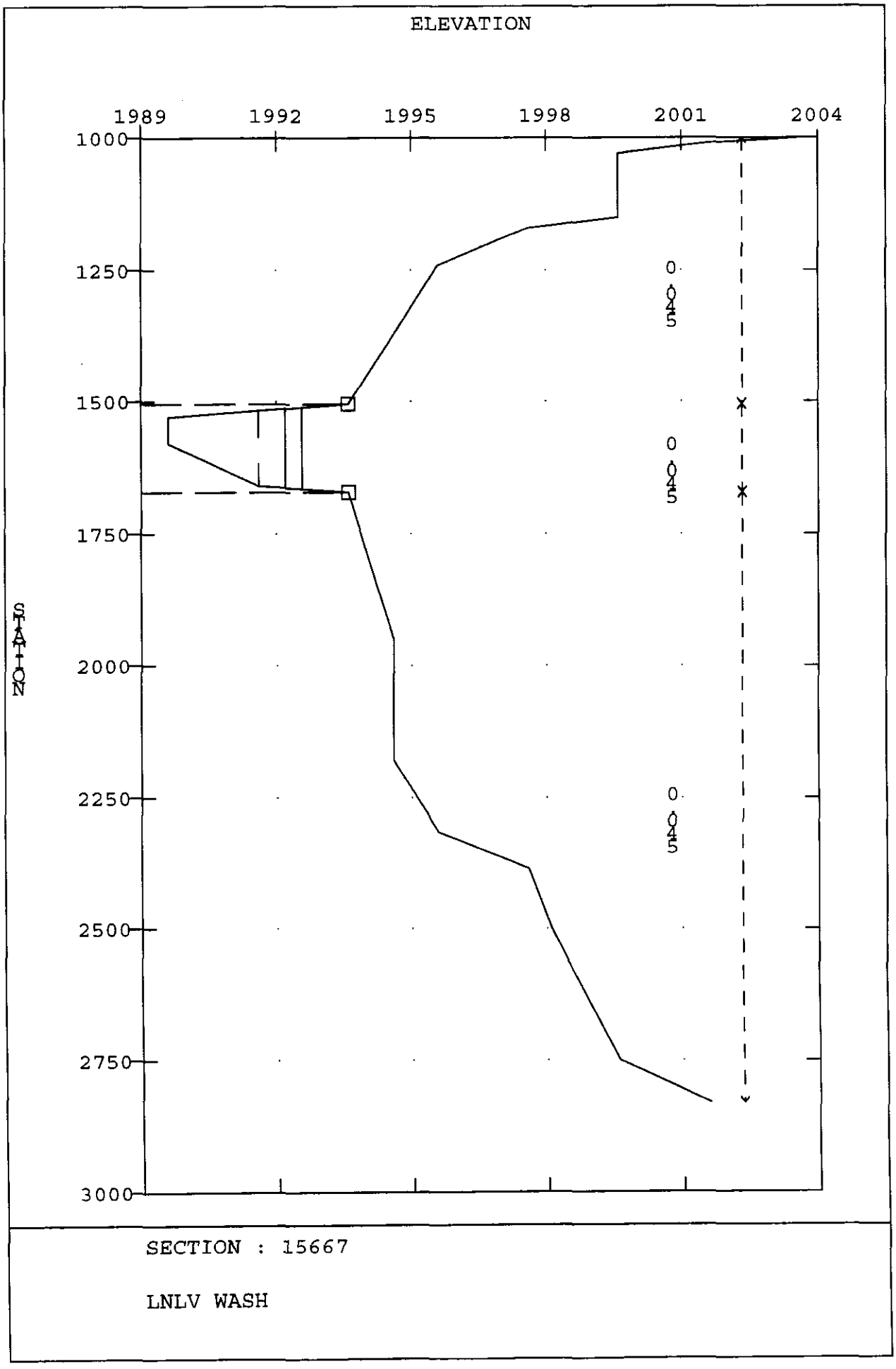
SECTION : 14368

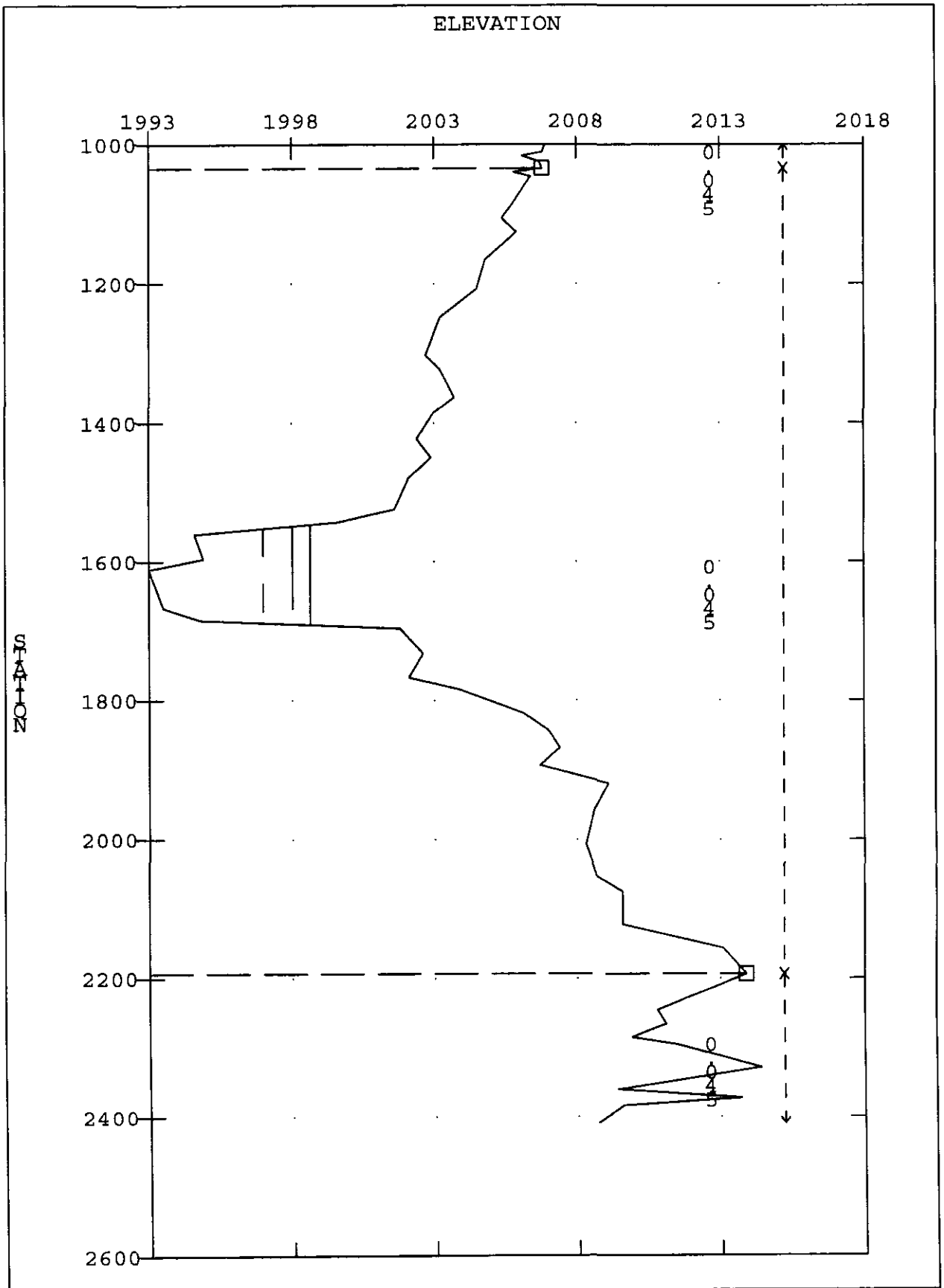
LNLV WASH



SECTION : 15114

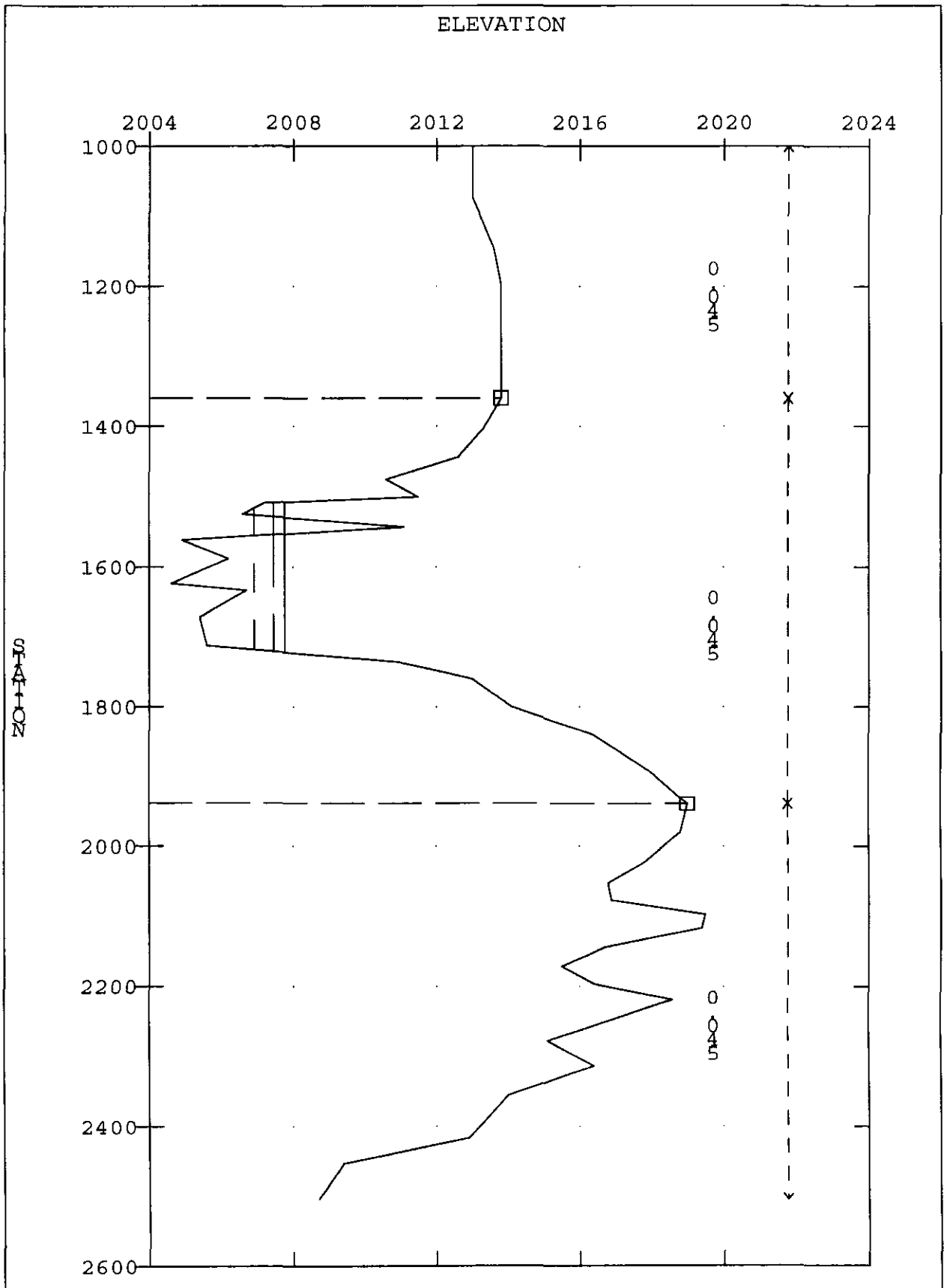
LNLV WASH


ELEVATION
1989
1992
1995
1998
2001
2004
1000
1250
1500
1750
2000
2250
2500
2750
3000
STATION
0.045
0.045
0.045
SECTION : 15667
LNLV WASH



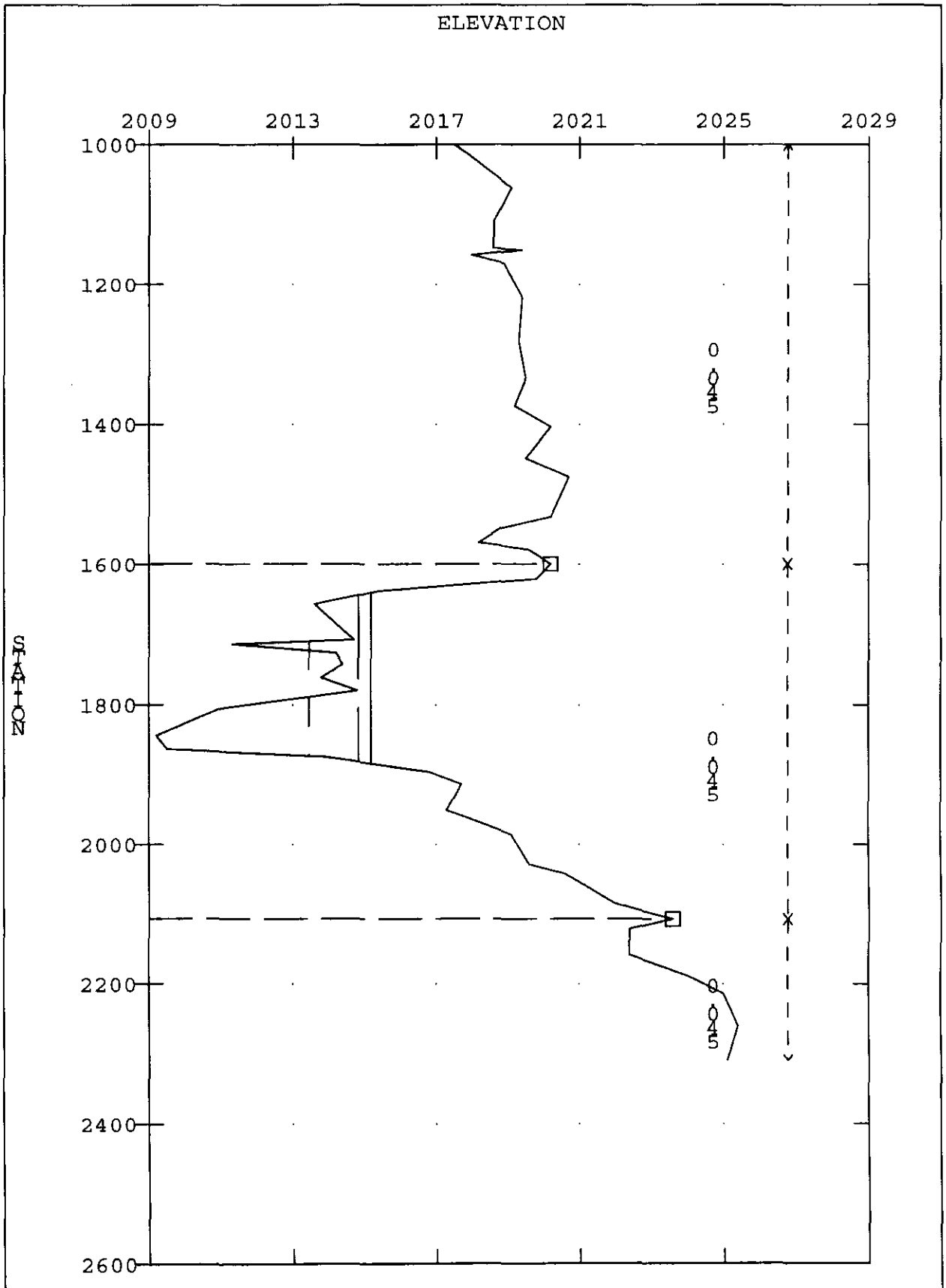
SECTION : 16546

LNLV WASH



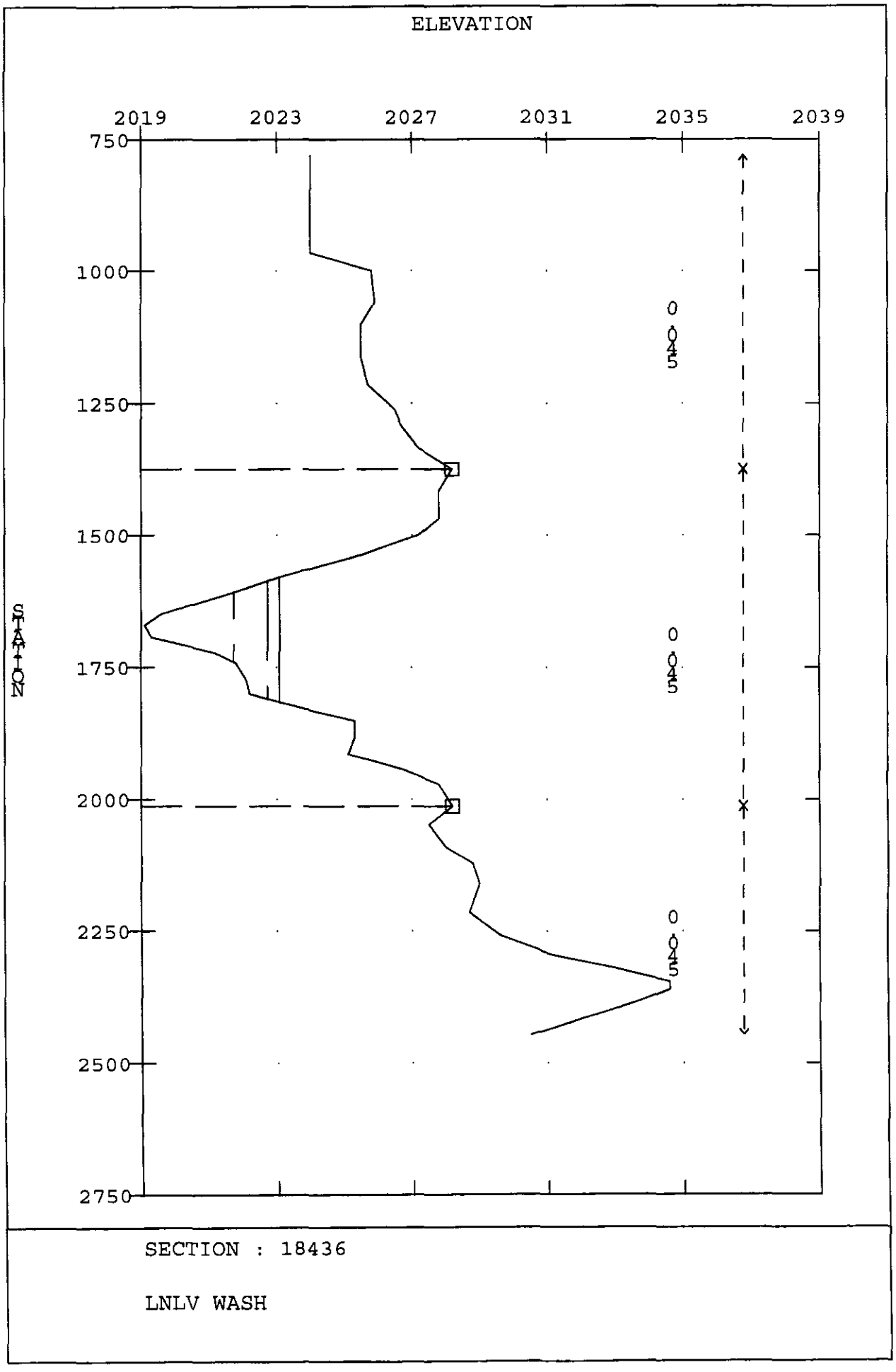
SECTION : 17058

LNLV WASH



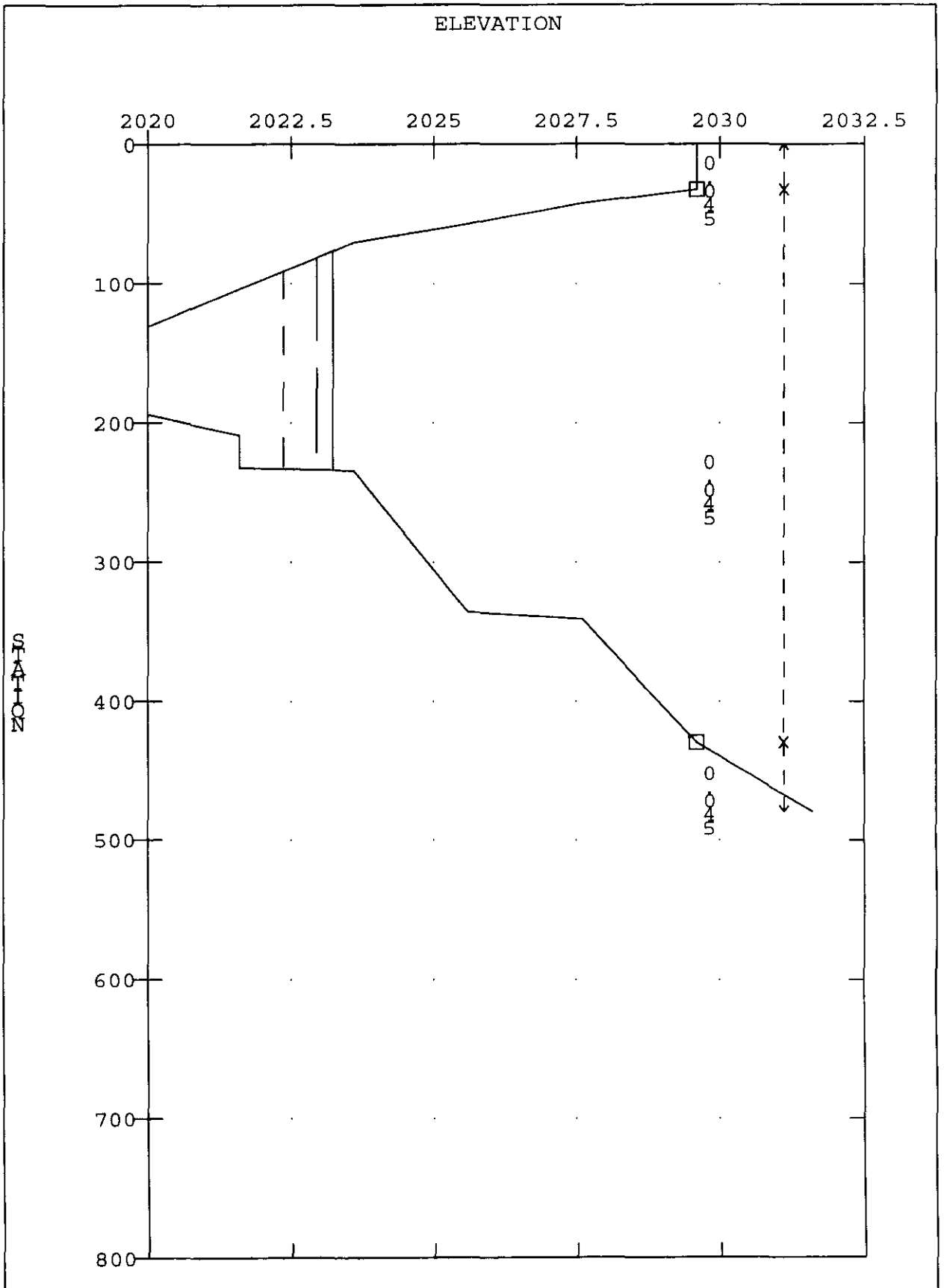
SECTION : 17612

LNLV WASH



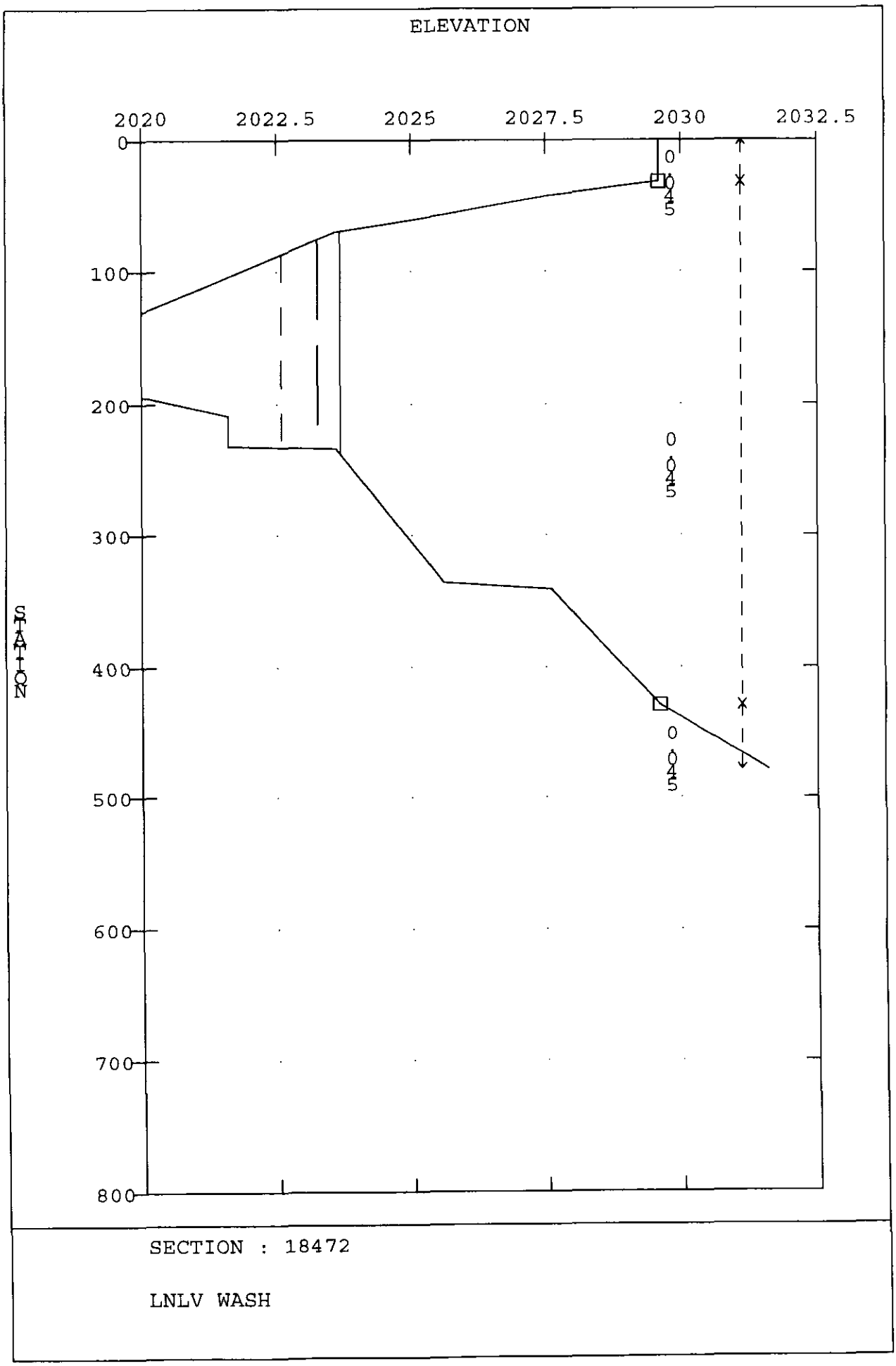
SECTION : 18436

LNLV WASH



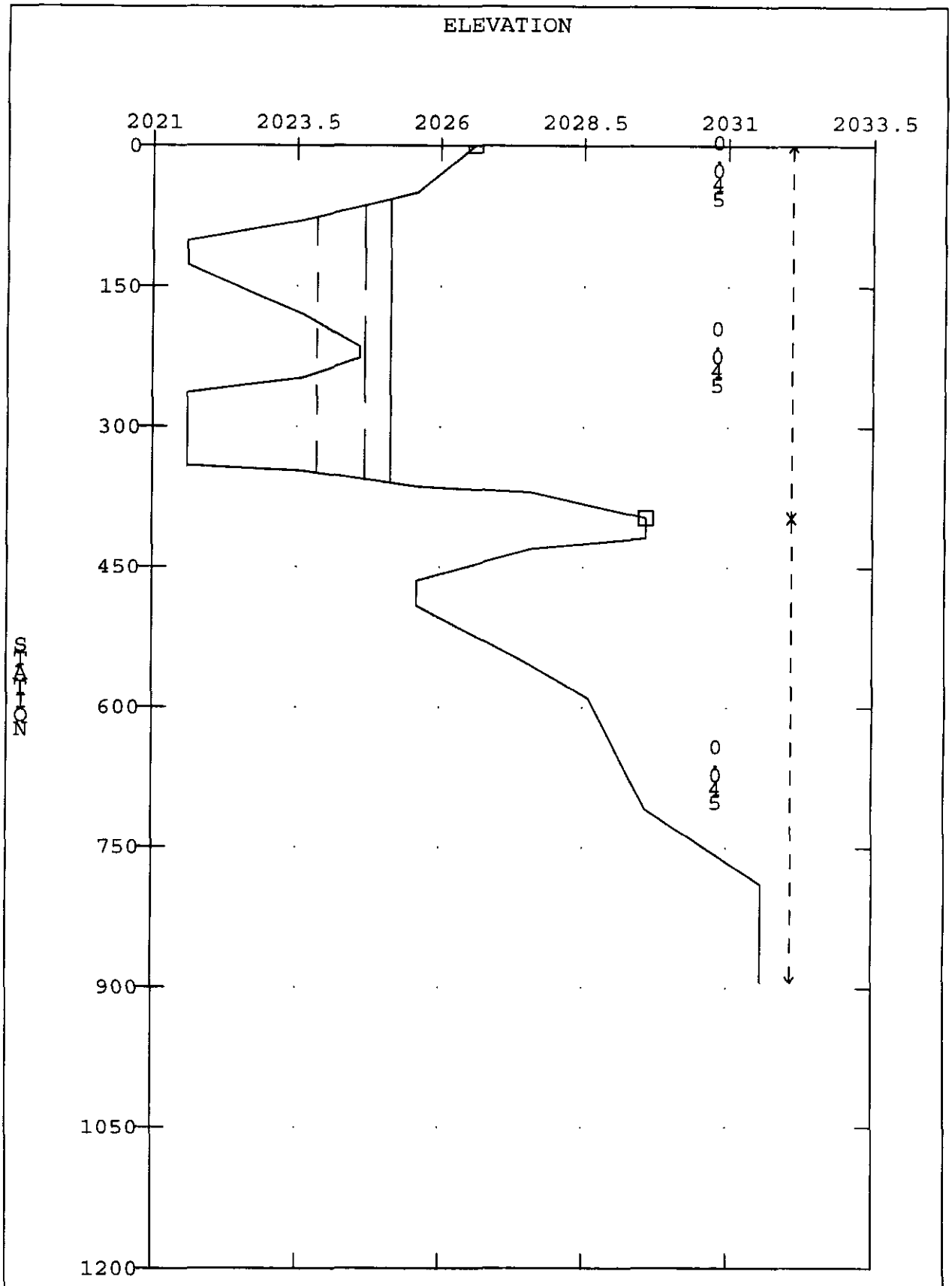
SECTION : 18462

LNLV WASH



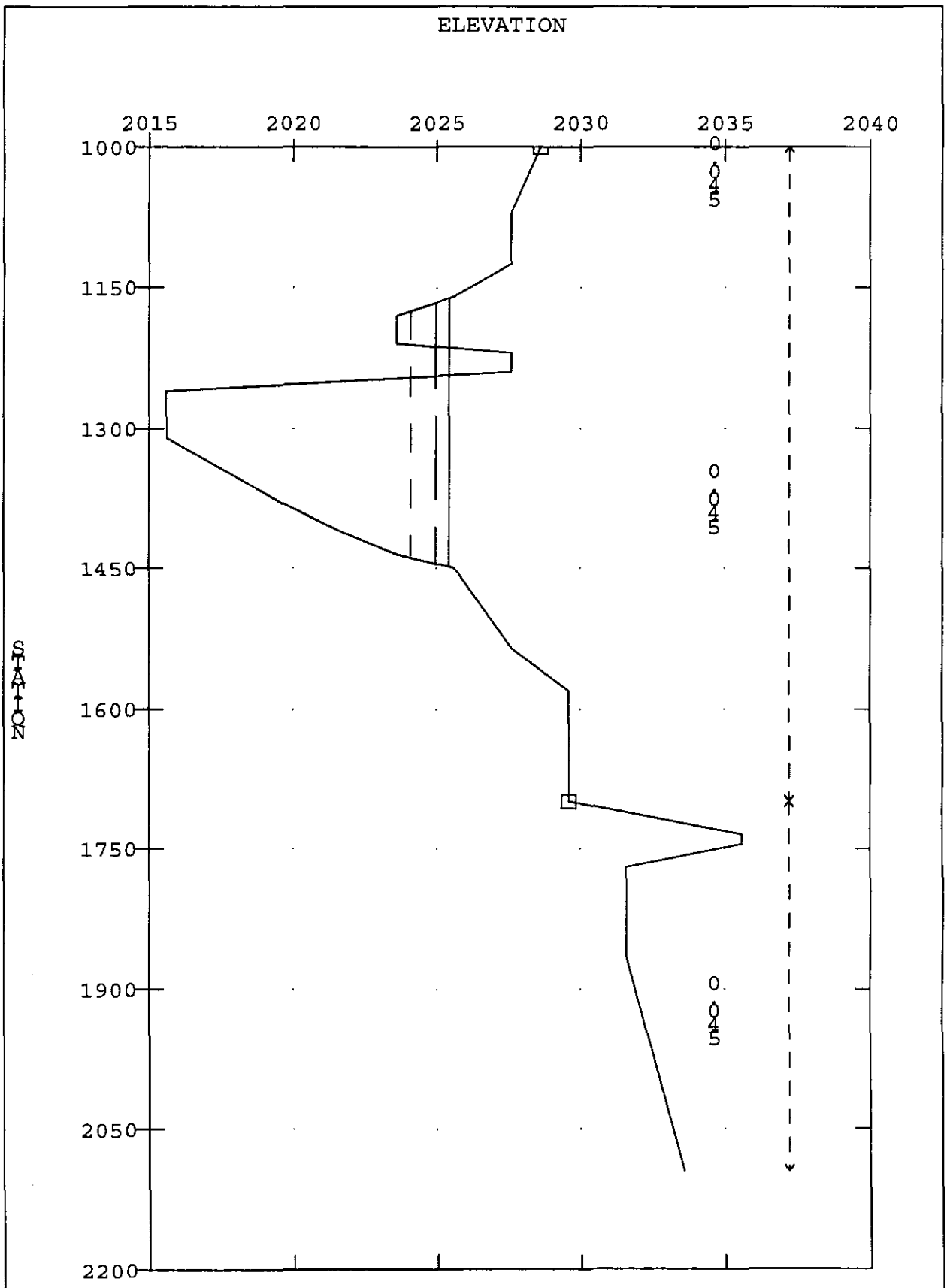
SECTION : 18472

LNLV WASH



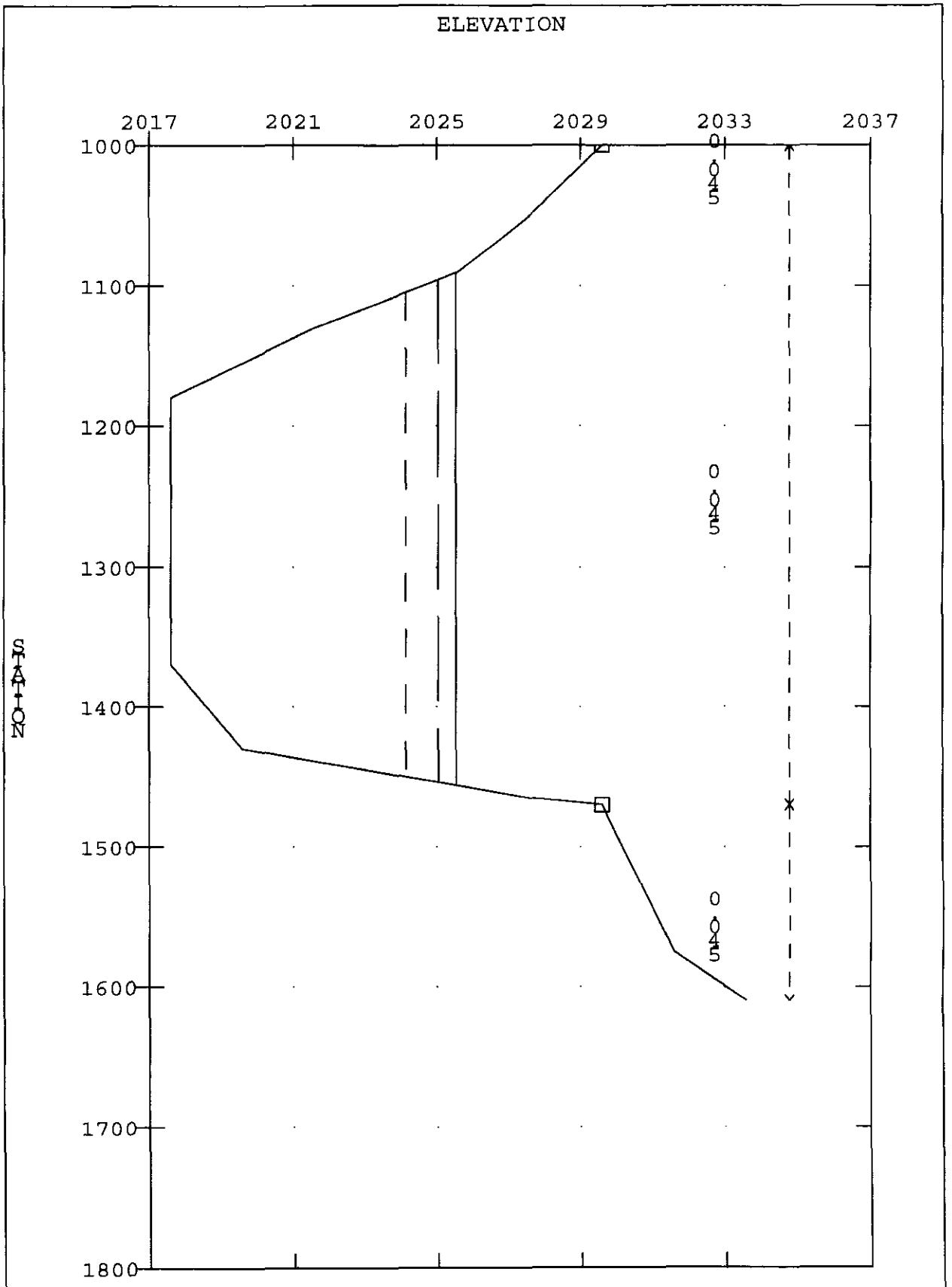
SECTION : 18619

LNLV WASH



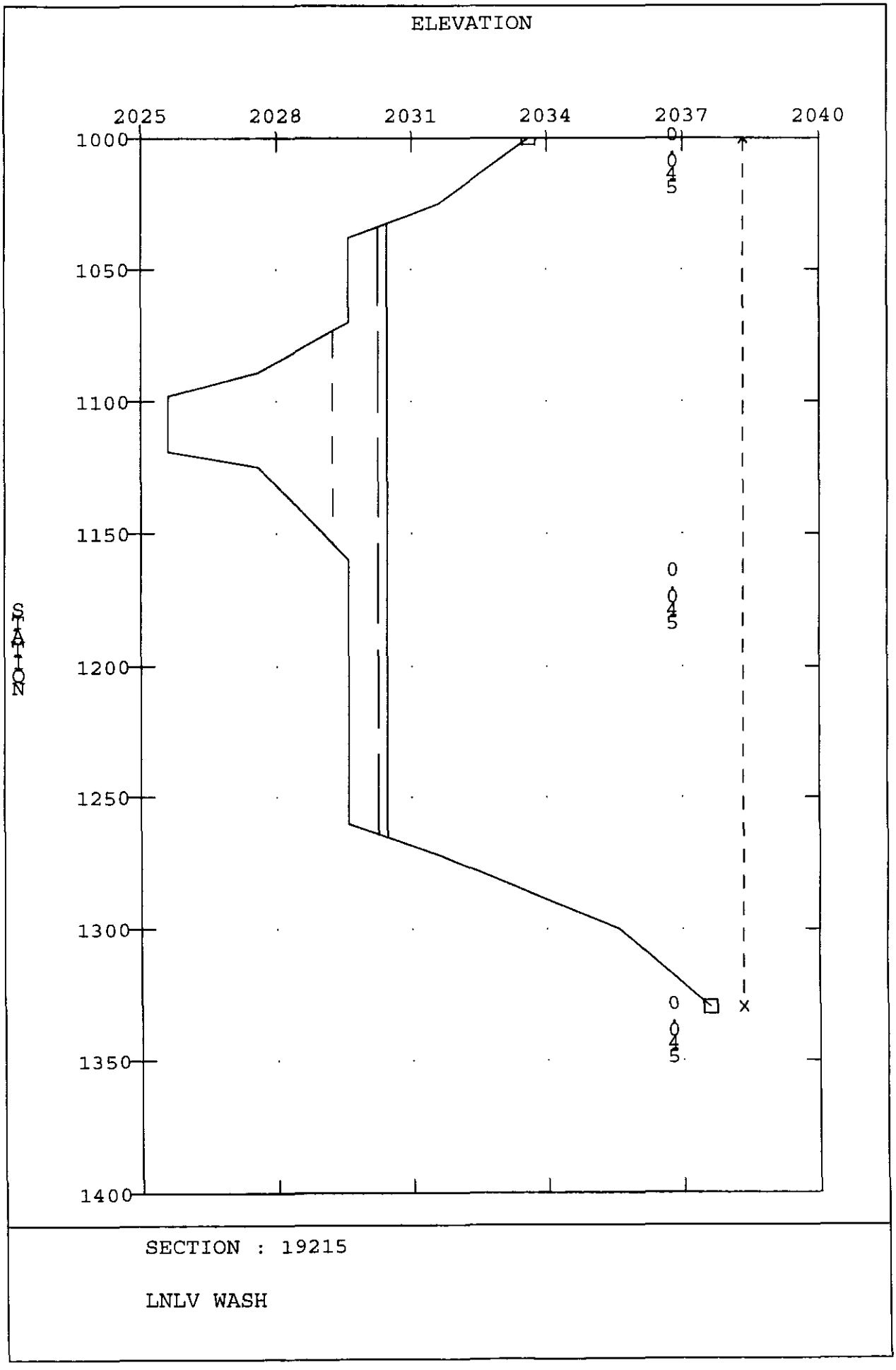
SECTION : 18710

LNLV WASH



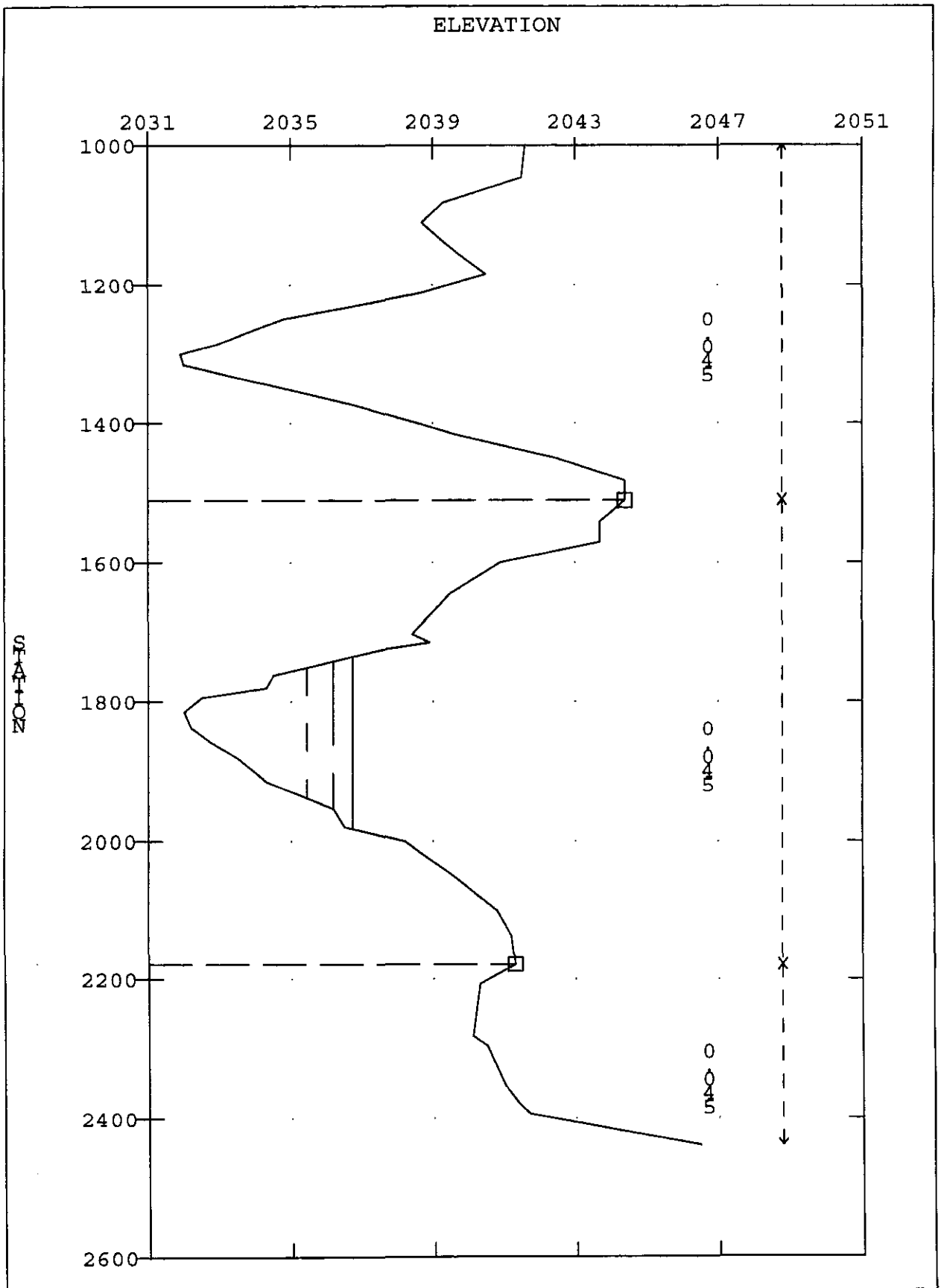
SECTION : 19020

LNLV WASH



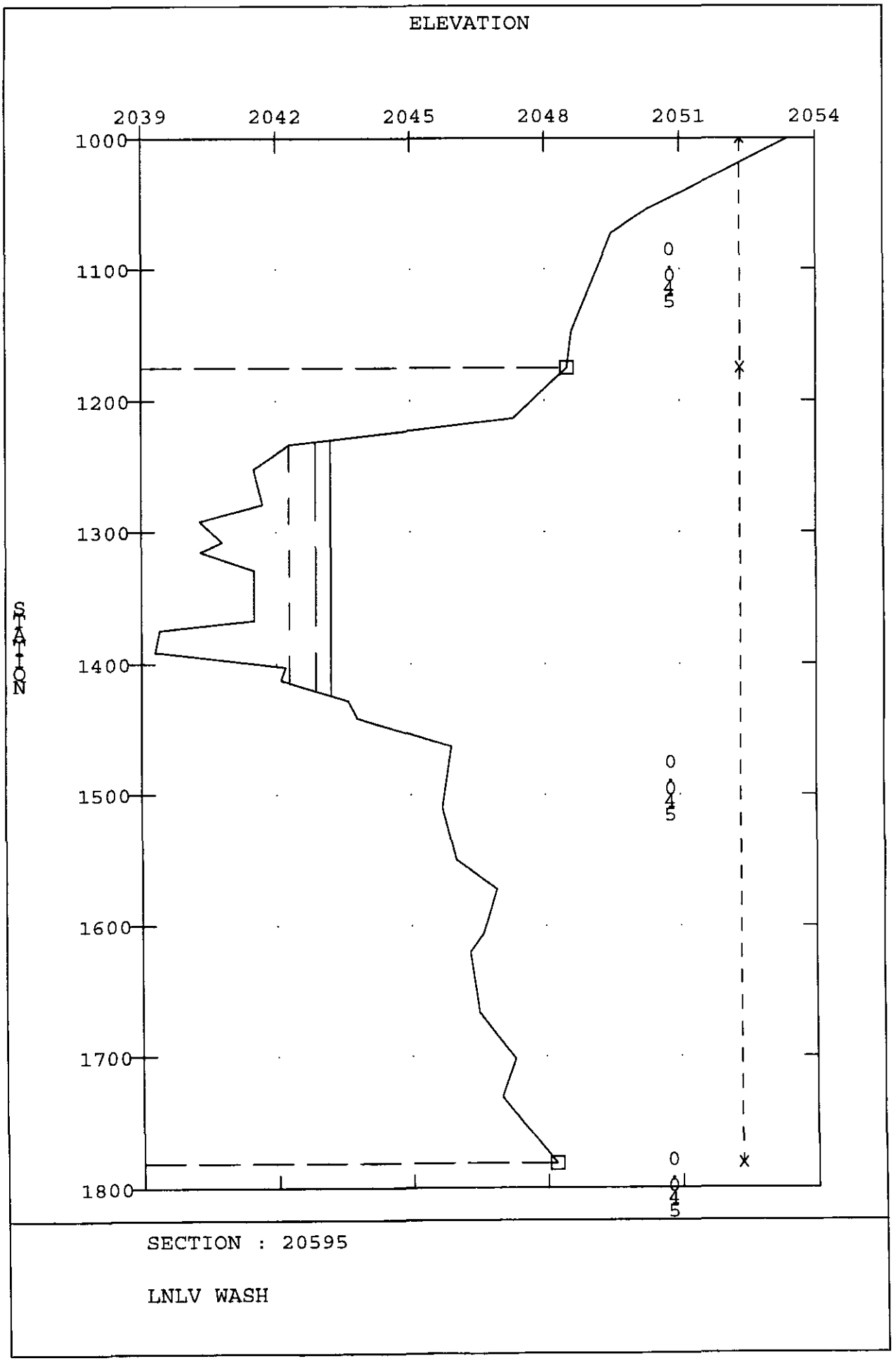
SECTION : 19215

LNLV WASH



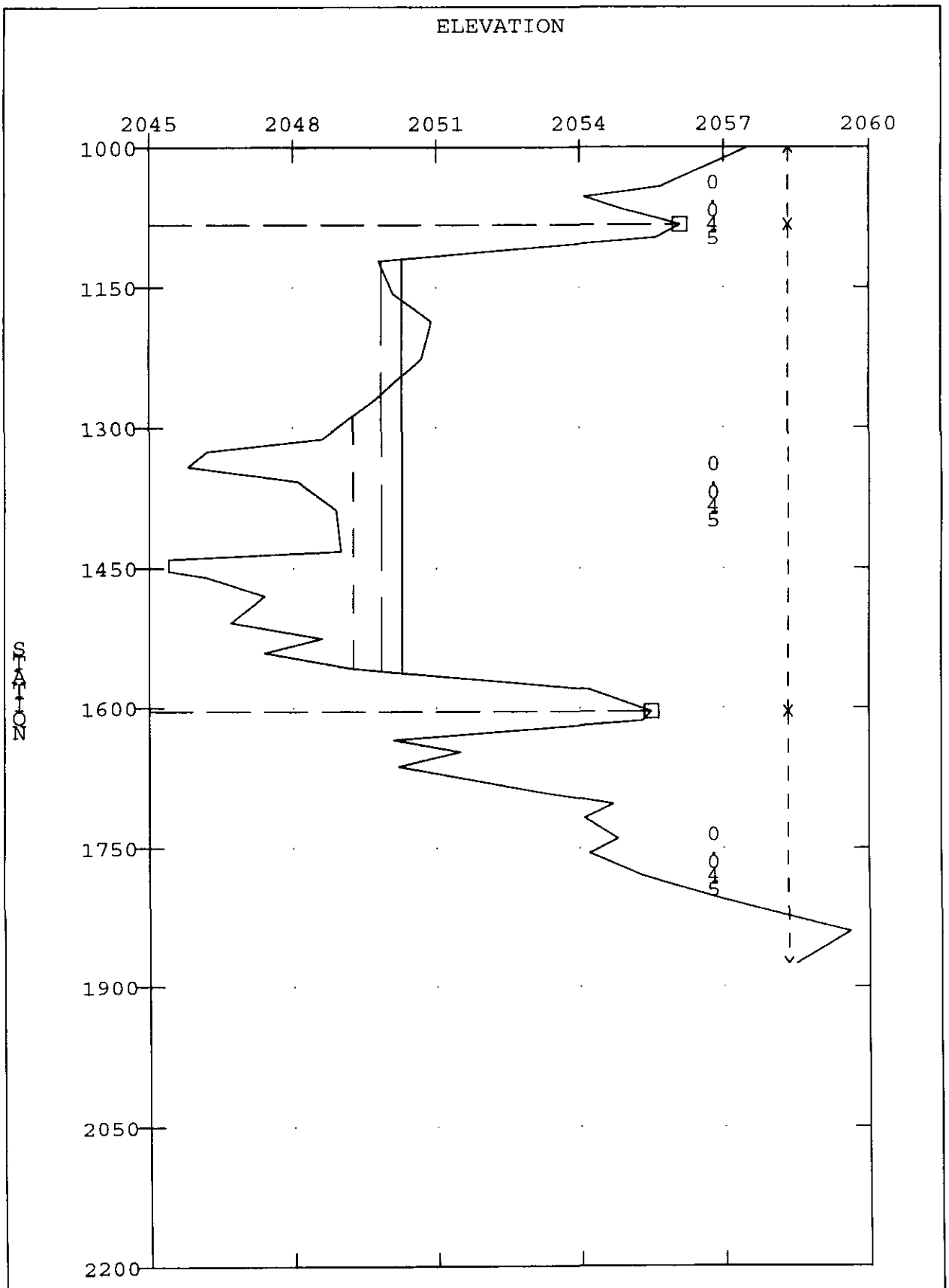
SECTION : 19802

LNLV WASH



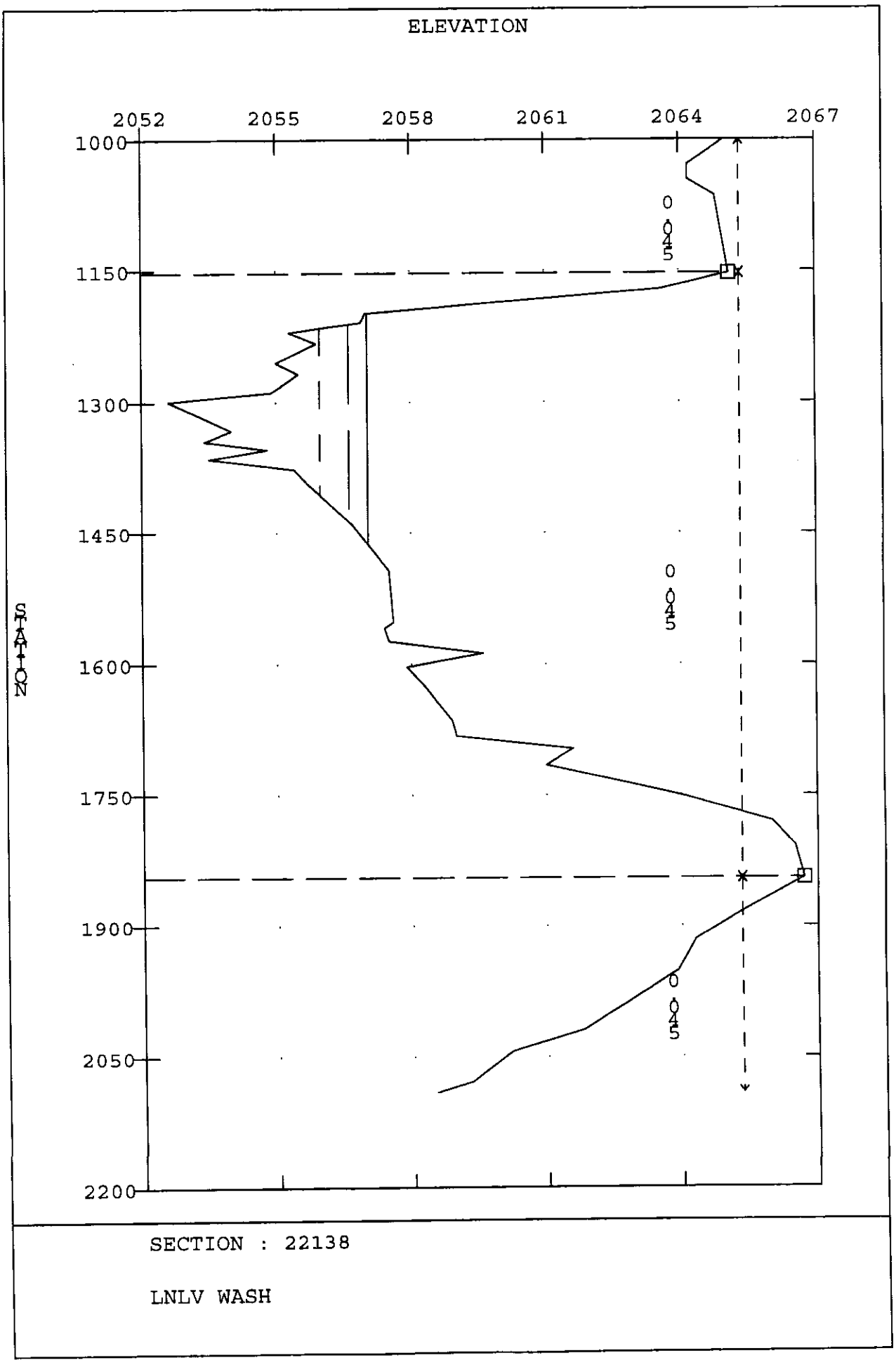
SECTION : 20595

LNLV WASH



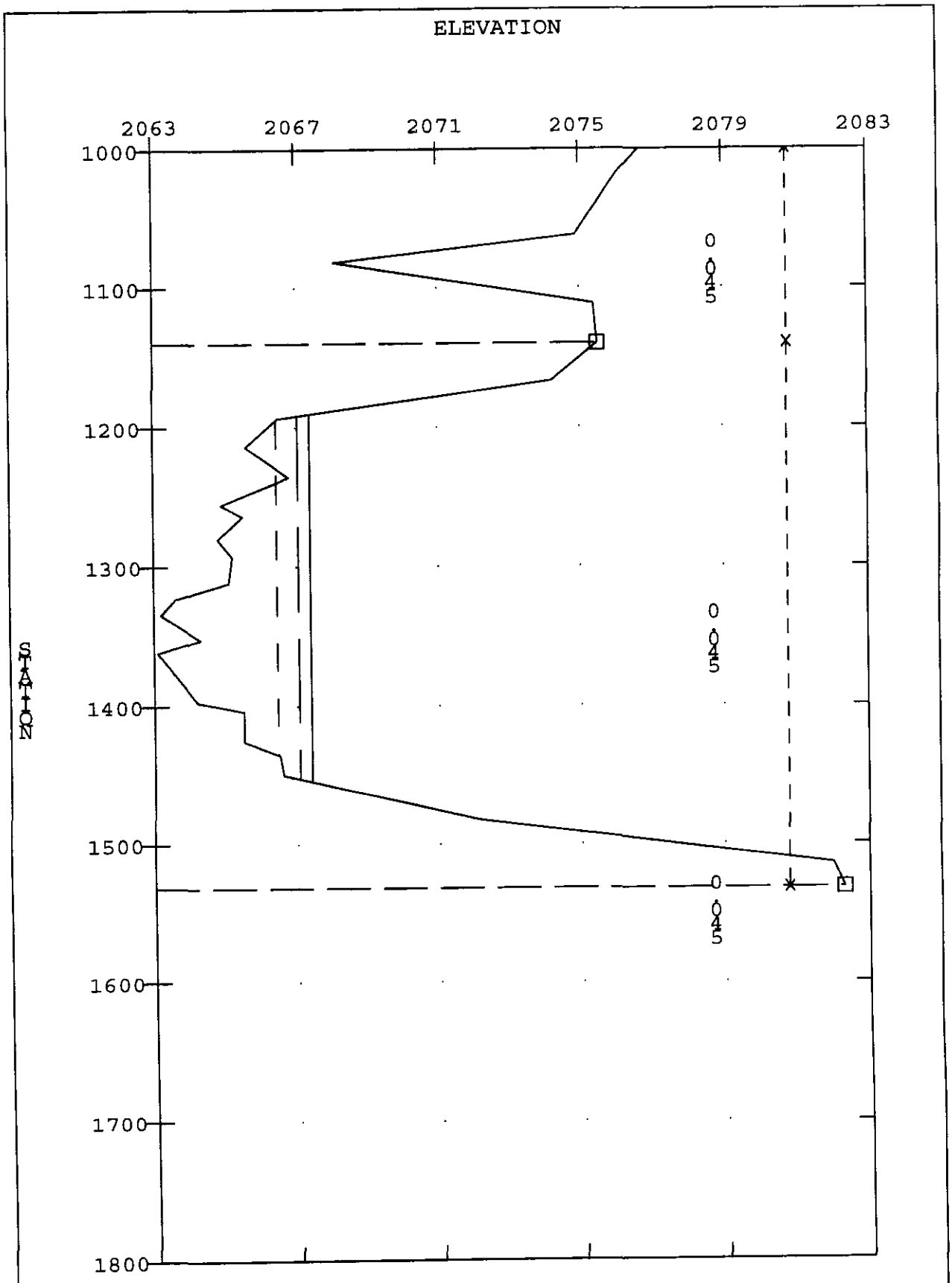
SECTION : 21291

LNLV WASH



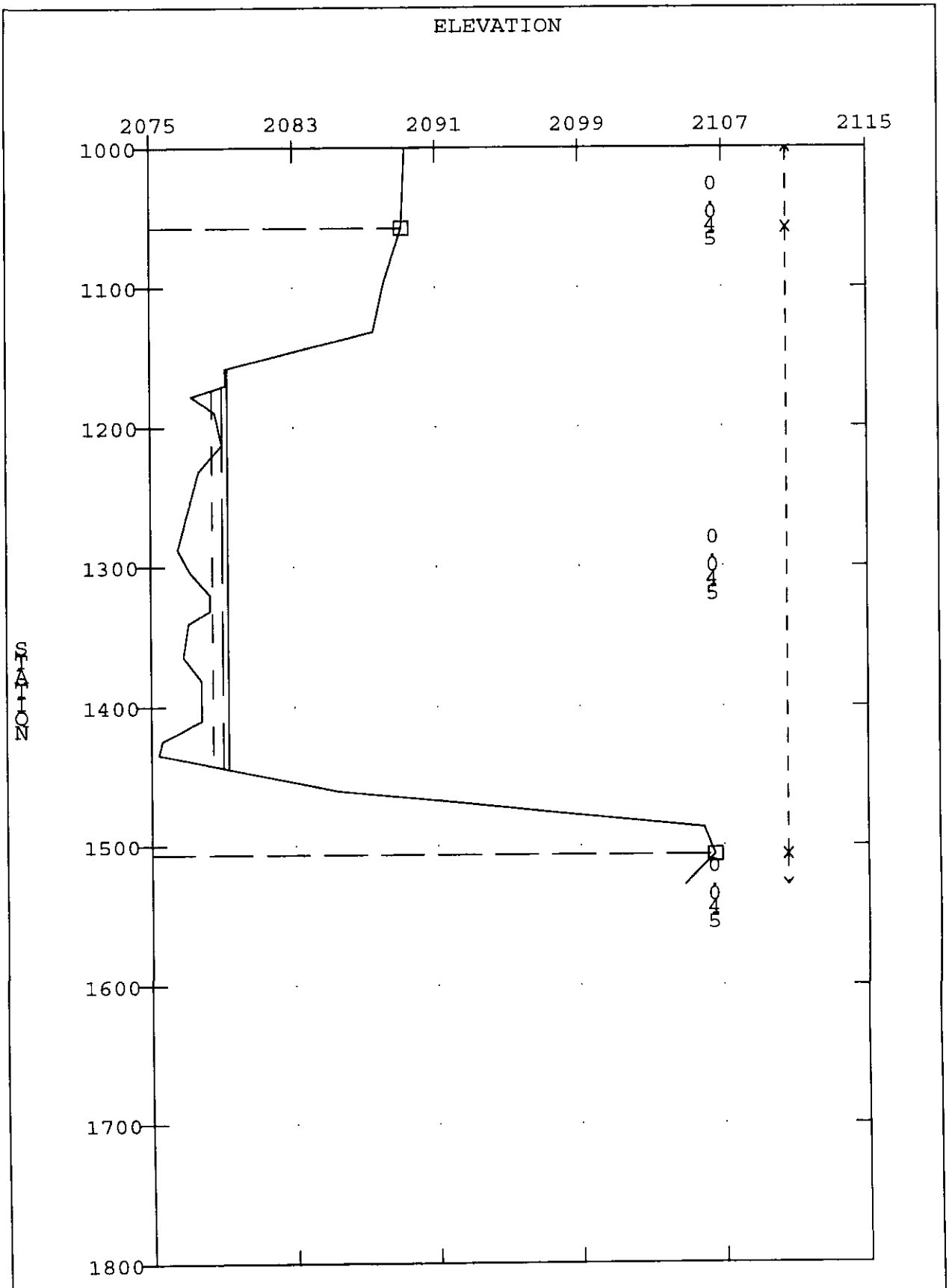
SECTION : 22138

LNLV WASH



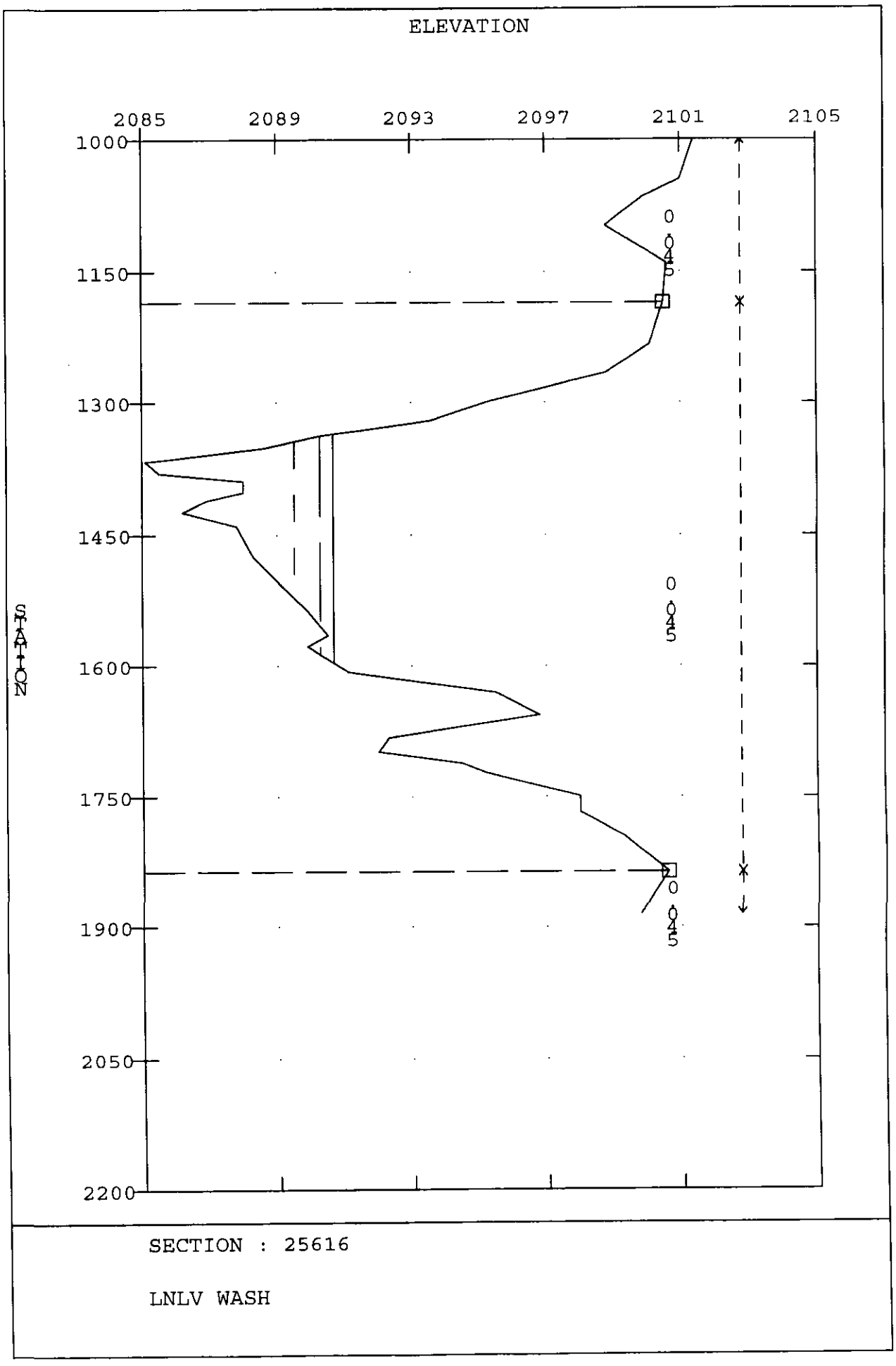
SECTION : 23230

LNLV WASH



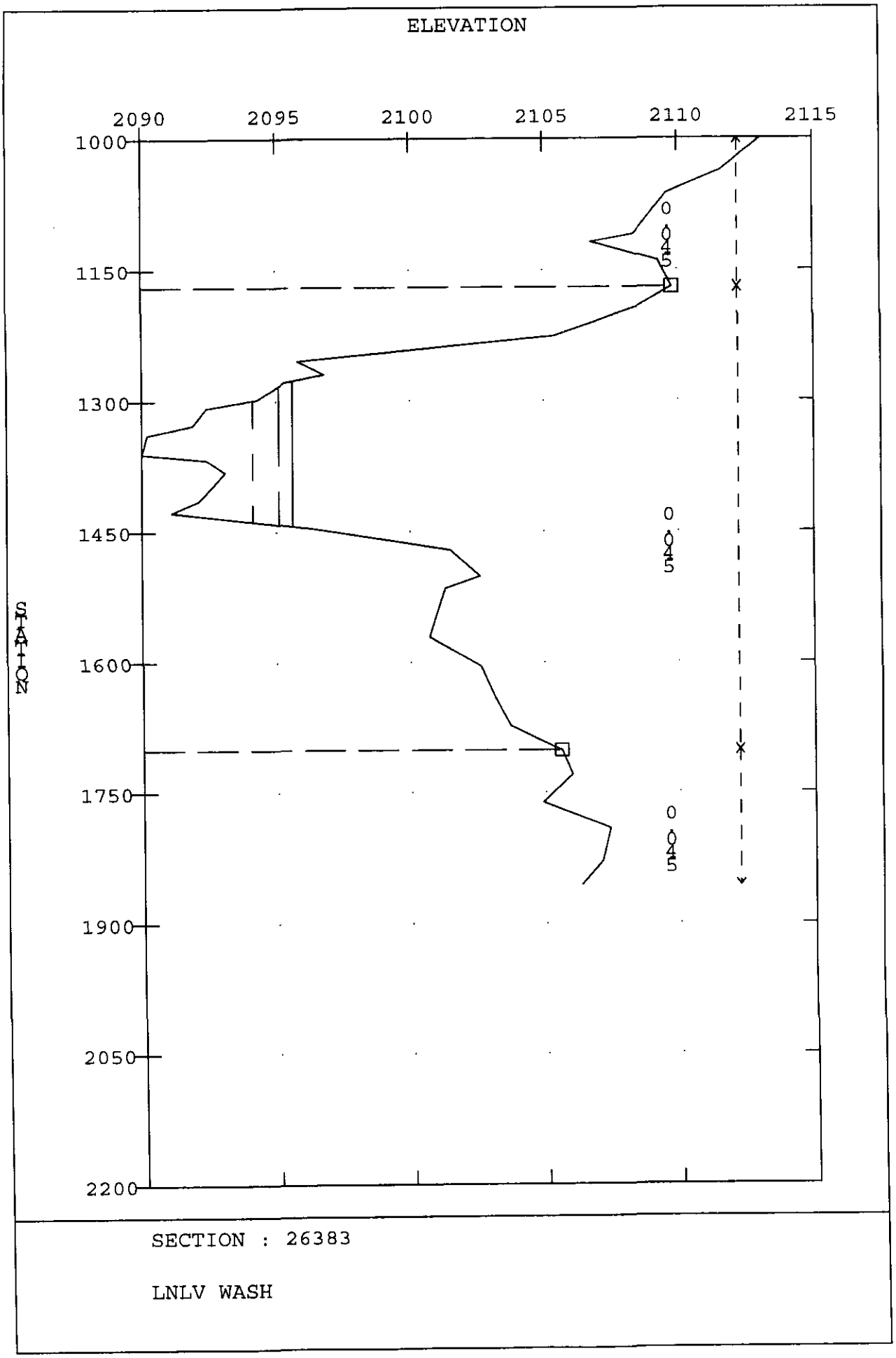
SECTION : 24530

LNLV WASH



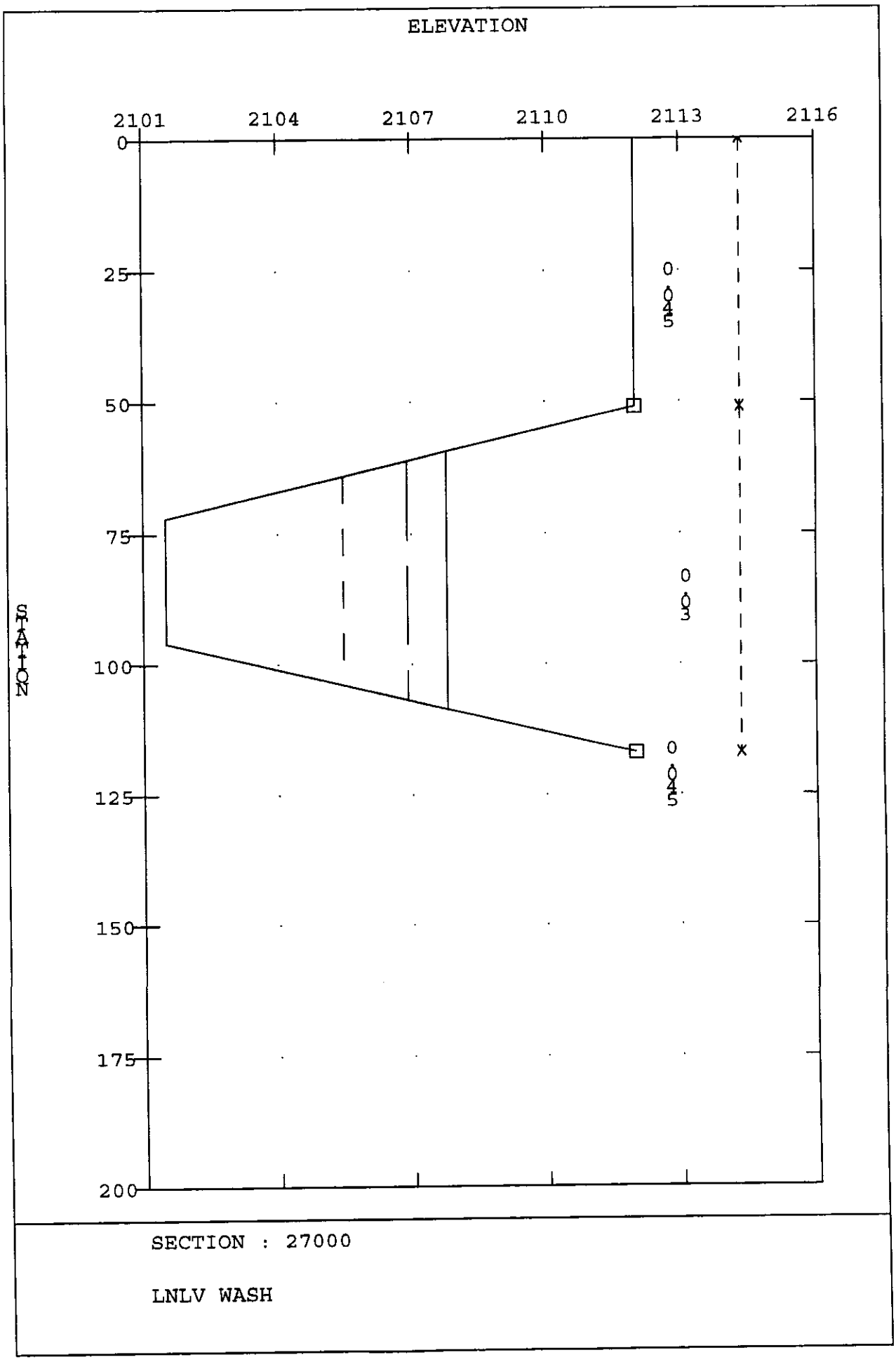
SECTION : 25616

LNLV WASH



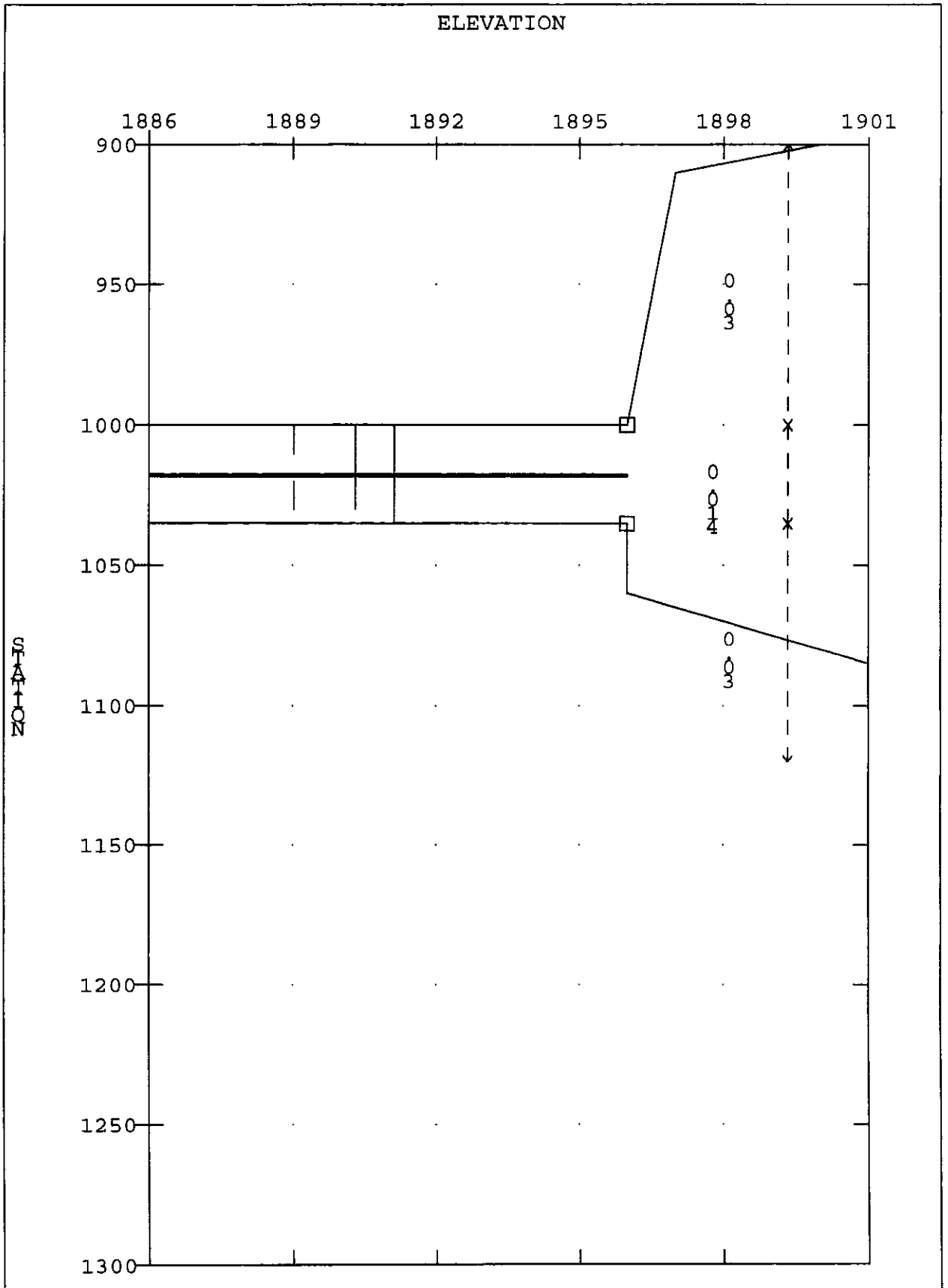
SECTION : 26383

LNLV WASH



SECTION : 27000

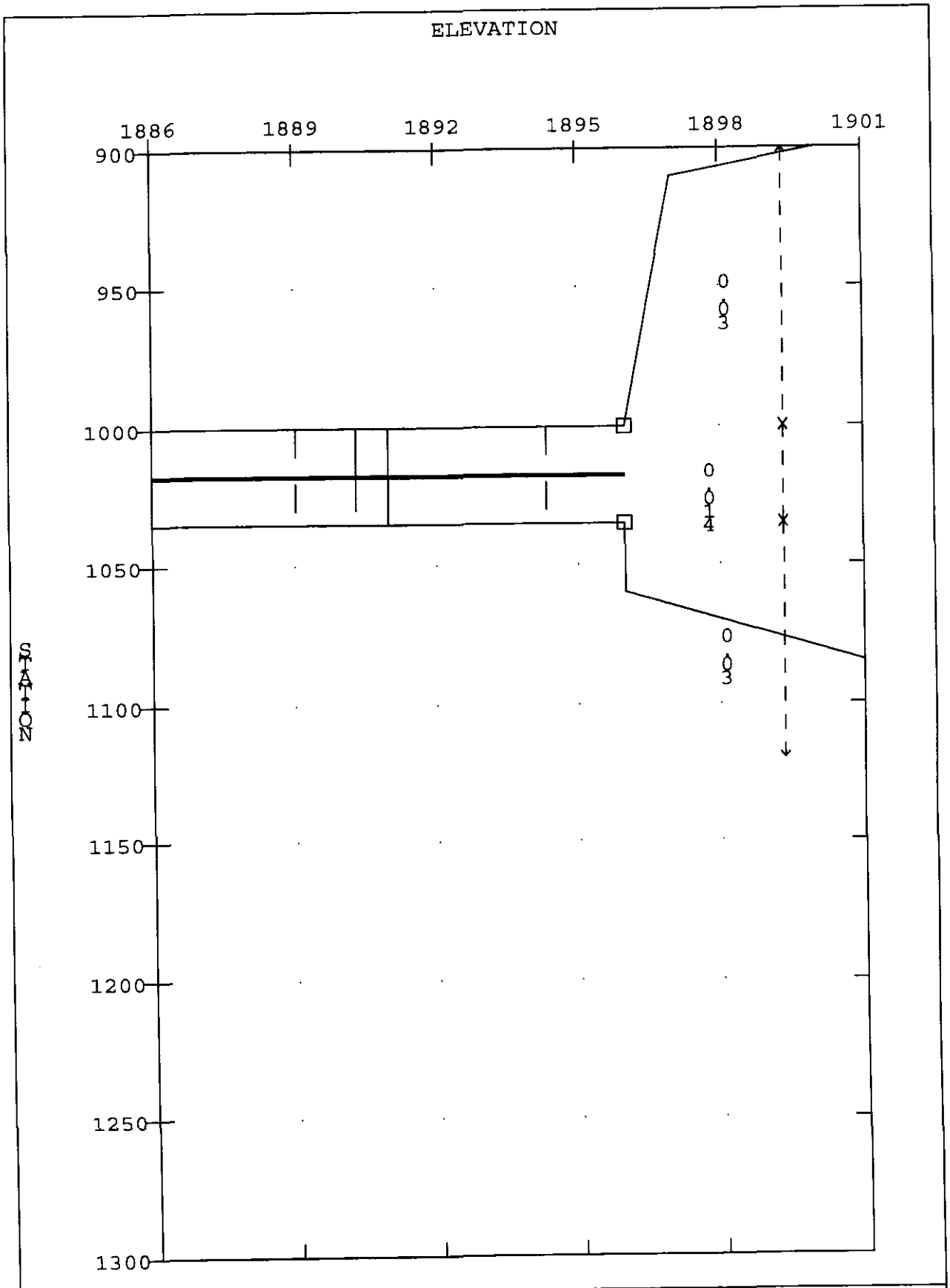
LNLV WASH



SECTION : 27303

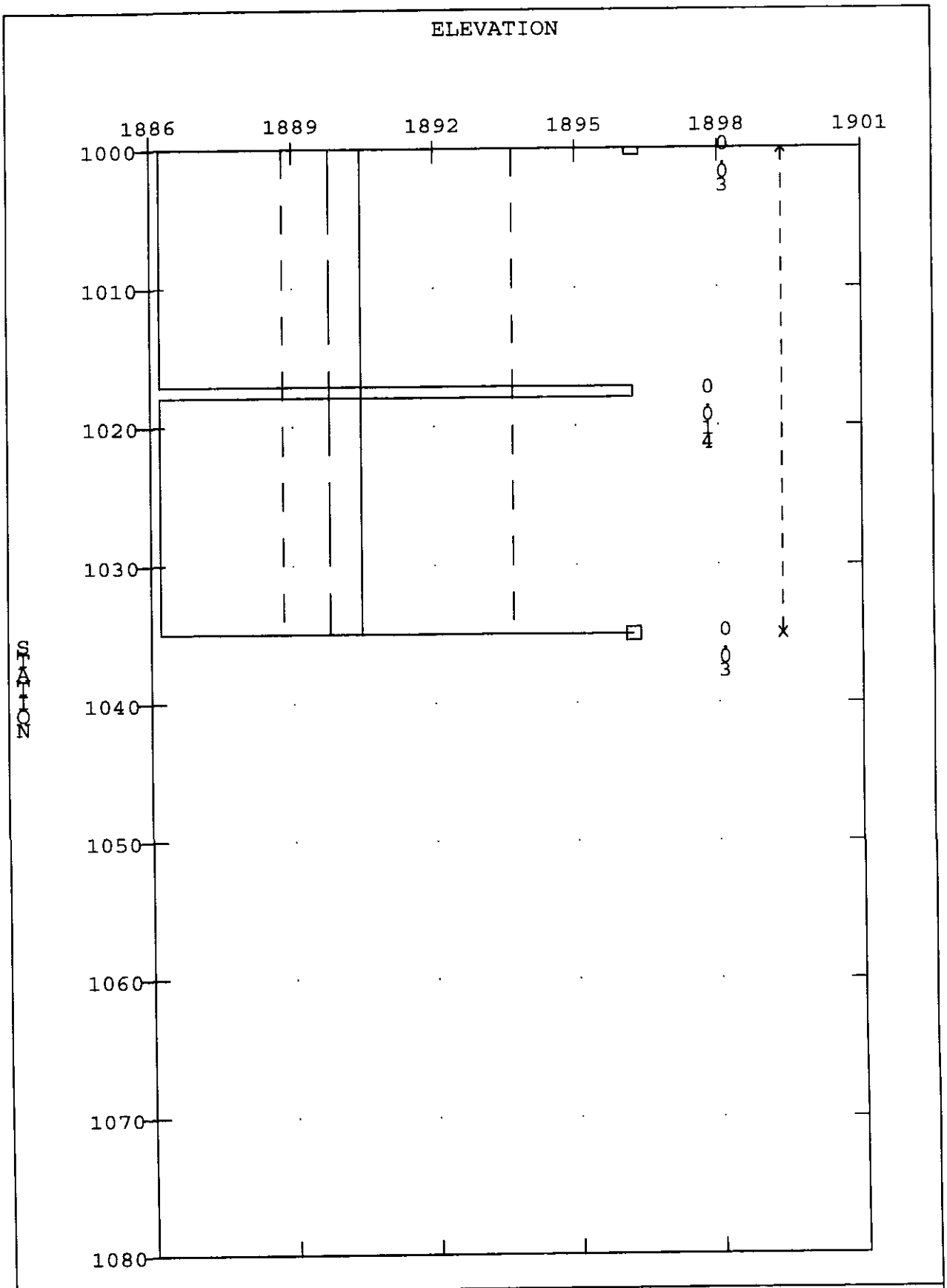
LNLV WASH

Cross Section Plots
KGSCW2



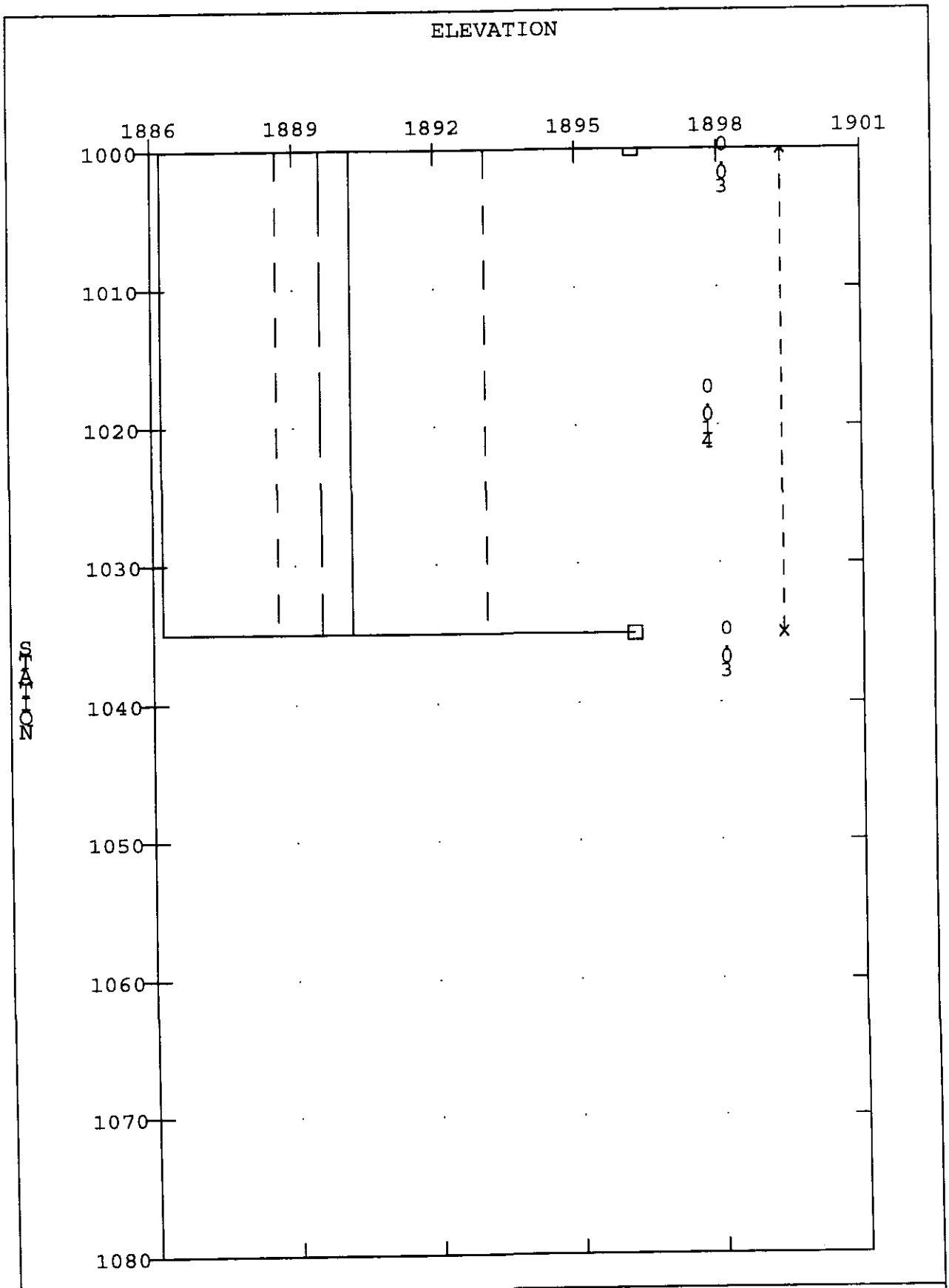
SECTION : 150

LNLV WASH W/O DIVERSION



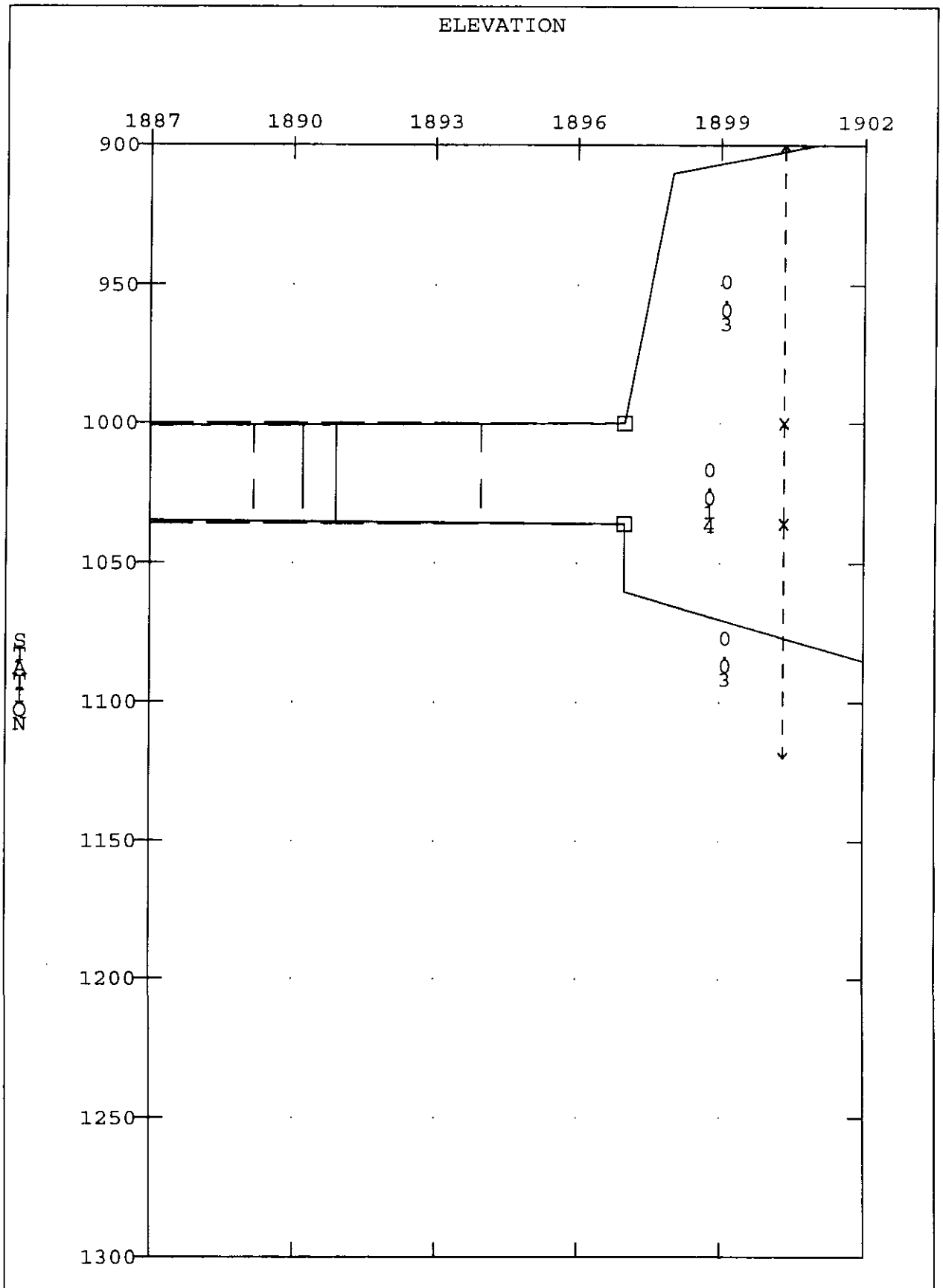
SECTION : 243.6

LNLV WASH W/O DIVERSION



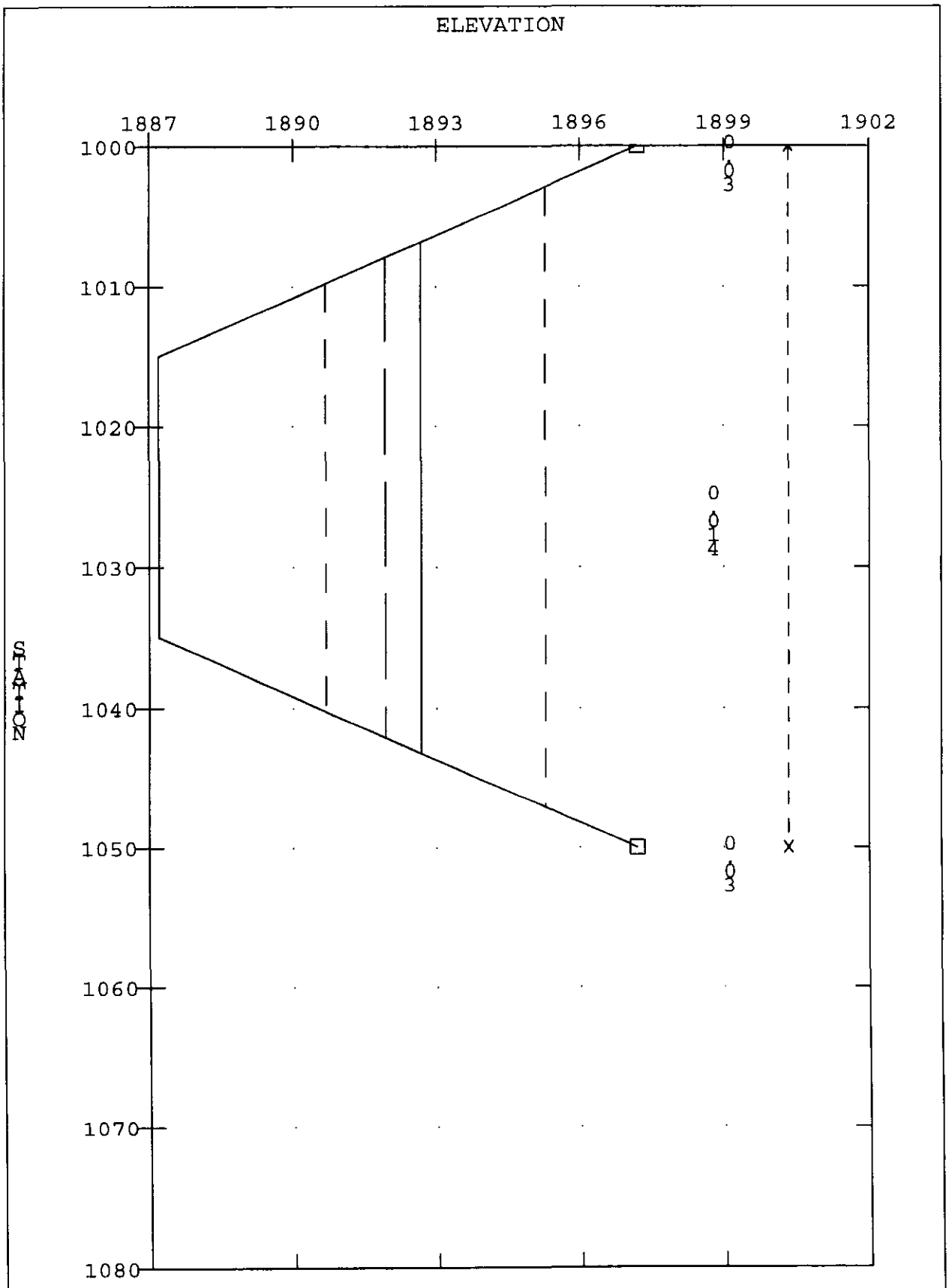
SECTION : 244.6

LNLV WASH W/O DIVERSION



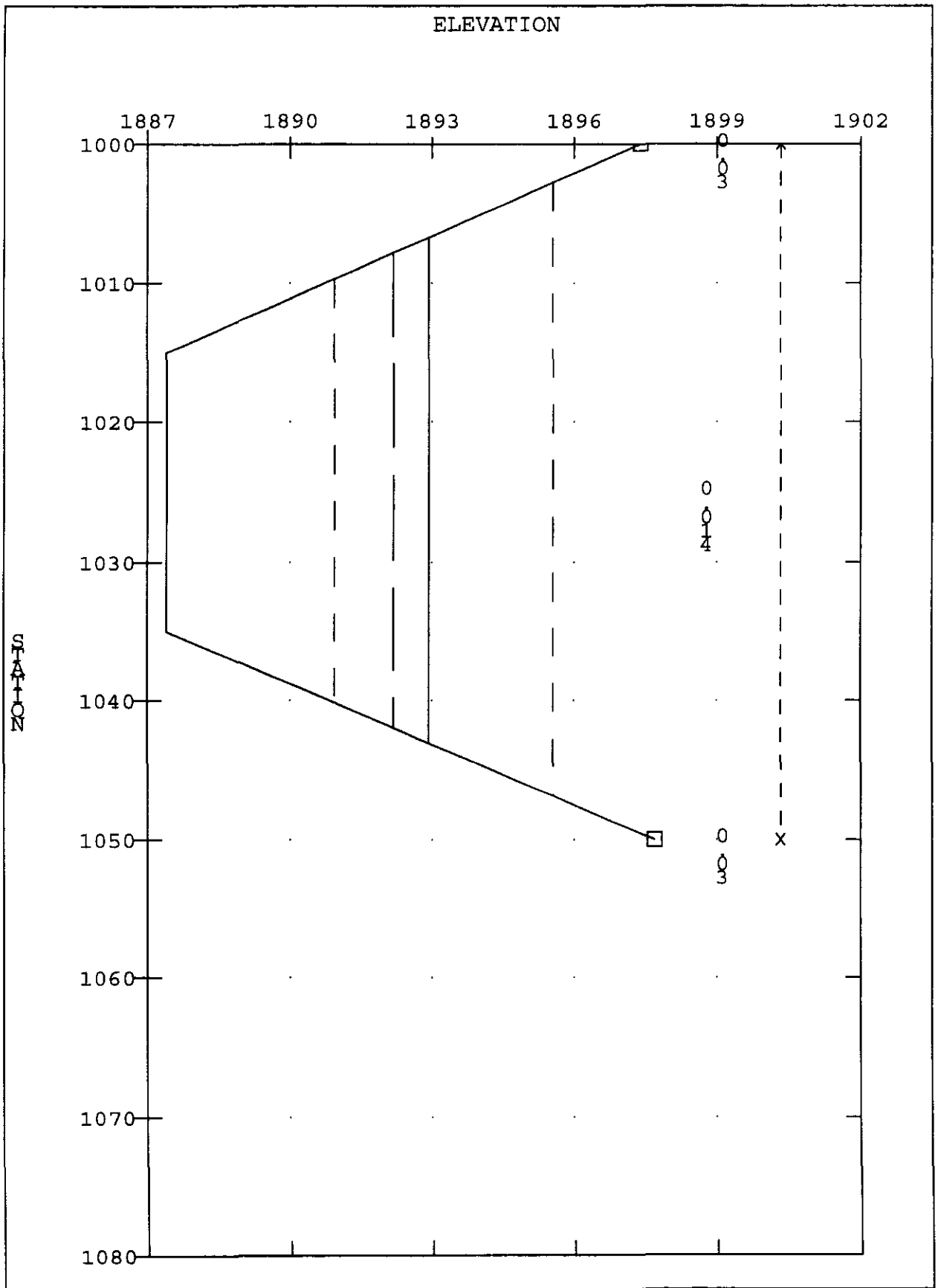
SECTION : 450

LNLV WASH W/O DIVERSION



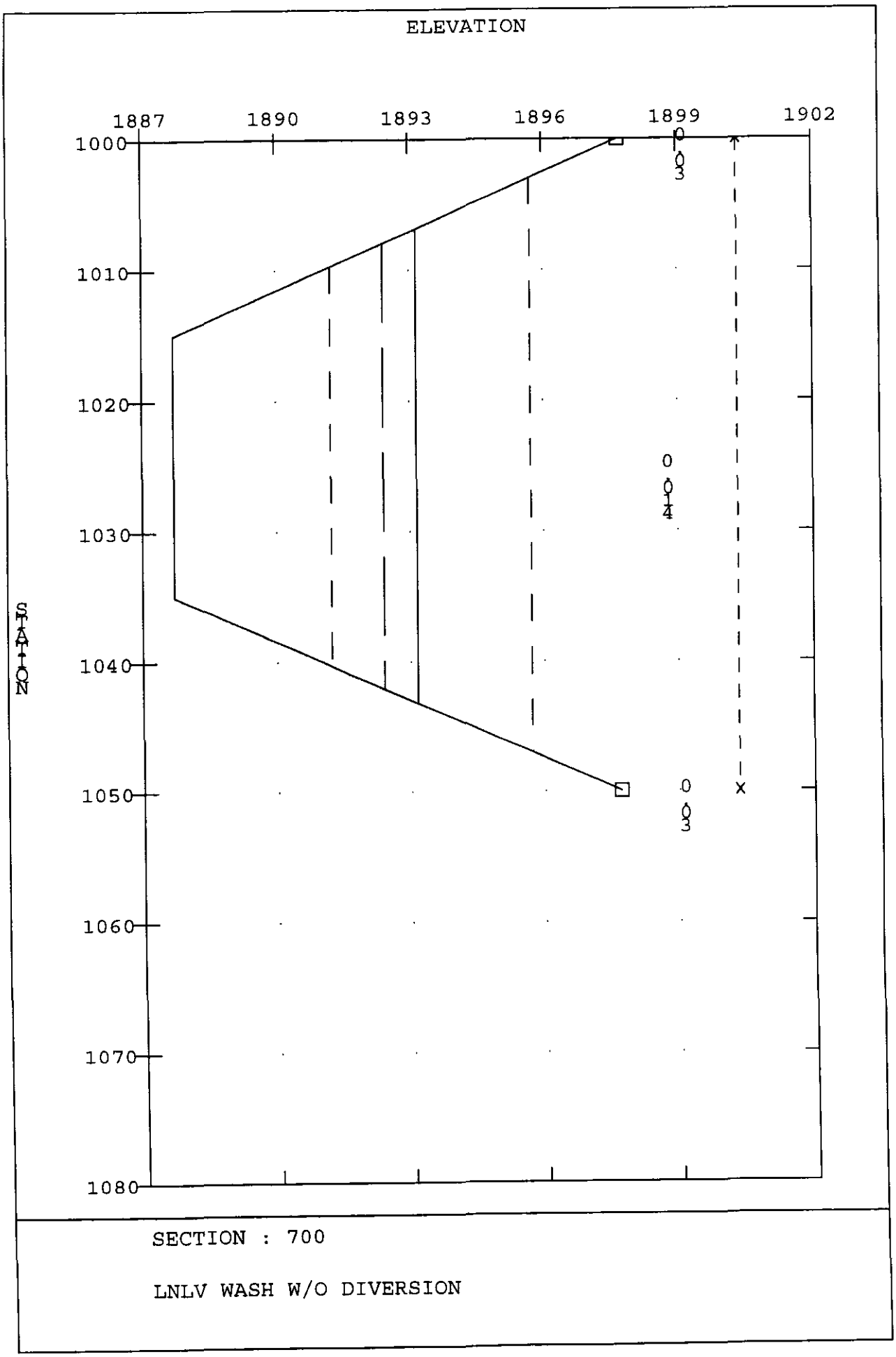
SECTION : 544

LNLV WASH W/O DIVERSION



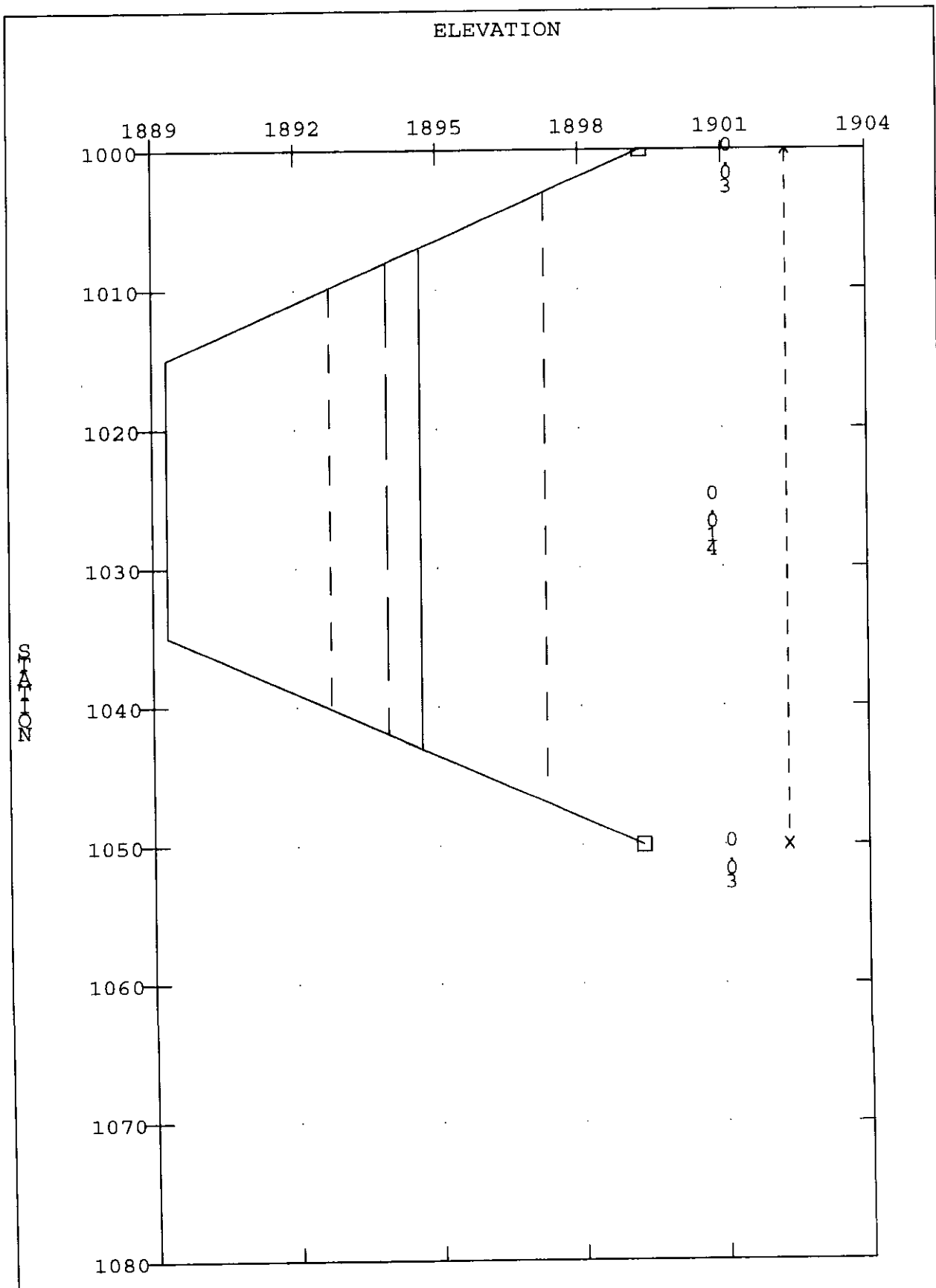
SECTION : 600

LNLV WASH W/O DIVERSION



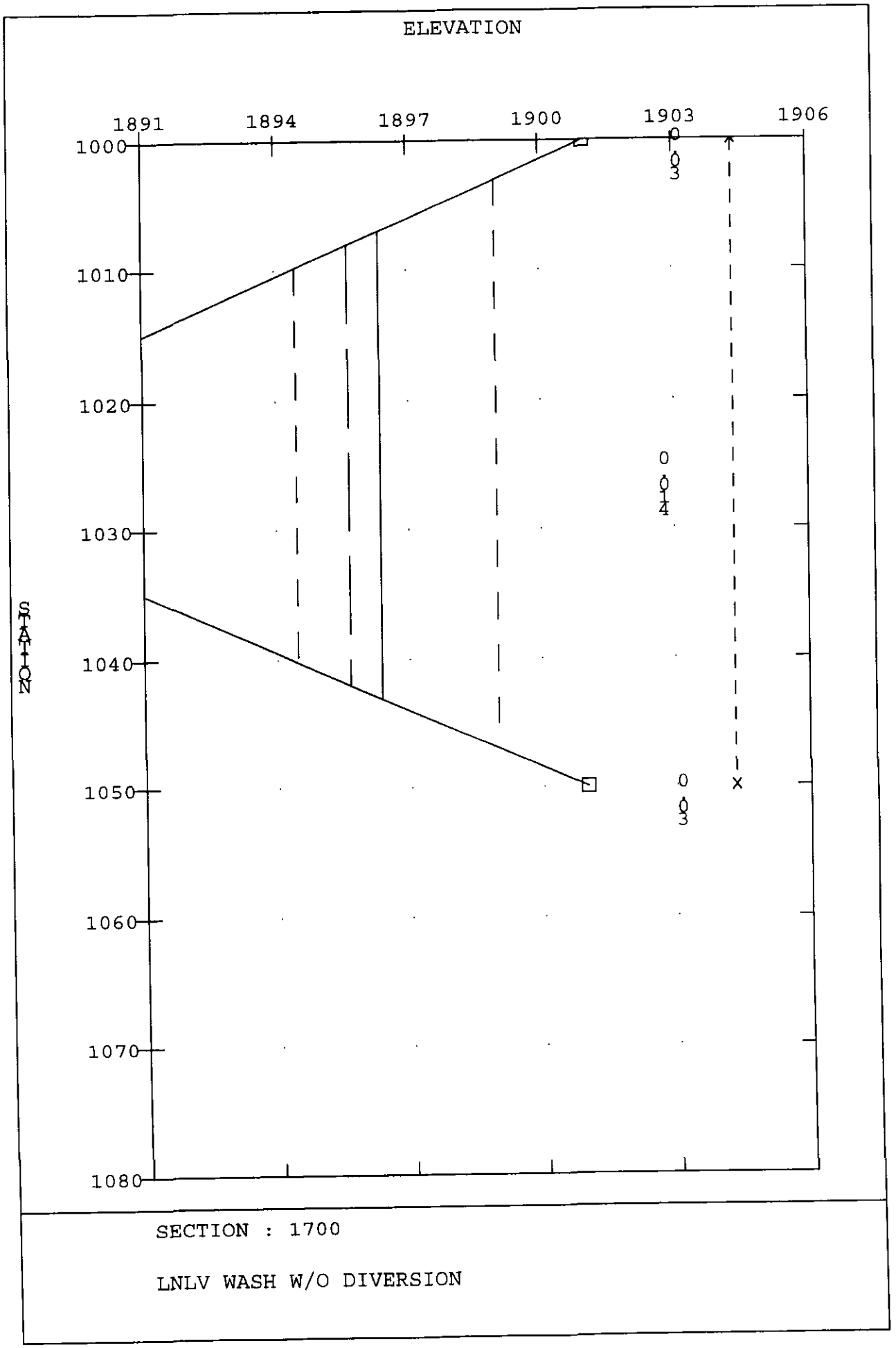
SECTION : 700

LNLV WASH W/O DIVERSION



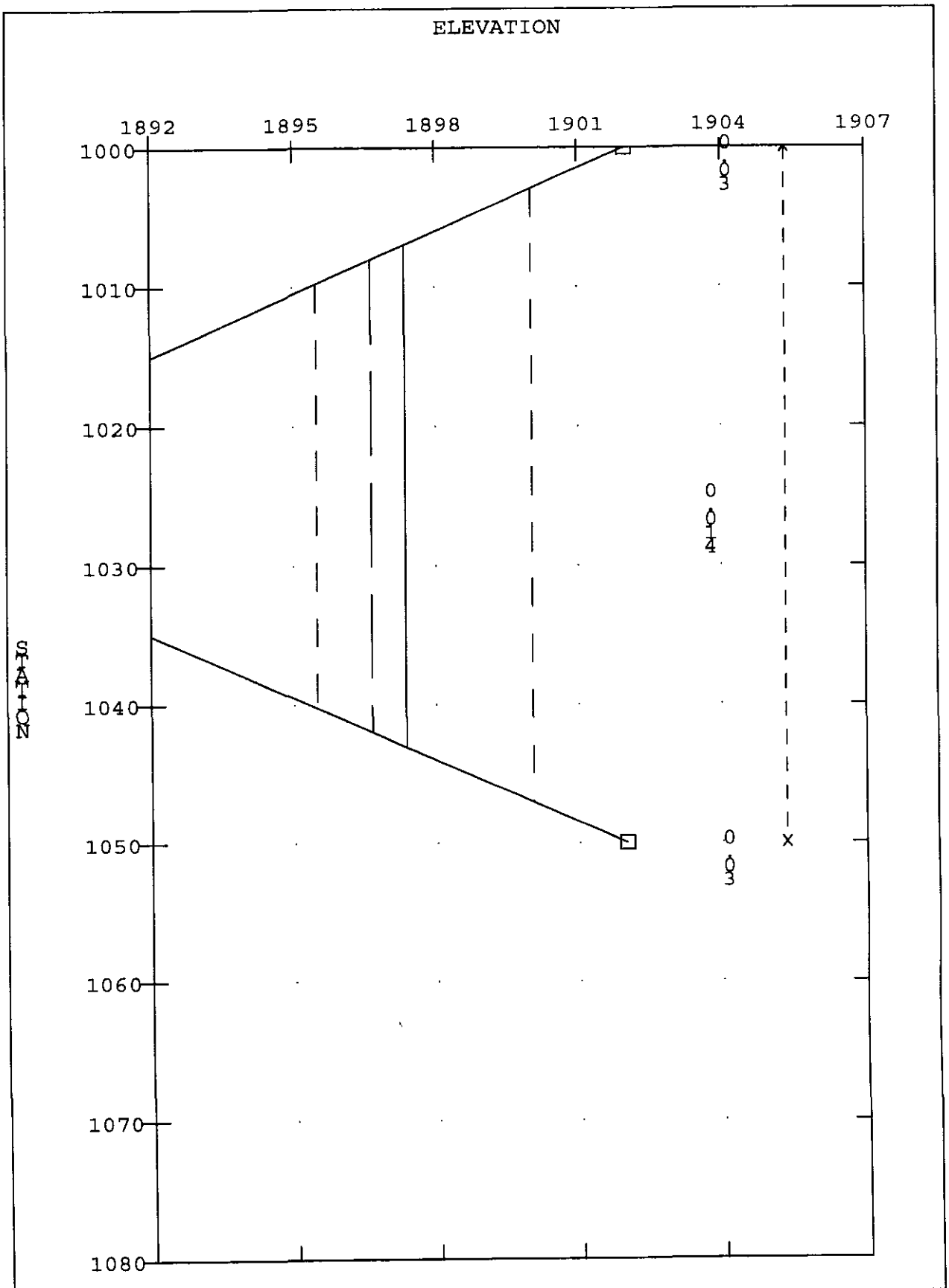
SECTION : 1200

LNLV WASH W/O DIVERSION



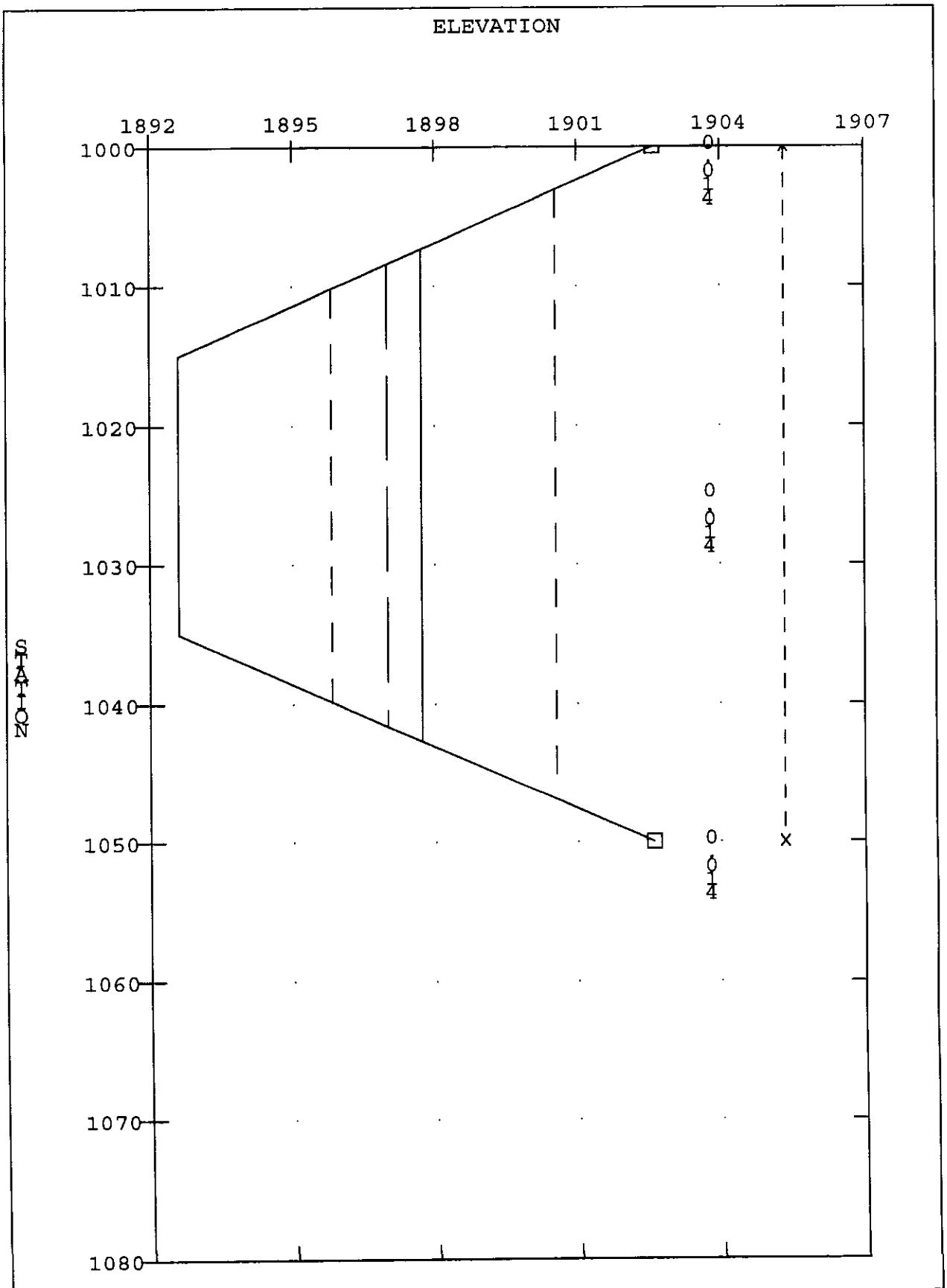
SECTION : 1700

LNLV WASH W/O DIVERSION



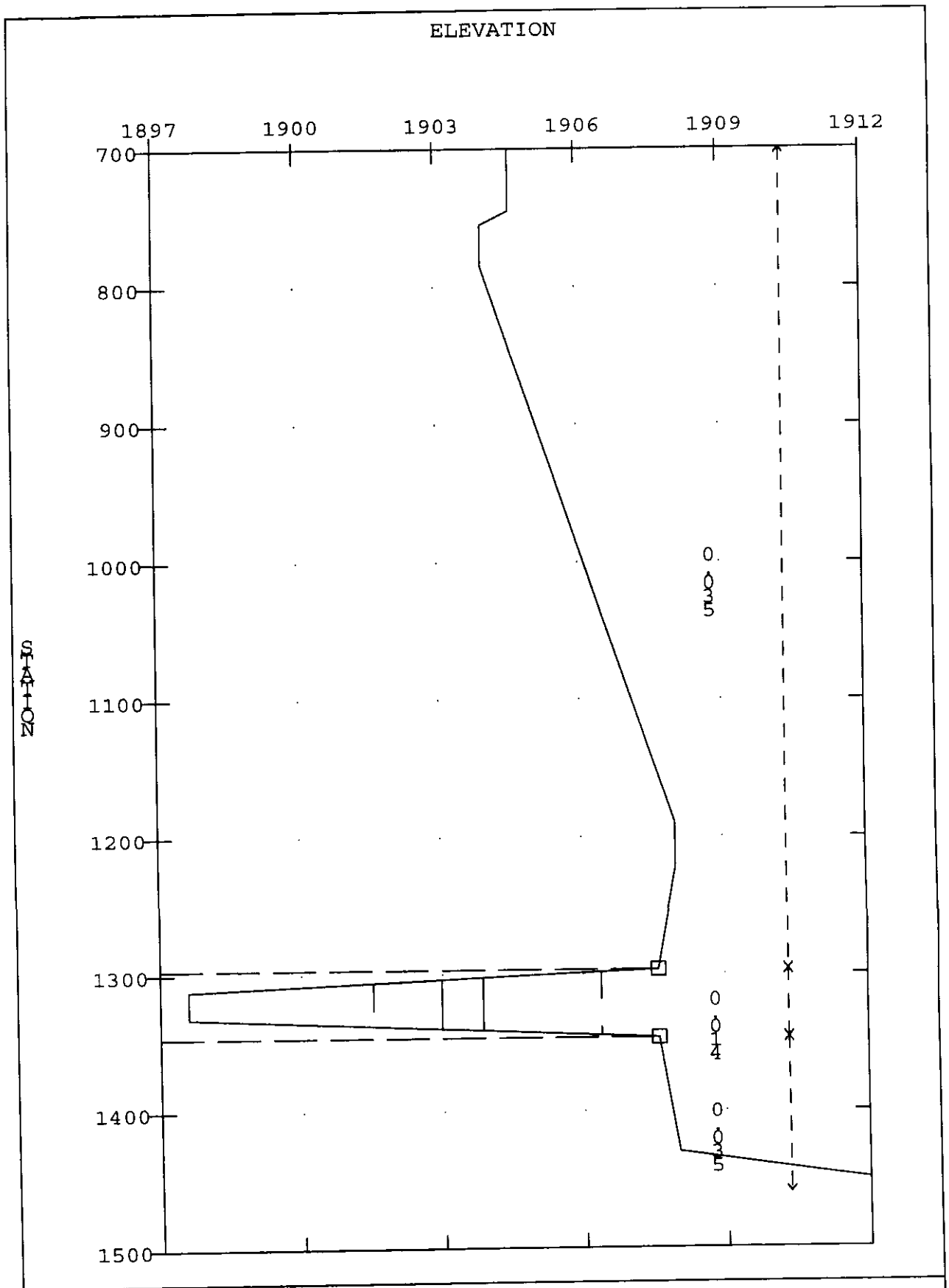
SECTION : 2000

LNLV WASH W/O DIVERSION



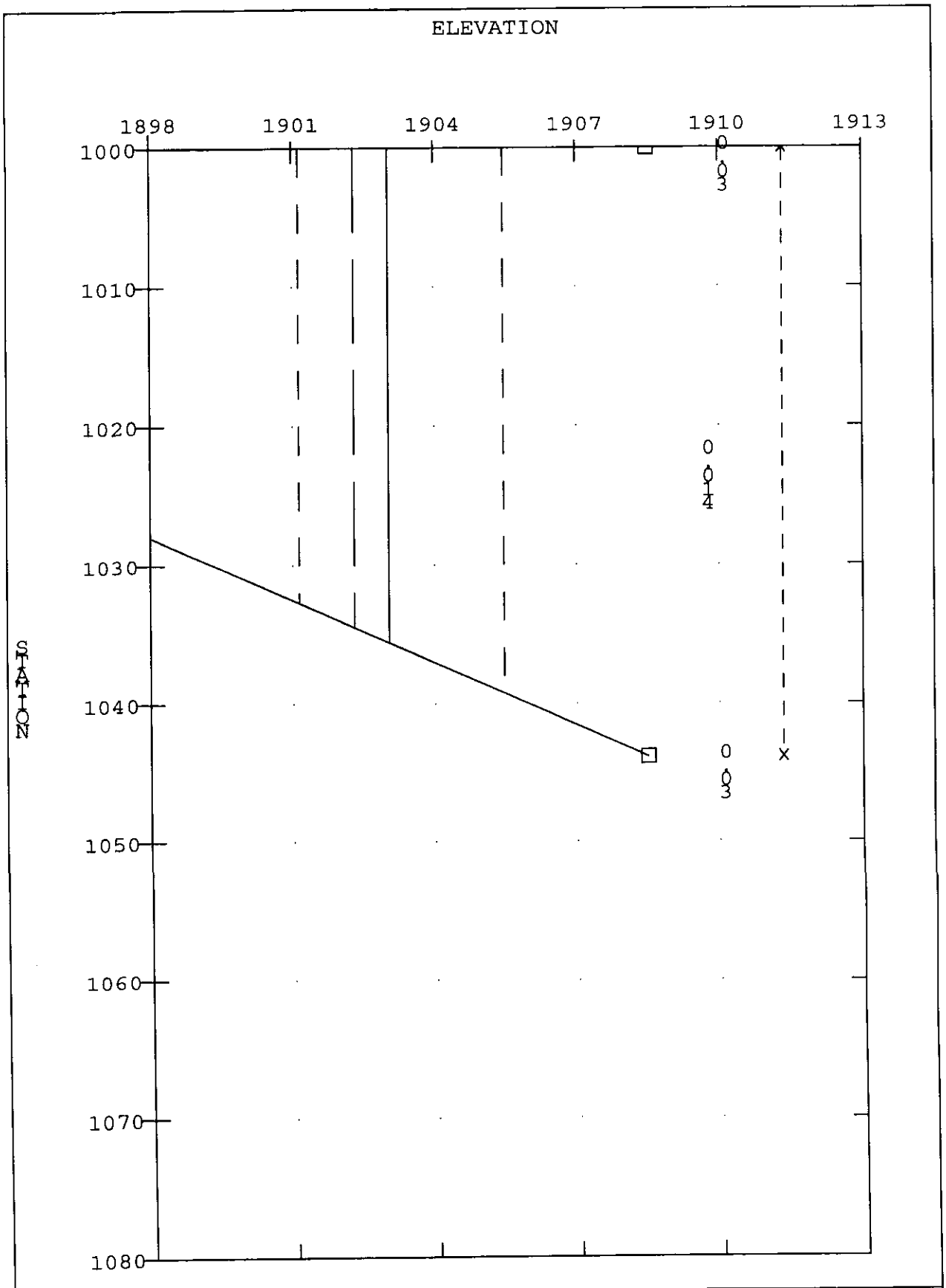
SECTION : 2200

LNLV WASH W/O DIVERSION



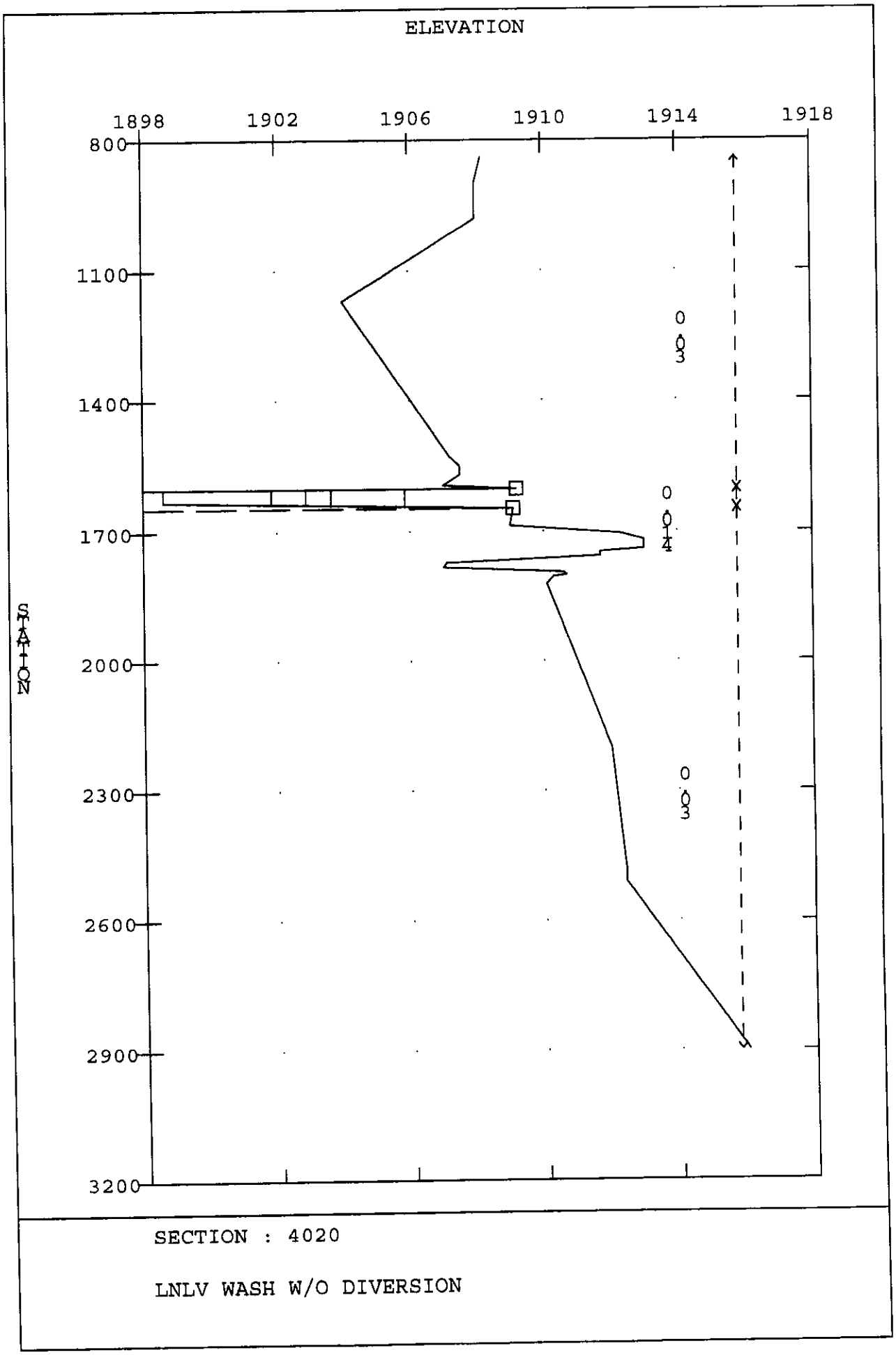
SECTION : 3724

LNLV WASH W/O DIVERSION



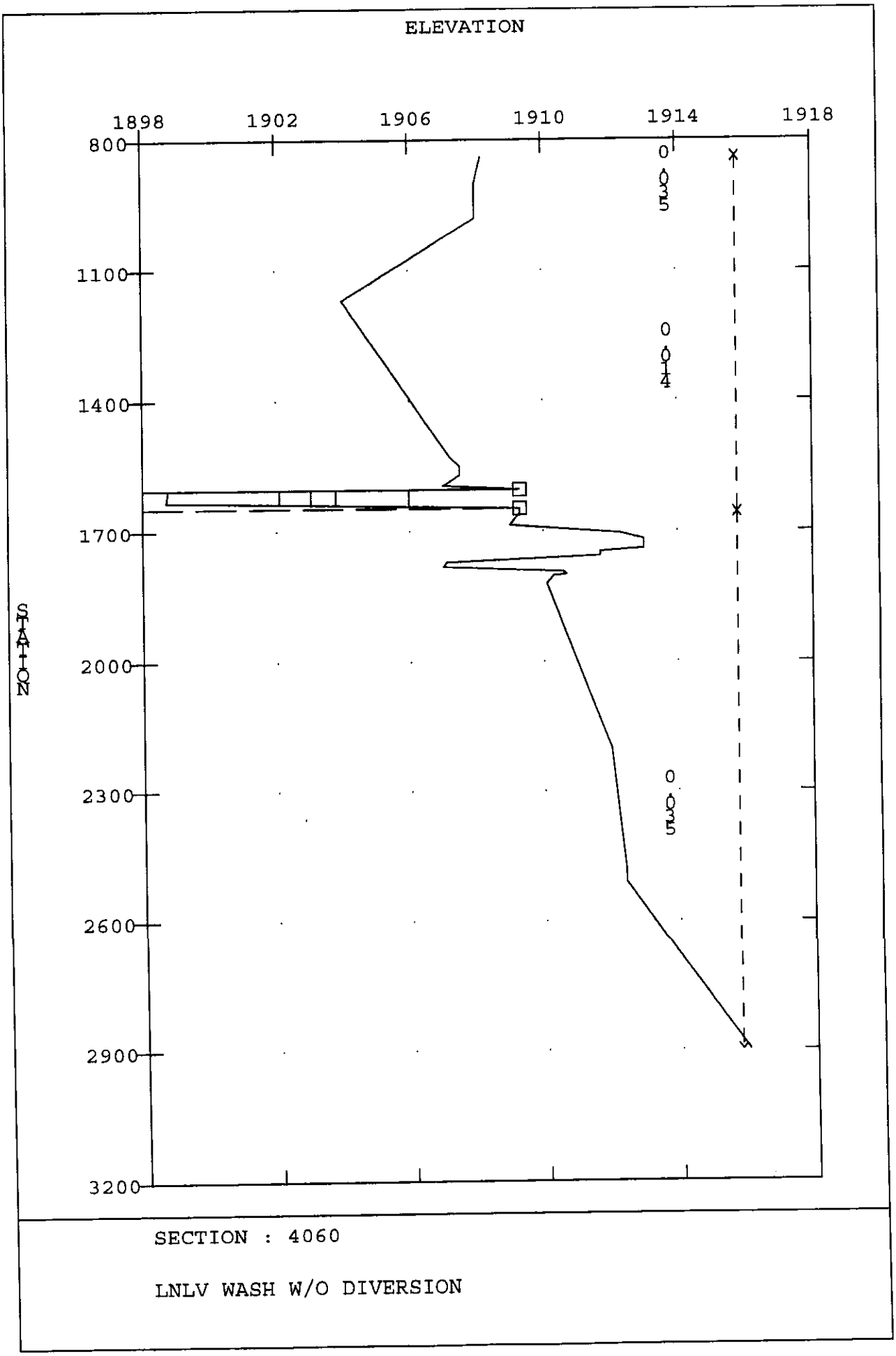
SECTION : 3823

LNLV WASH W/O DIVERSION



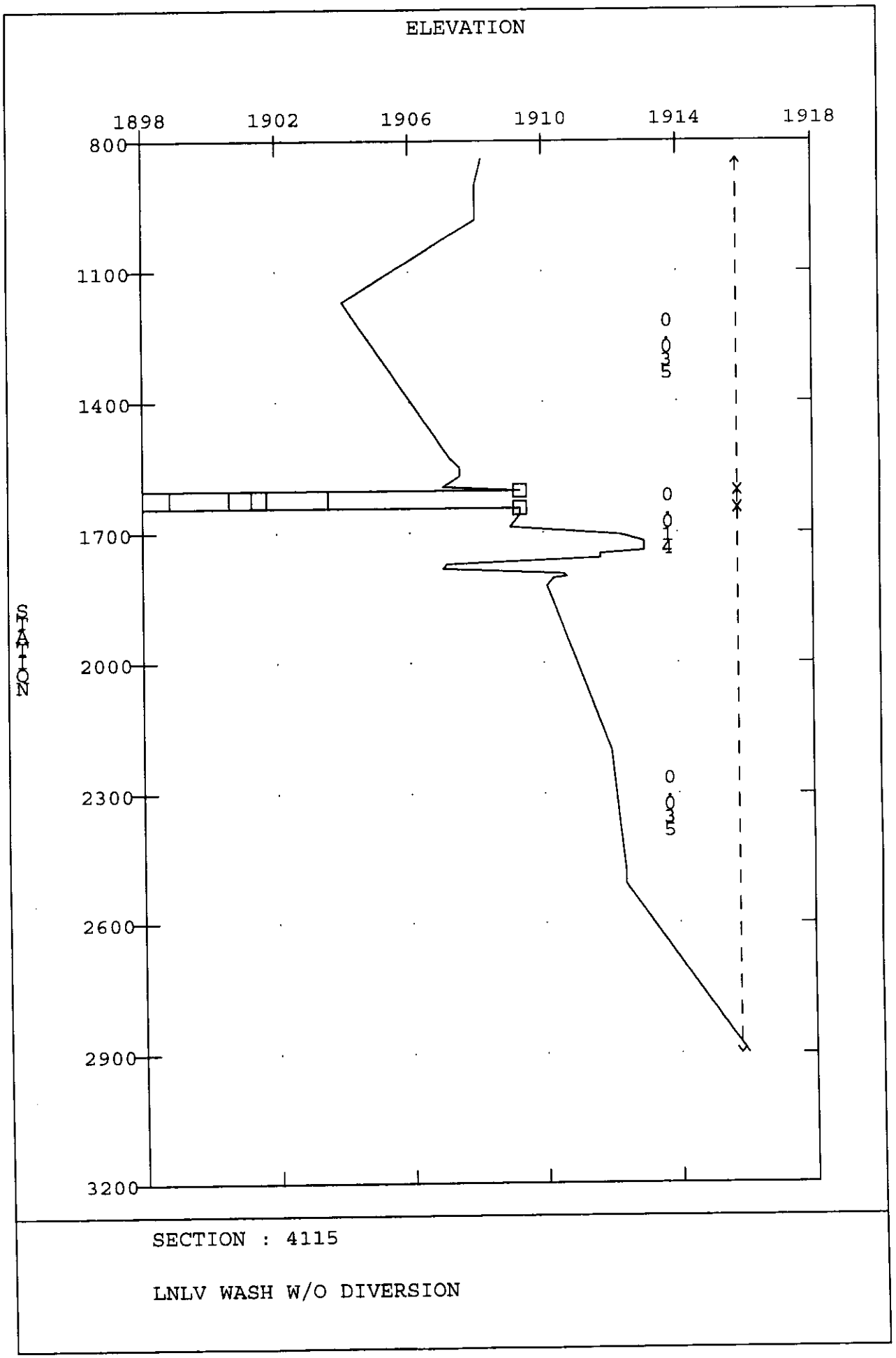
SECTION : 4020

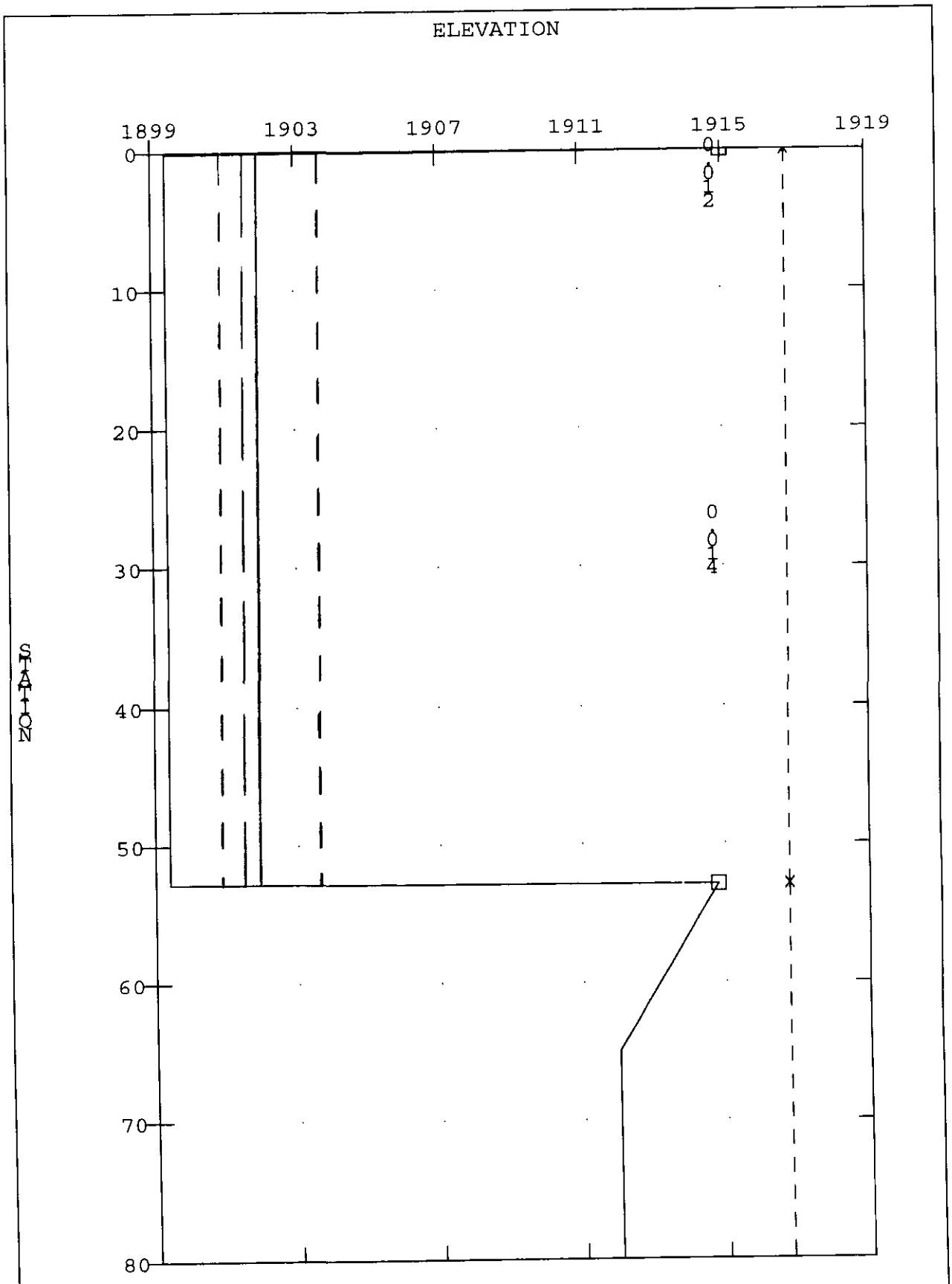
LNLV WASH W/O DIVERSION



SECTION : 4060

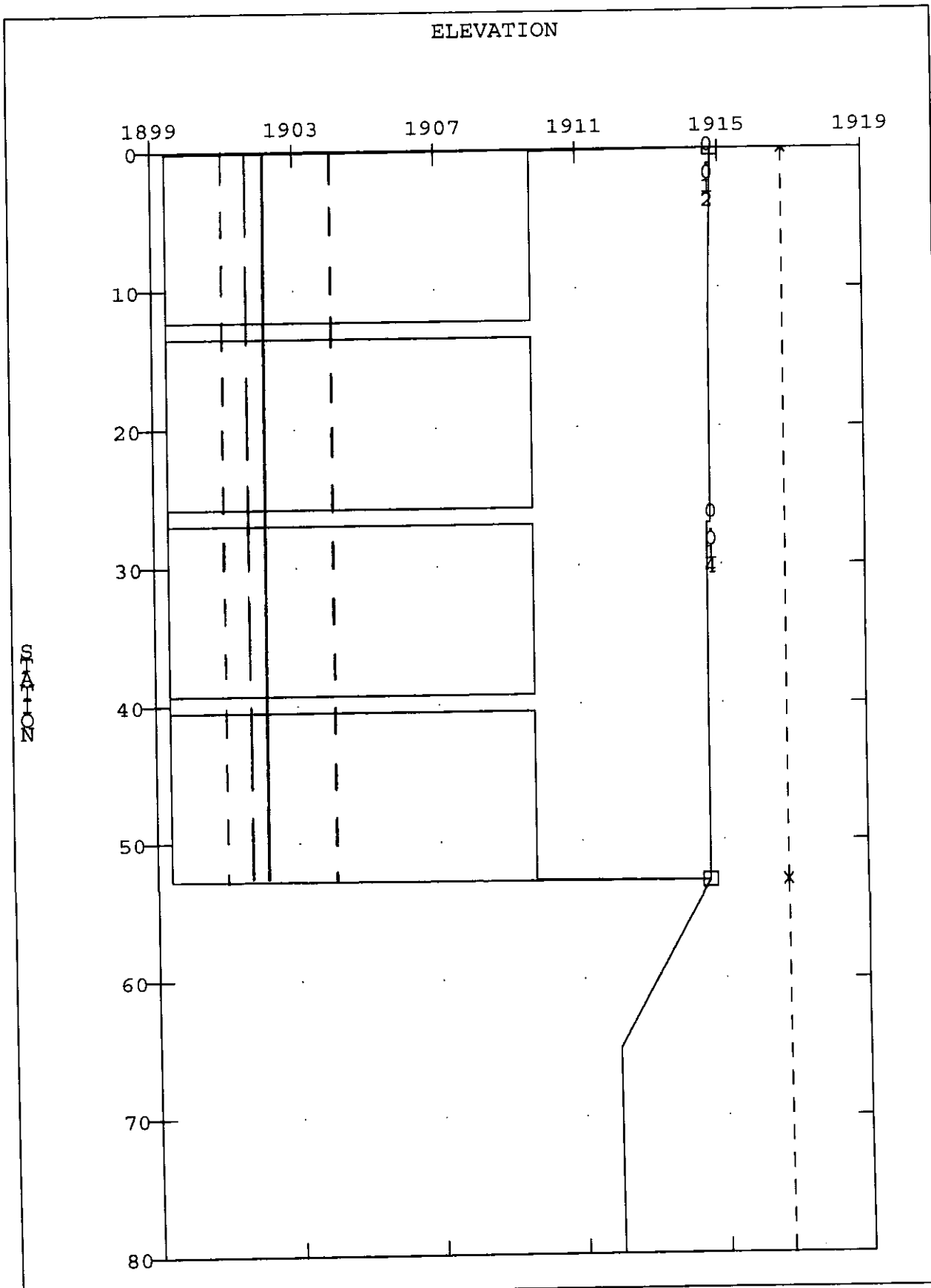
LNLV WASH W/O DIVERSION

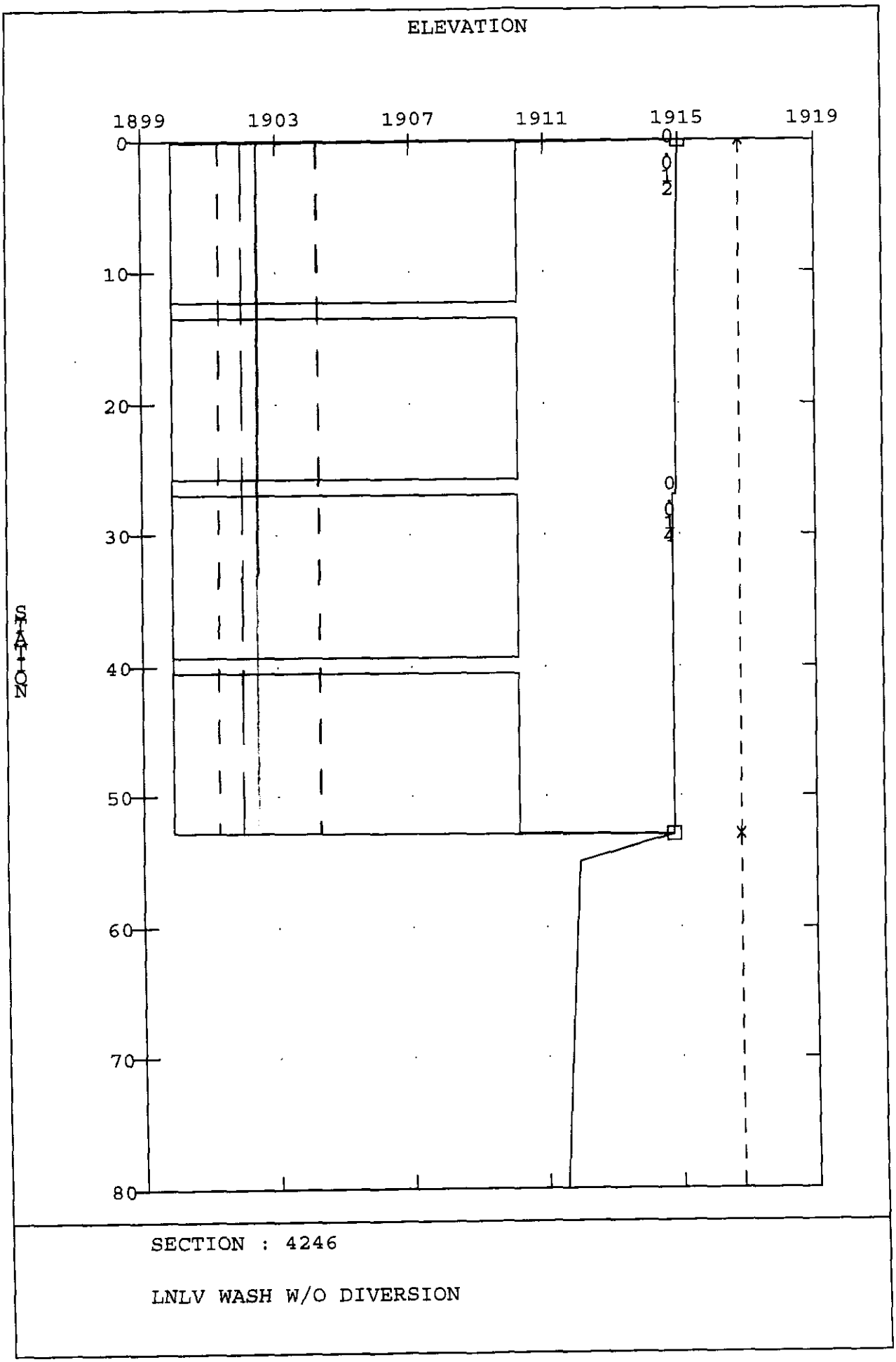

ELEVATION
1898
1902
1906
1910
1914
1918
800
1100
1400
1700
2000
2300
2600
2900
3200
STATION
0
0
0
SECTION : 4115
LNLV WASH W/O DIVERSION

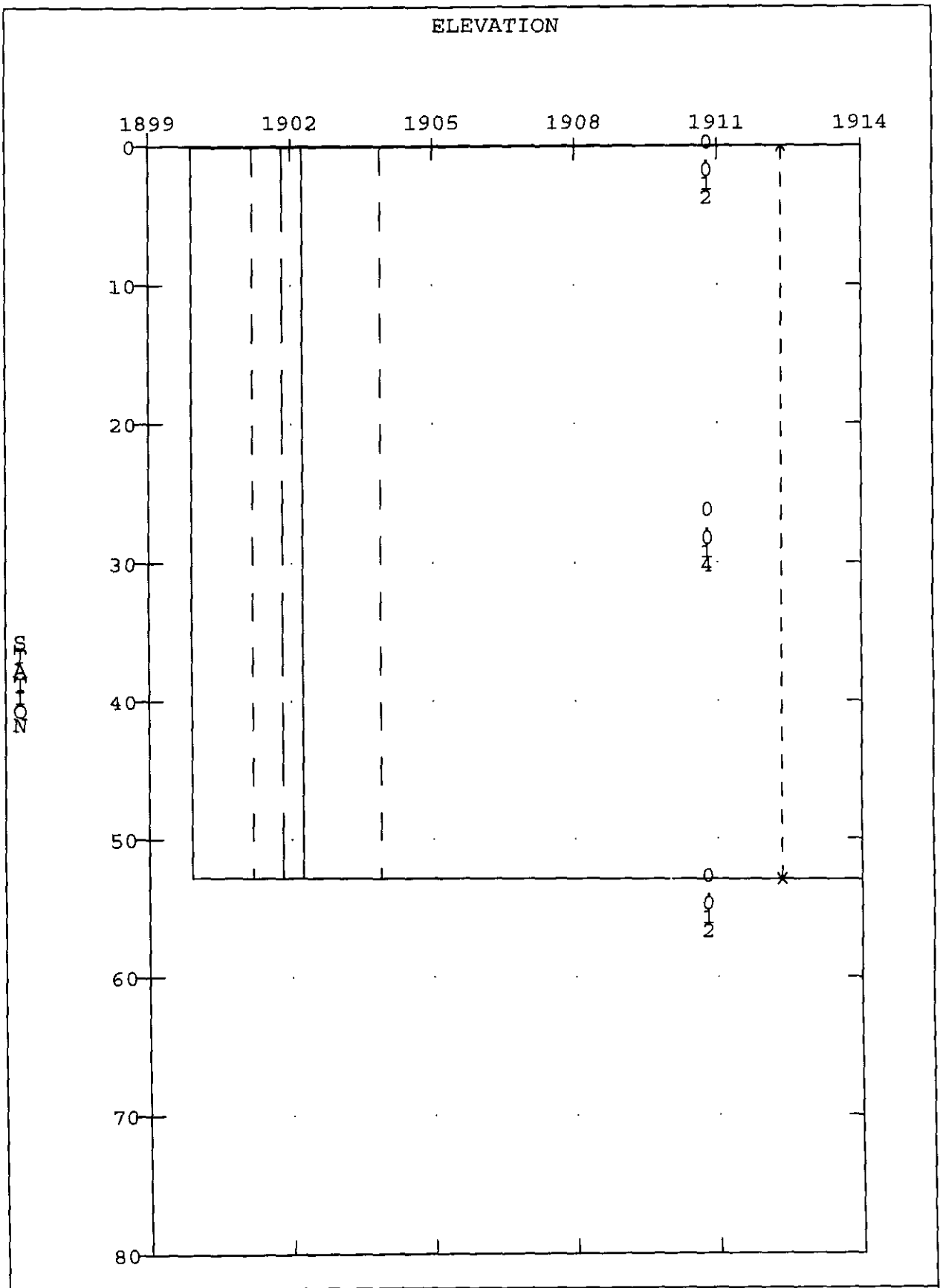


SECTION : 4188

LNLV WASH W/O DIVERSION

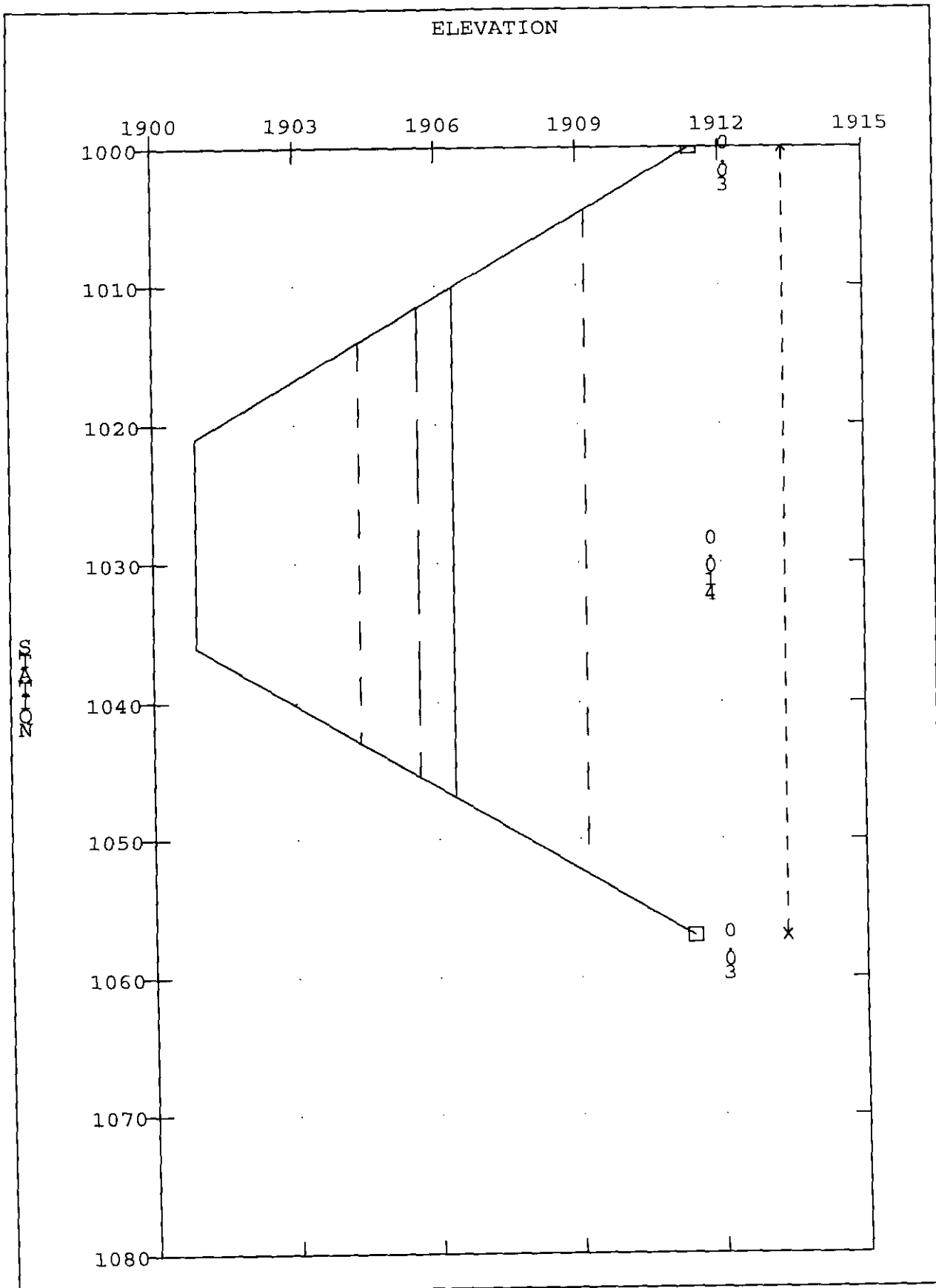

ELEVATION
1899
1903
1907
1911
1915
1919
0
10
20
30
40
50
60
70
80
STATION
SECTION : 4189
LNLV WASH W/O DIVERSION


ELEVATION
1899
1903
1907
1911
1915
1919
0
10
20
30
40
50
60
70
80
STATION
SECTION : 4246
LNLV WASH W/O DIVERSION



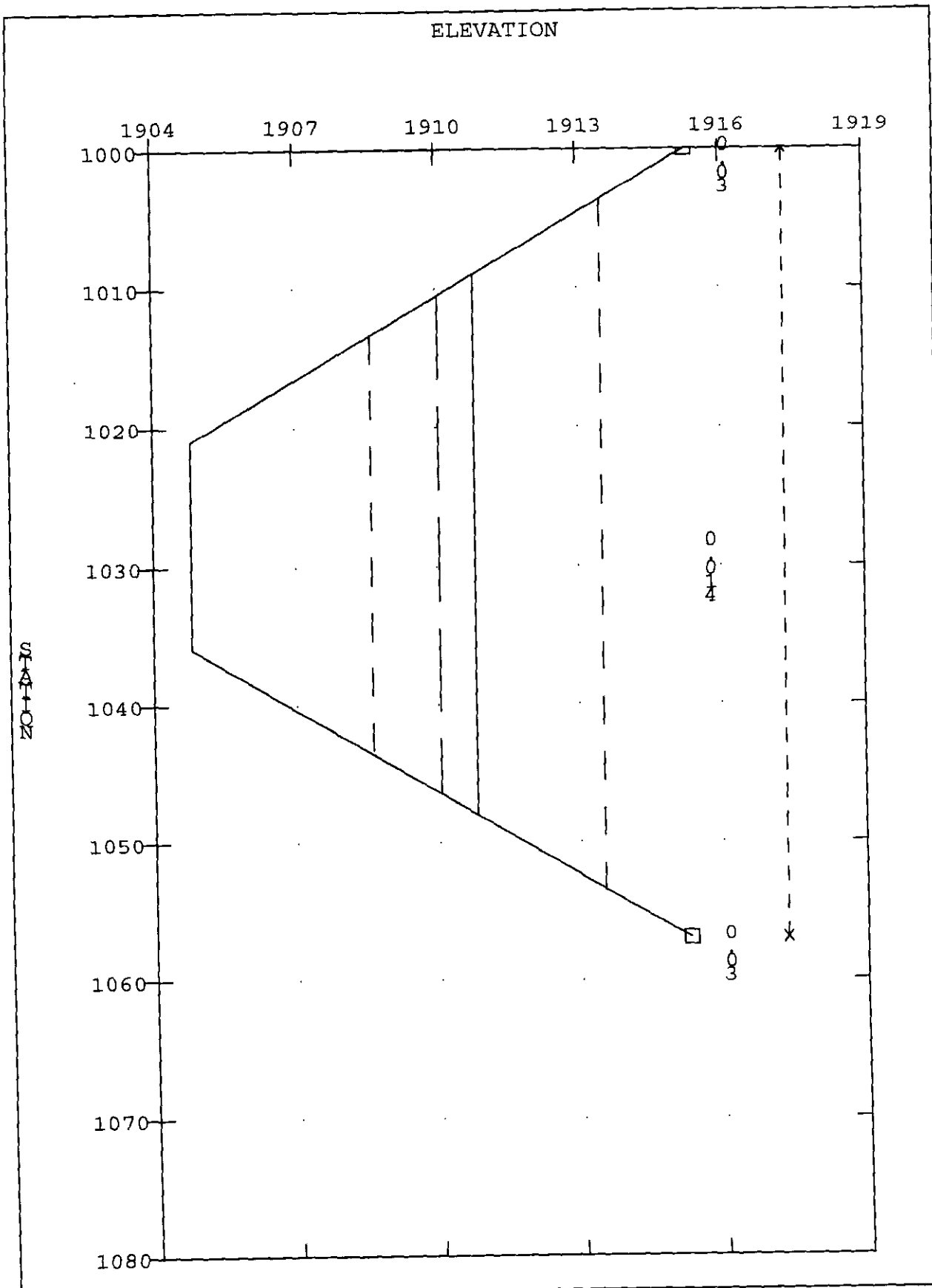
SECTION : 4247

LNLV WASH W/O DIVERSION



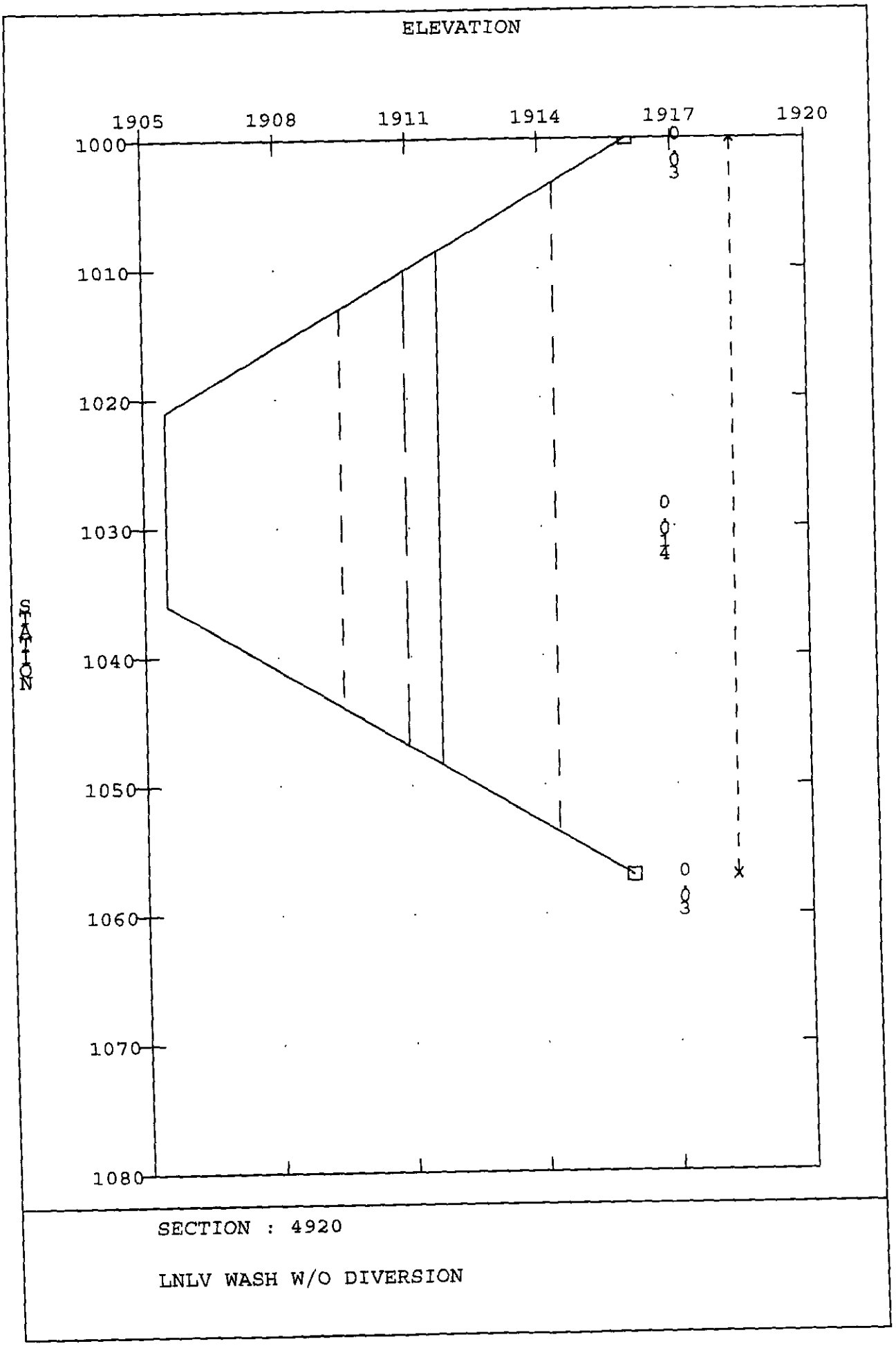
SECTION : 4360

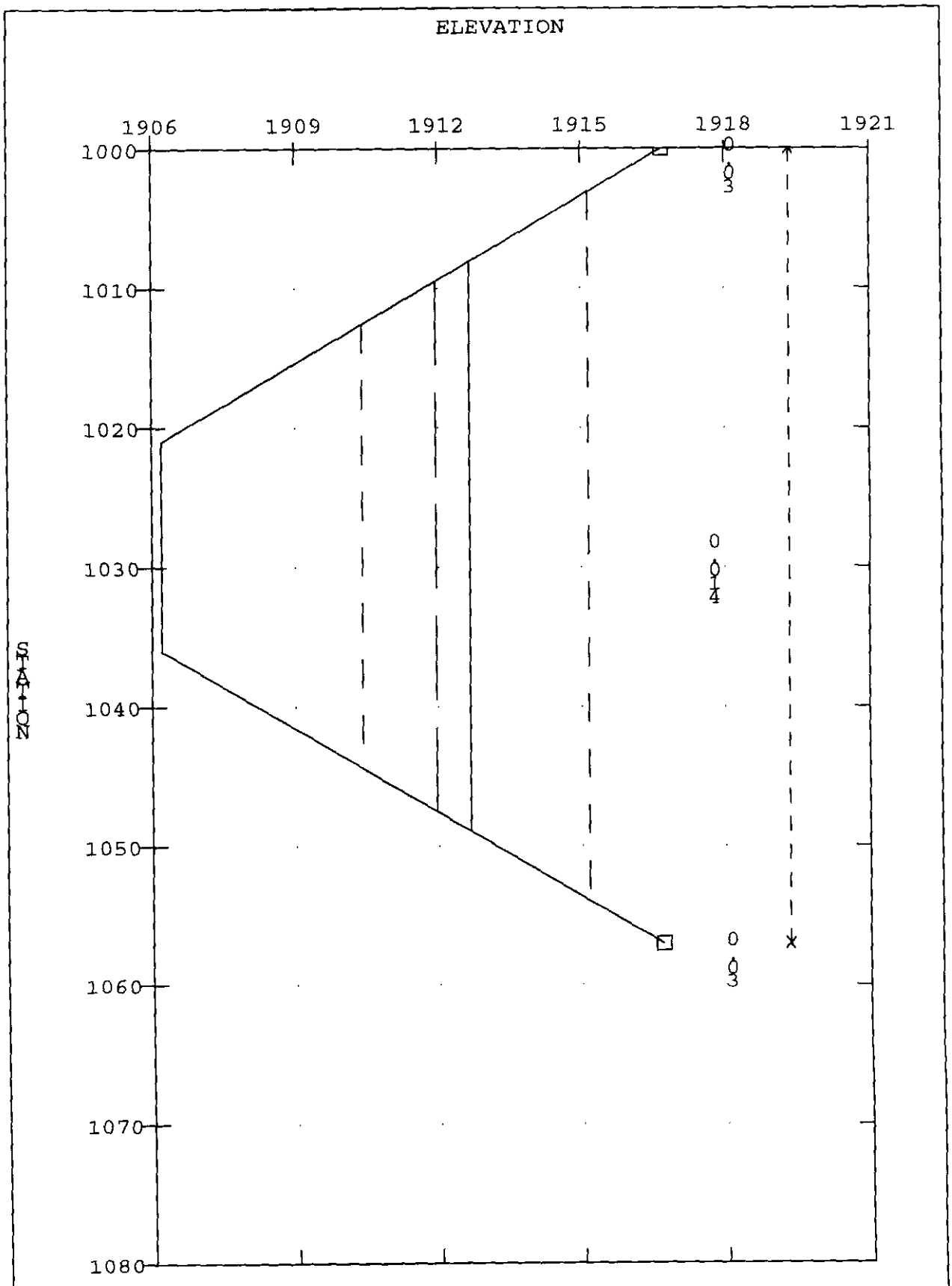
LNLV WASH W/O DIVERSION



SECTION : 4831

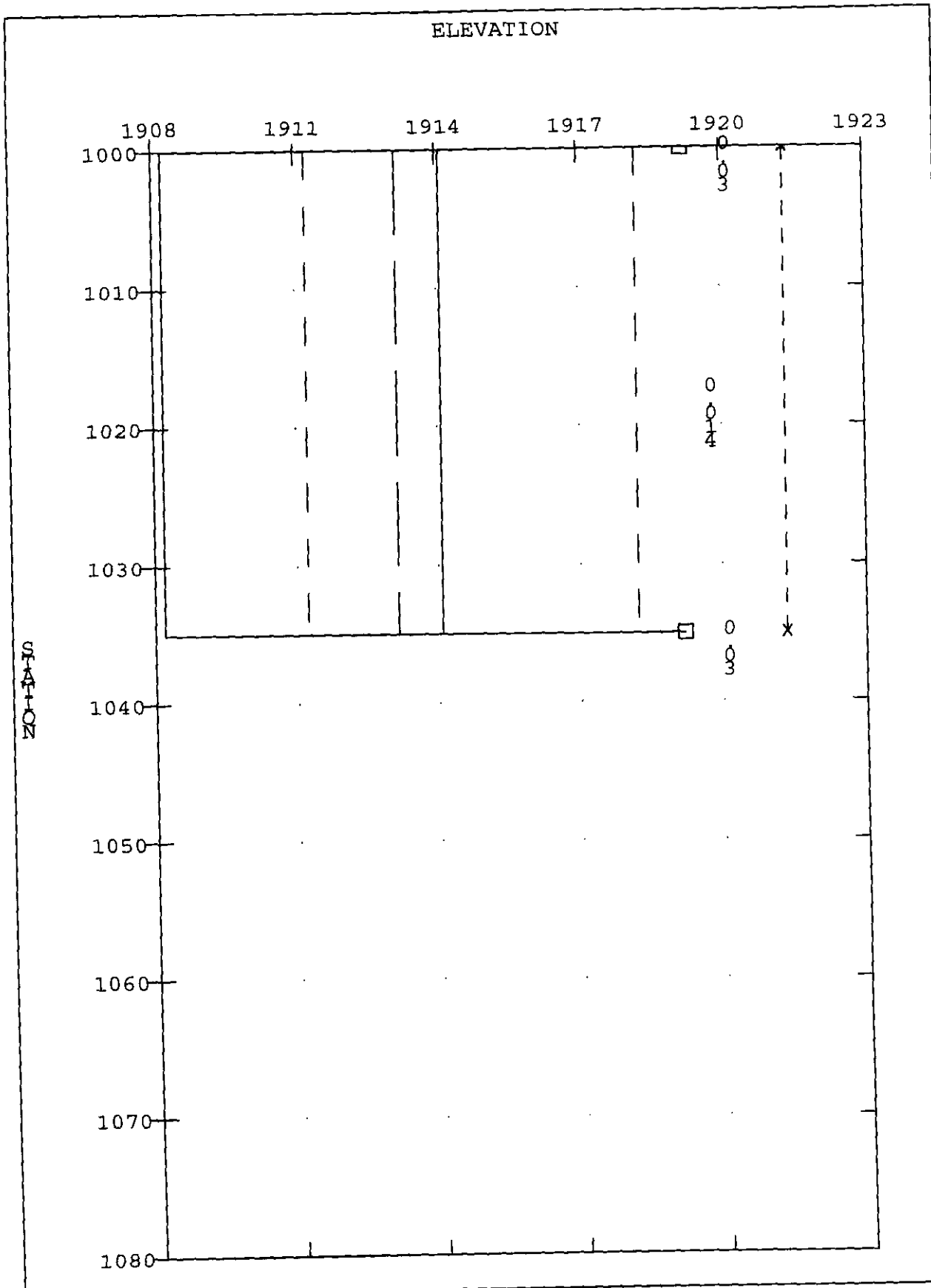
LNLV WASH W/O DIVERSION


ELEVATION
1905
1908
1911
1914
1917
1920
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 4920
LNLV WASH W/O DIVERSION



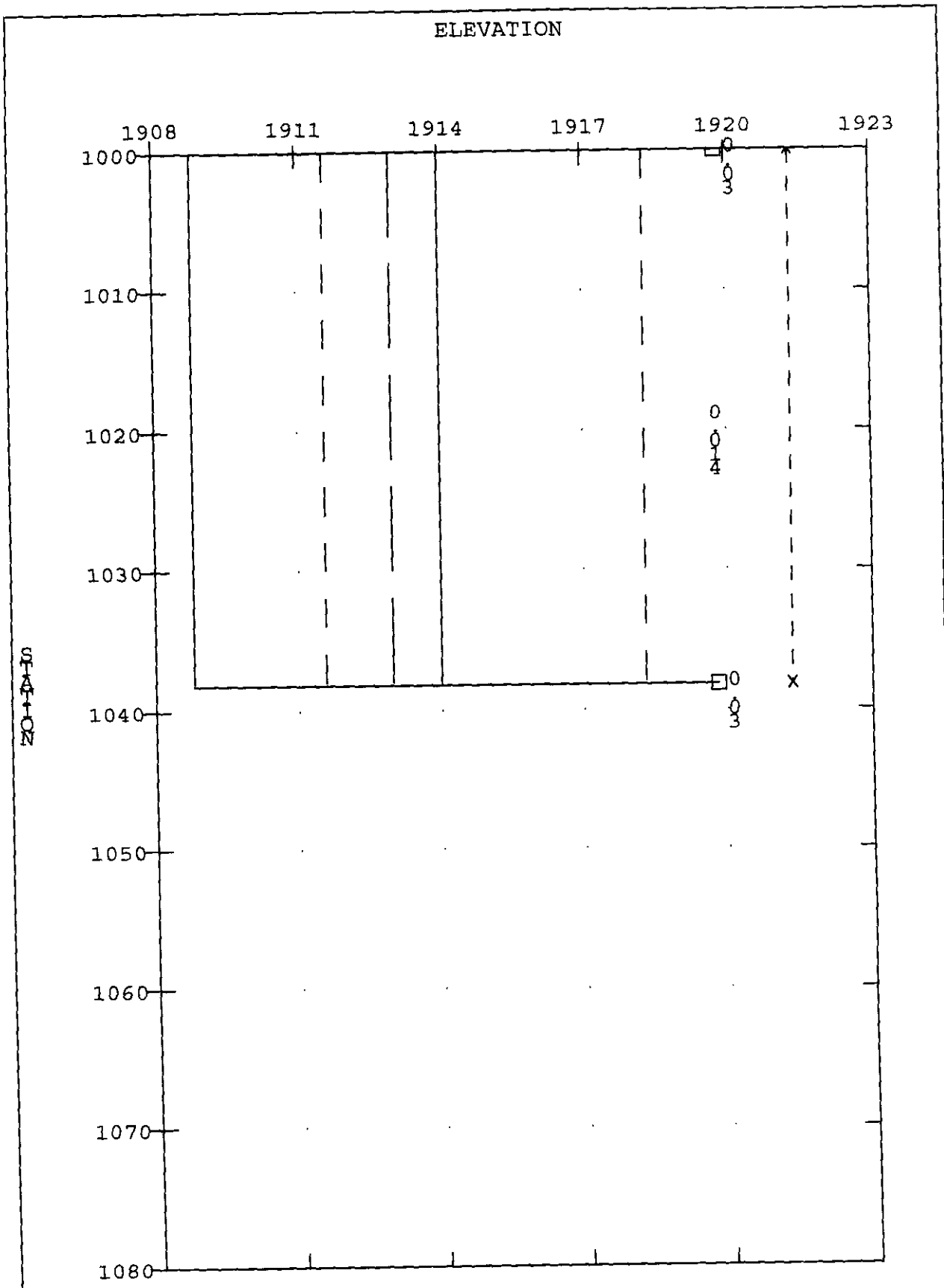
SECTION : 5005

LNLV WASH W/O DIVERSION



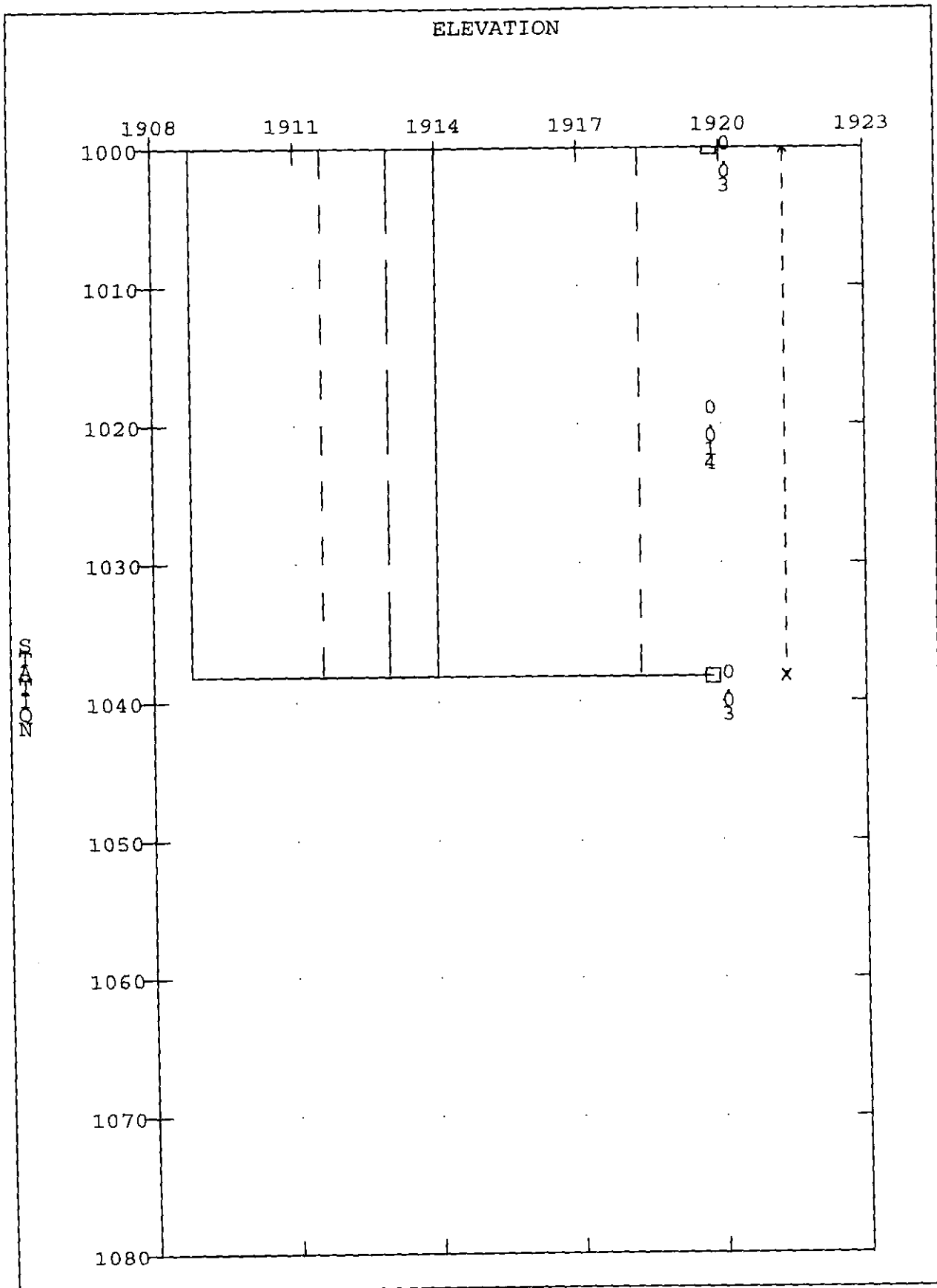
SECTION : 5105

LNLV WASH W/O DIVERSION



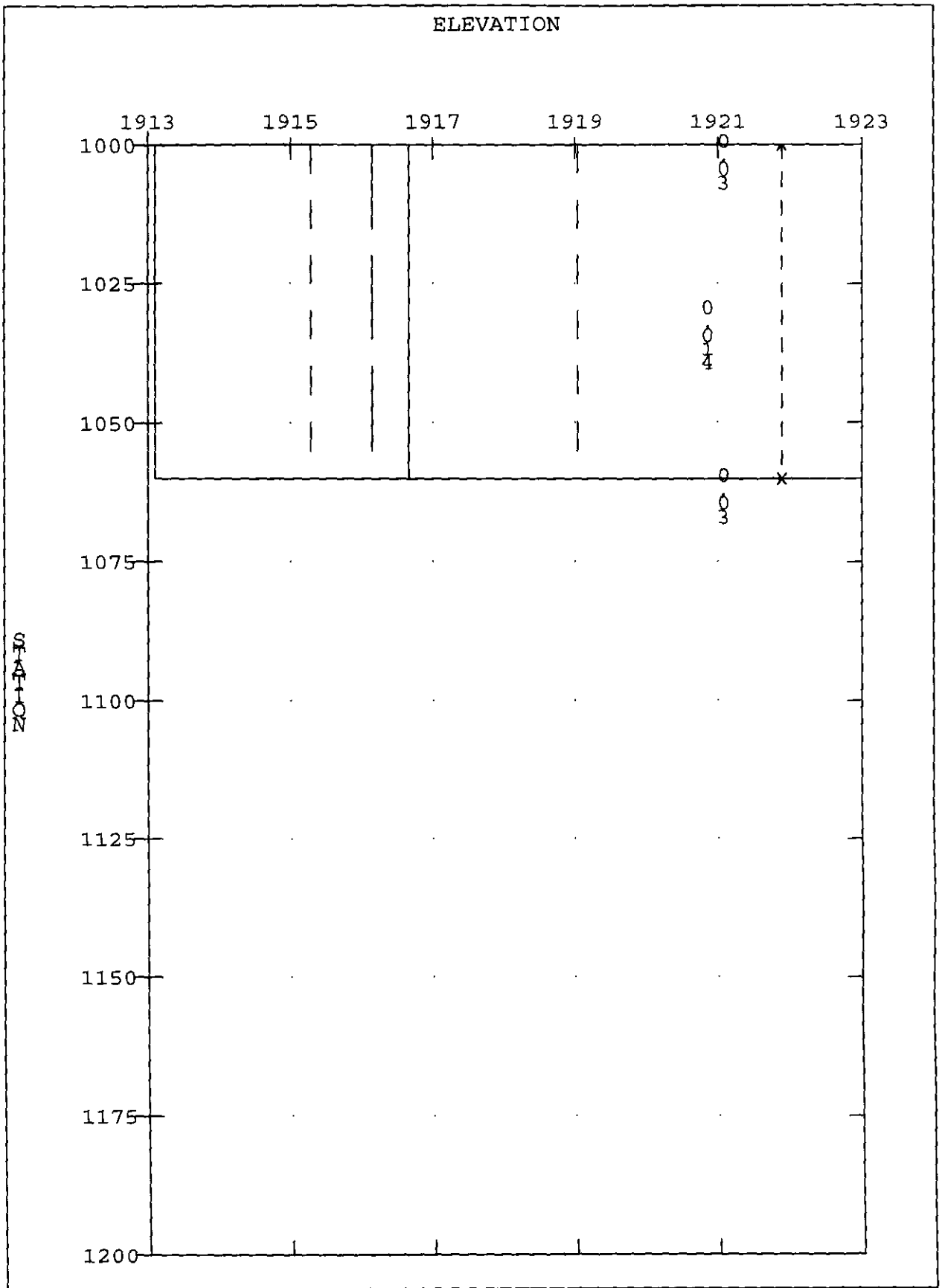
SECTION : 5200

LNLV WASH W/O DIVERSION



SECTION : 5500

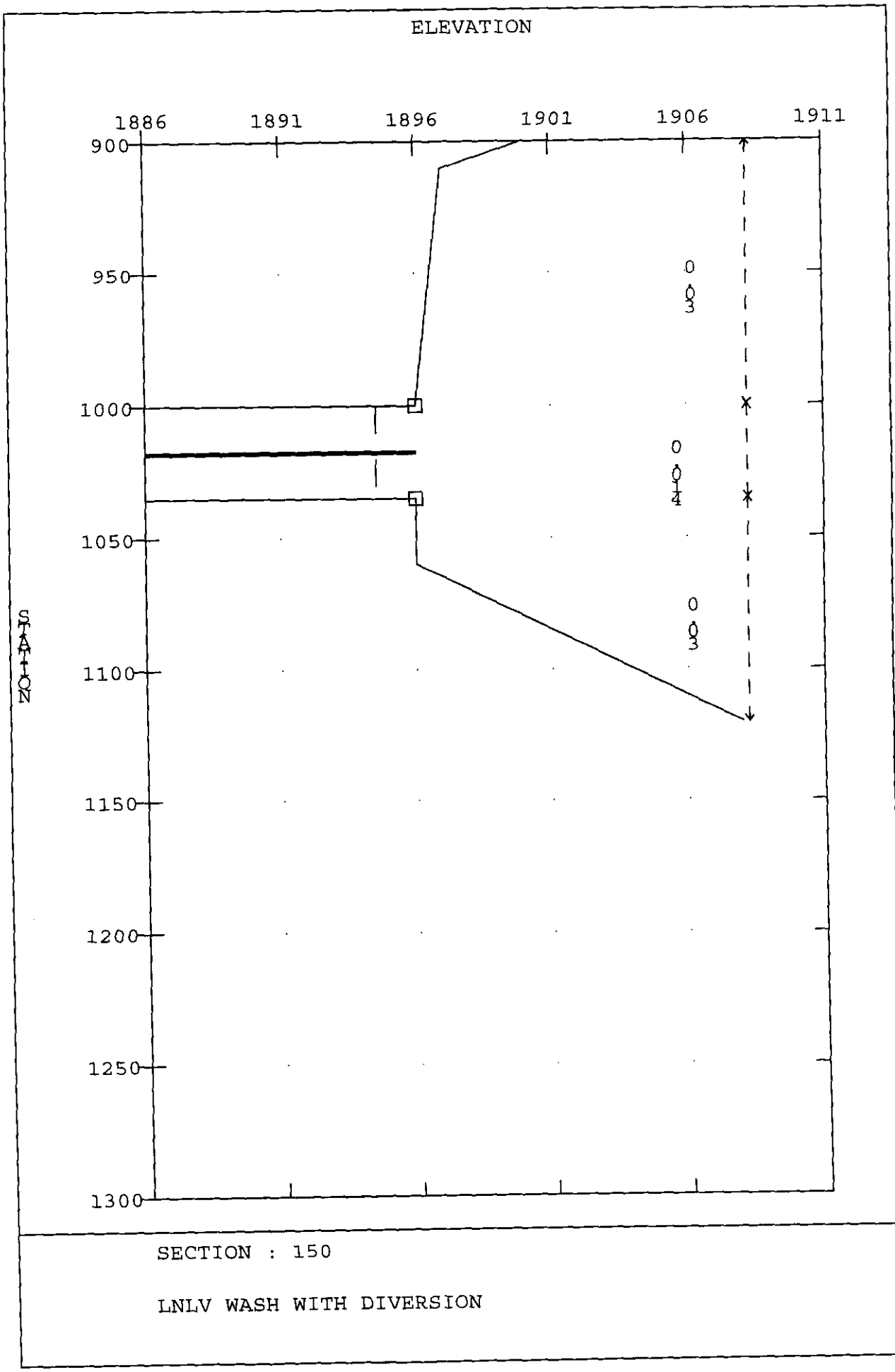
LNLV WASH W/O DIVERSION



SECTION : 5852

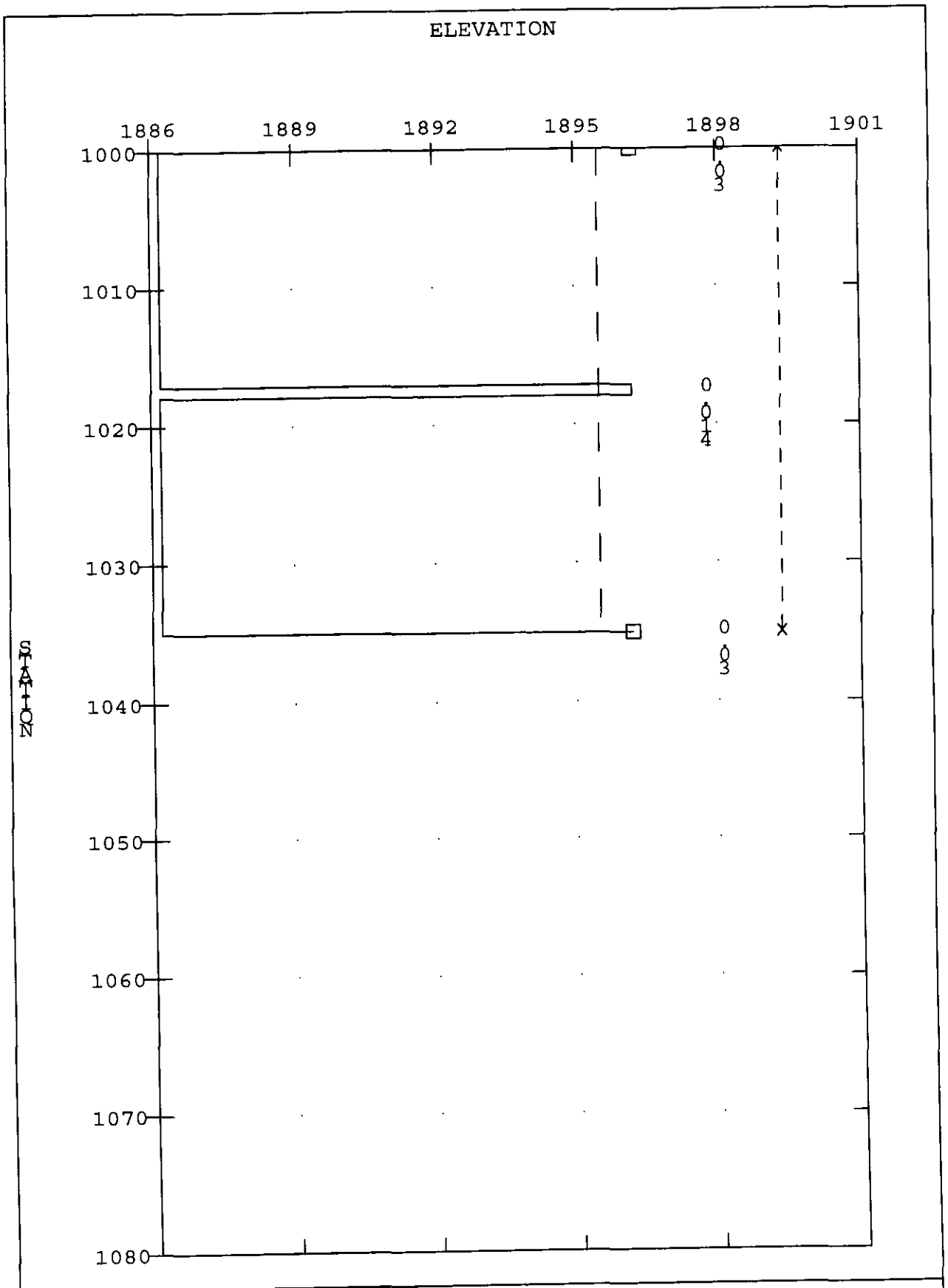
LNLV WASH W/O DIVERSION

Cross Section Plots
KBSBW2



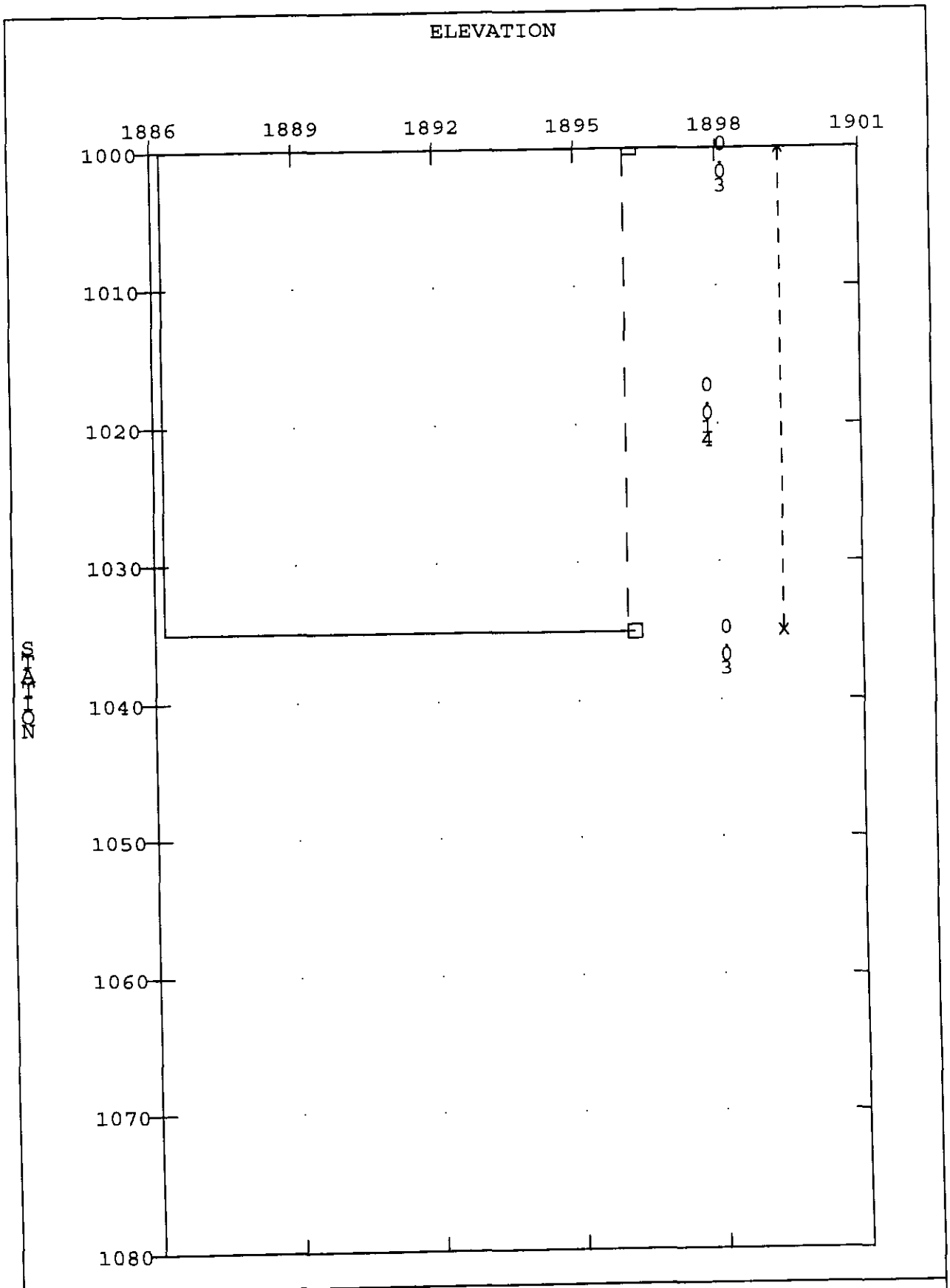
SECTION : 150

LNLV WASH WITH DIVERSION



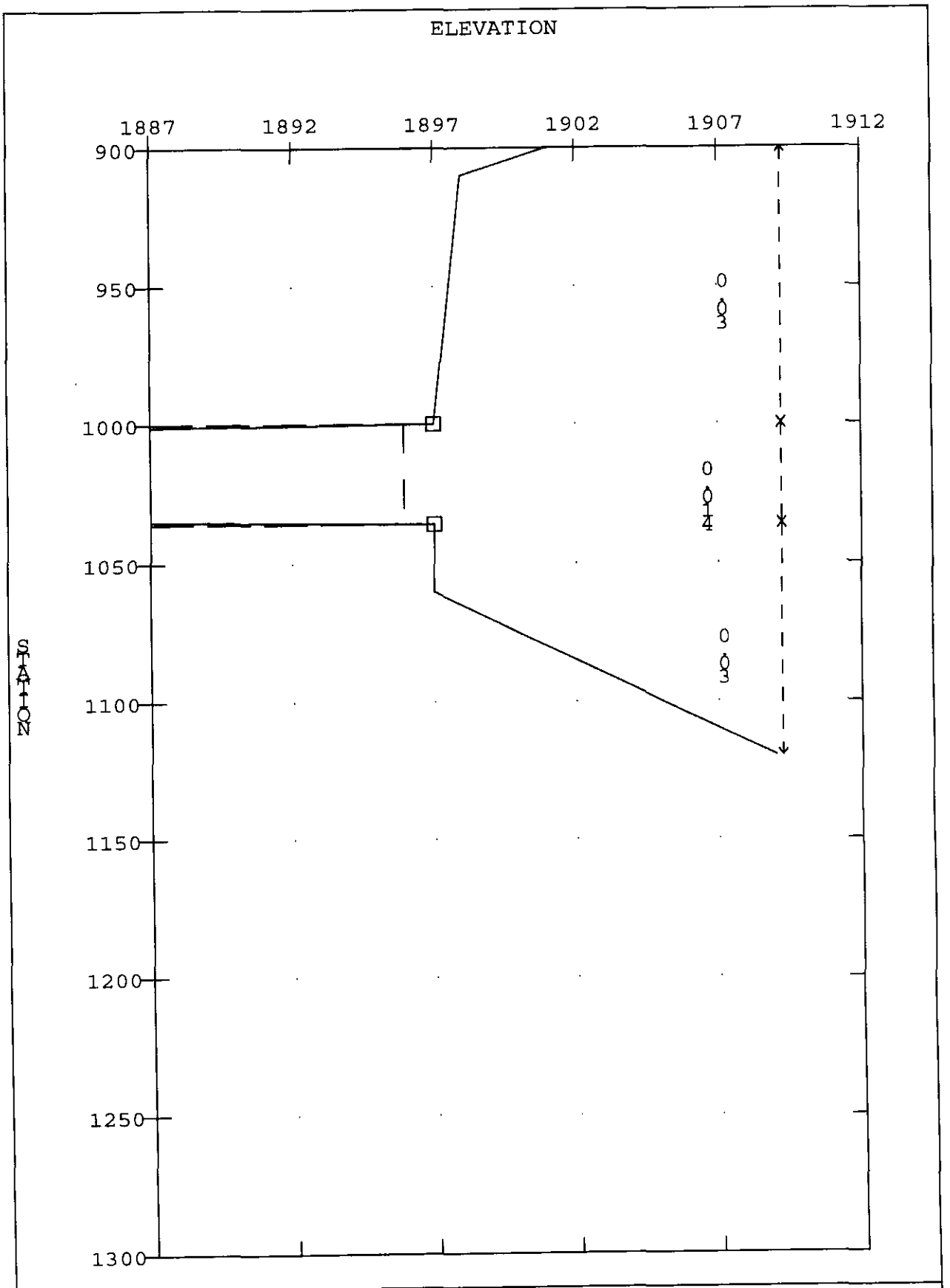
SECTION : 243.6

LNLV WASH WITH DIVERSION



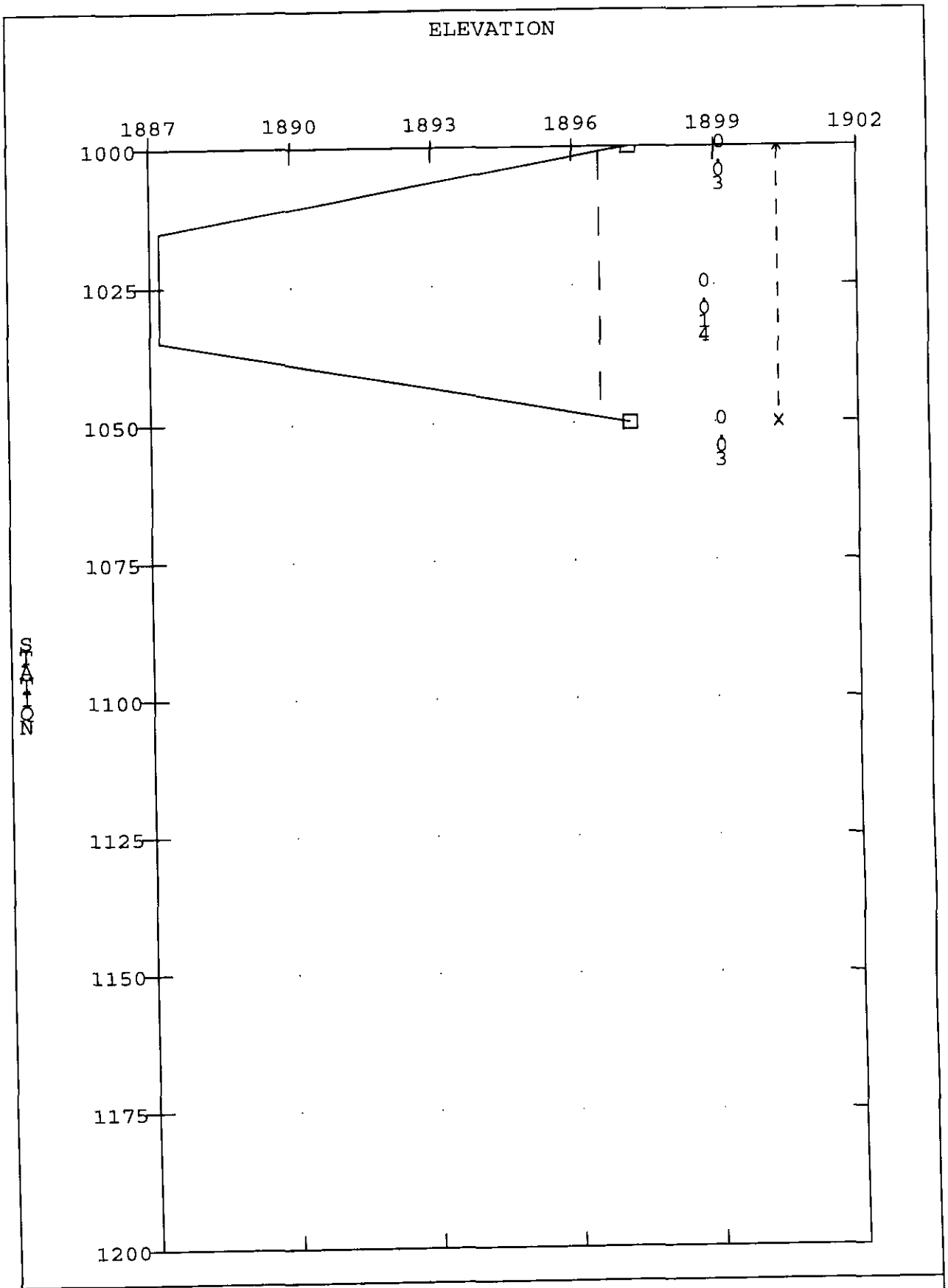
SECTION : 244.6

LNLV WASH WITH DIVERSION



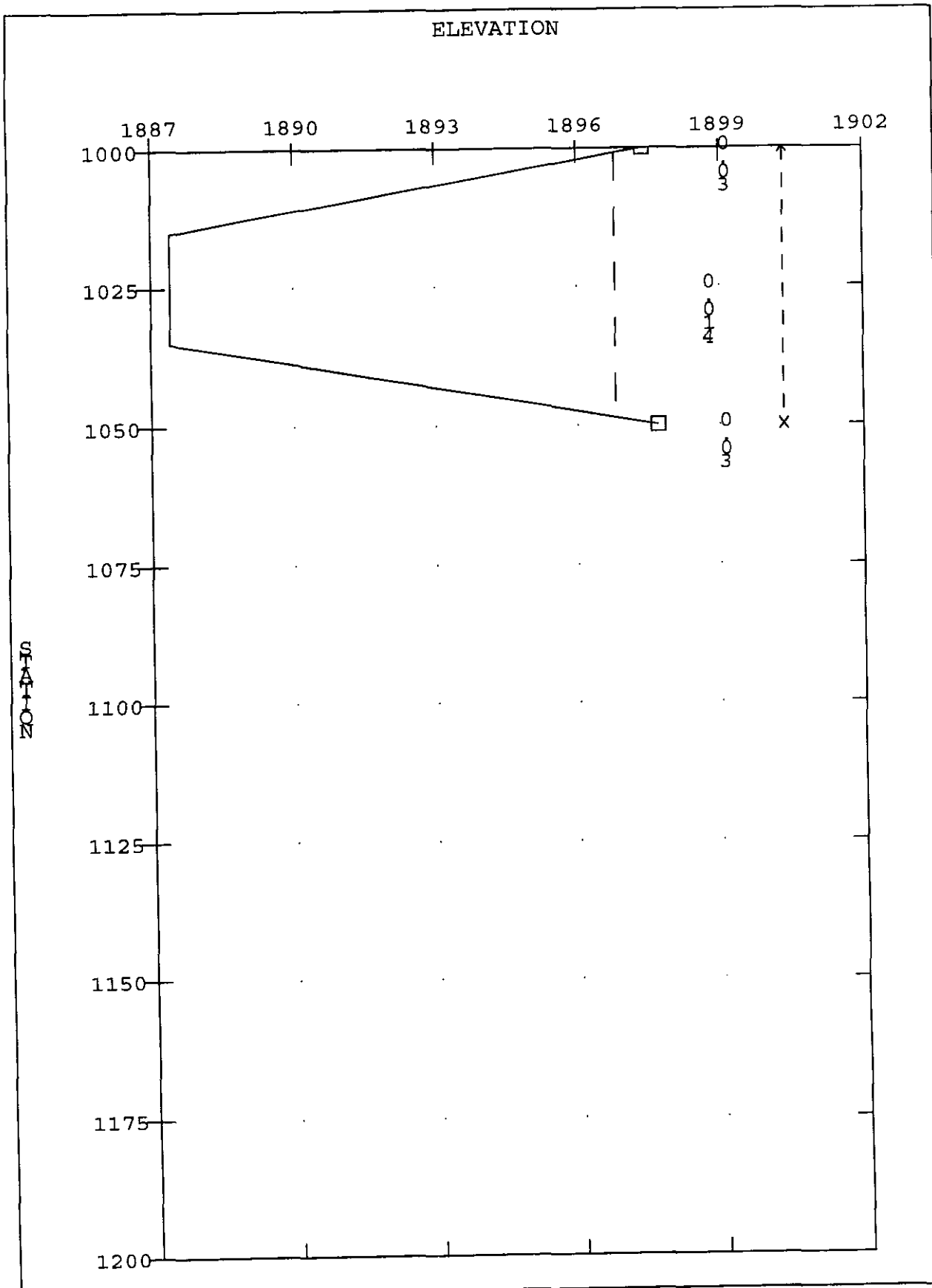
SECTION : 450

LNLV WASH WITH DIVERSION



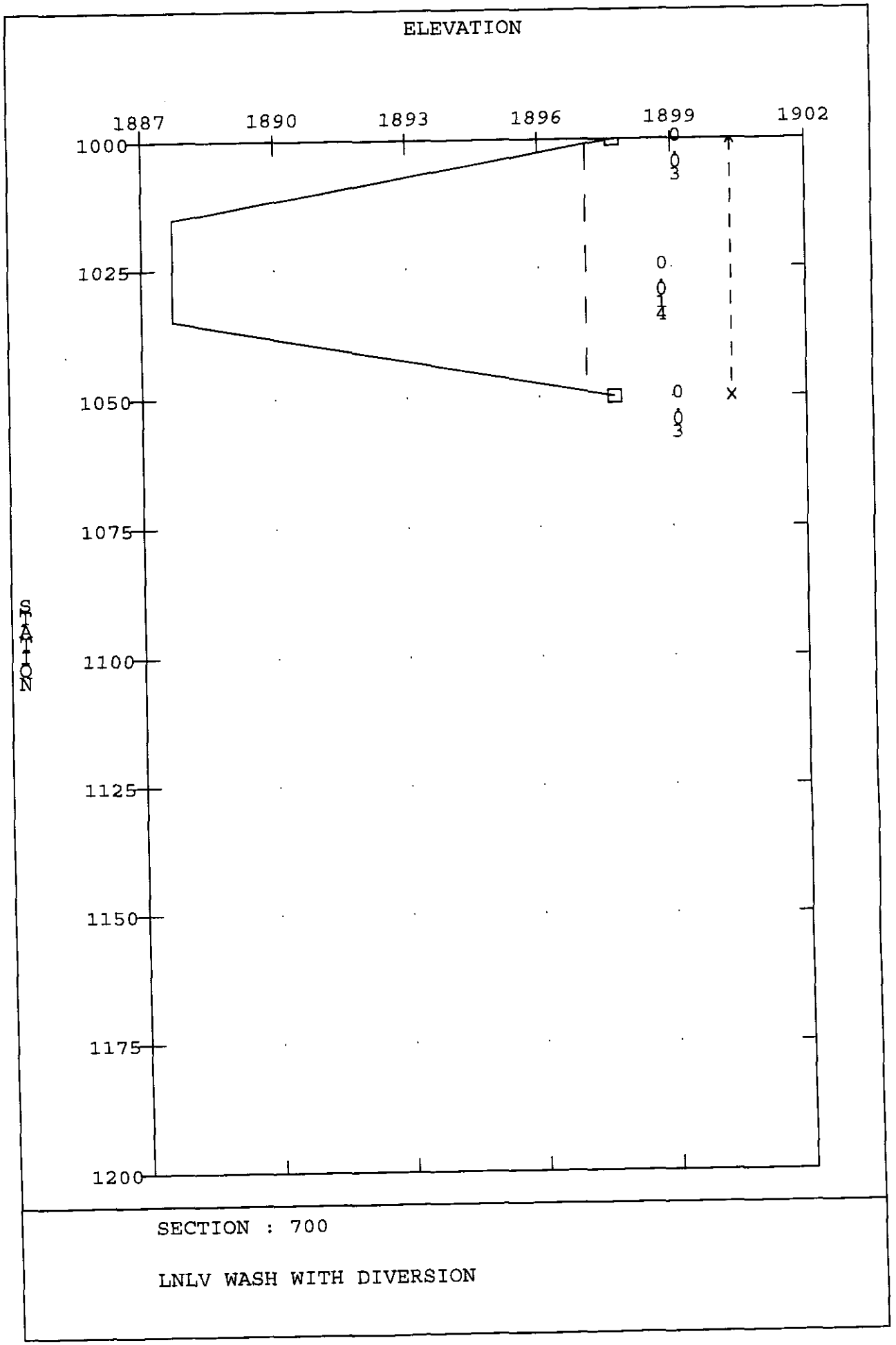
SECTION : 544

LNLV WASH WITH DIVERSION



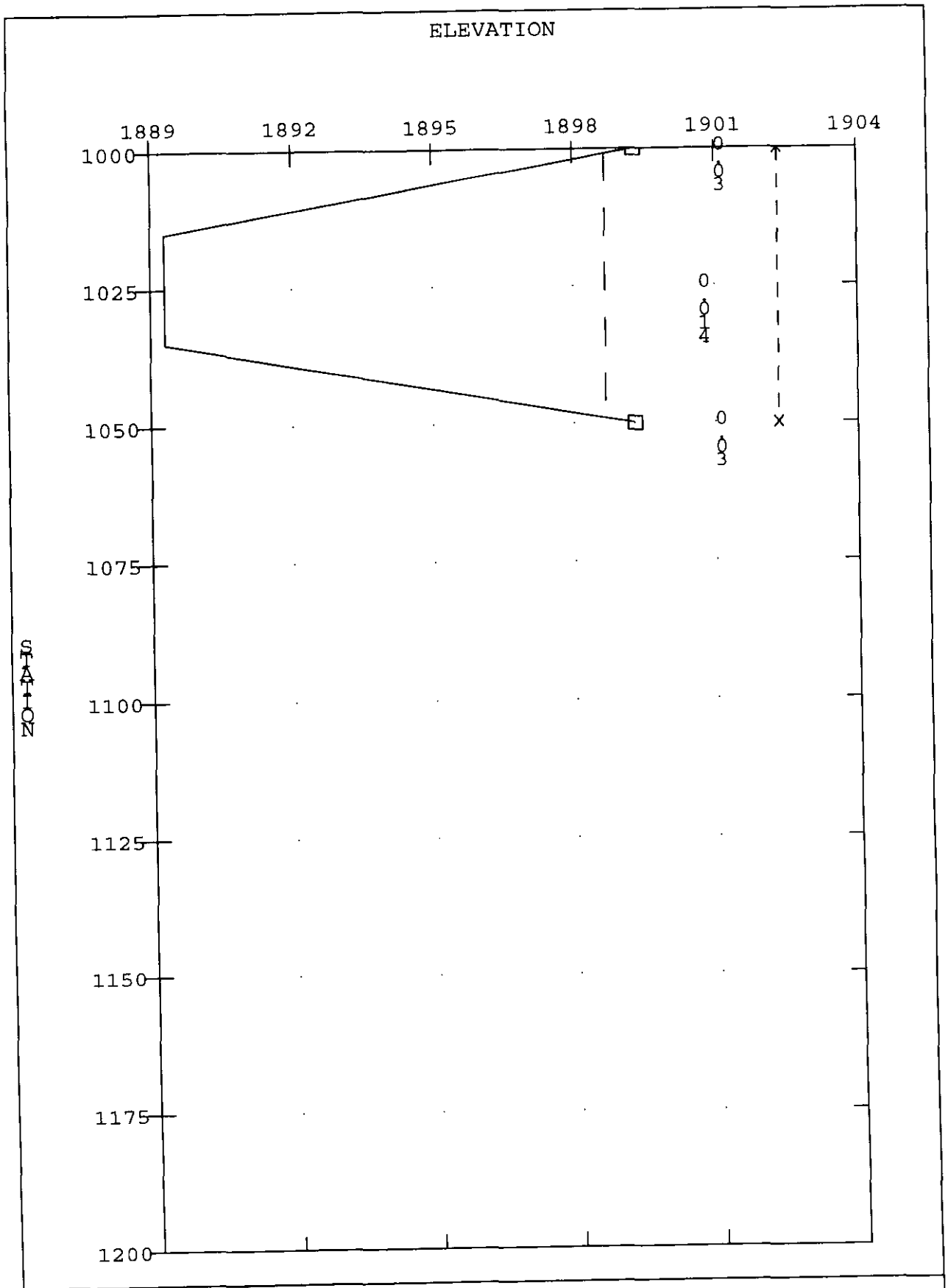
SECTION : 600

LNLV WASH WITH DIVERSION



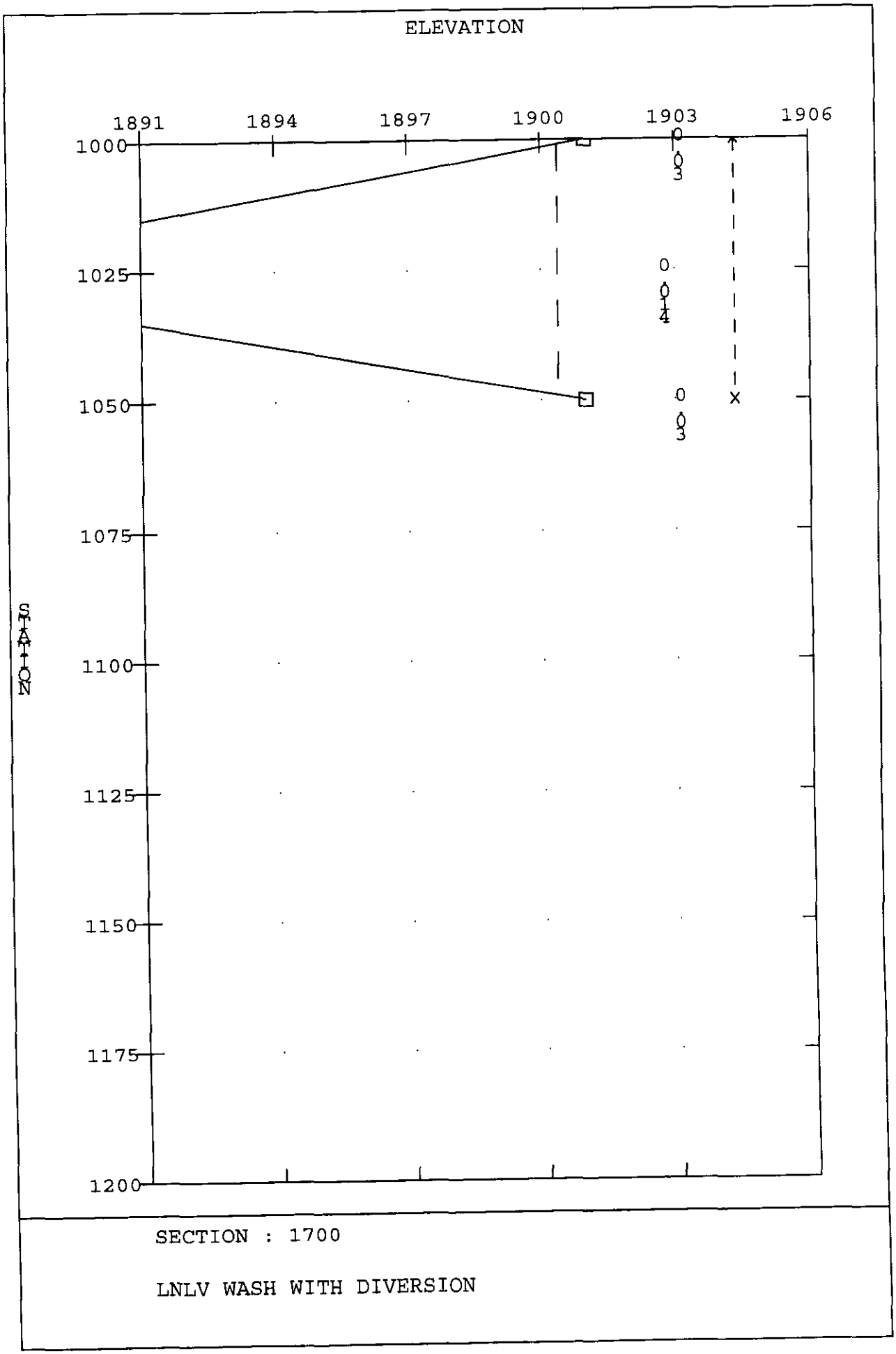
SECTION : 700

LNLV WASH WITH DIVERSION



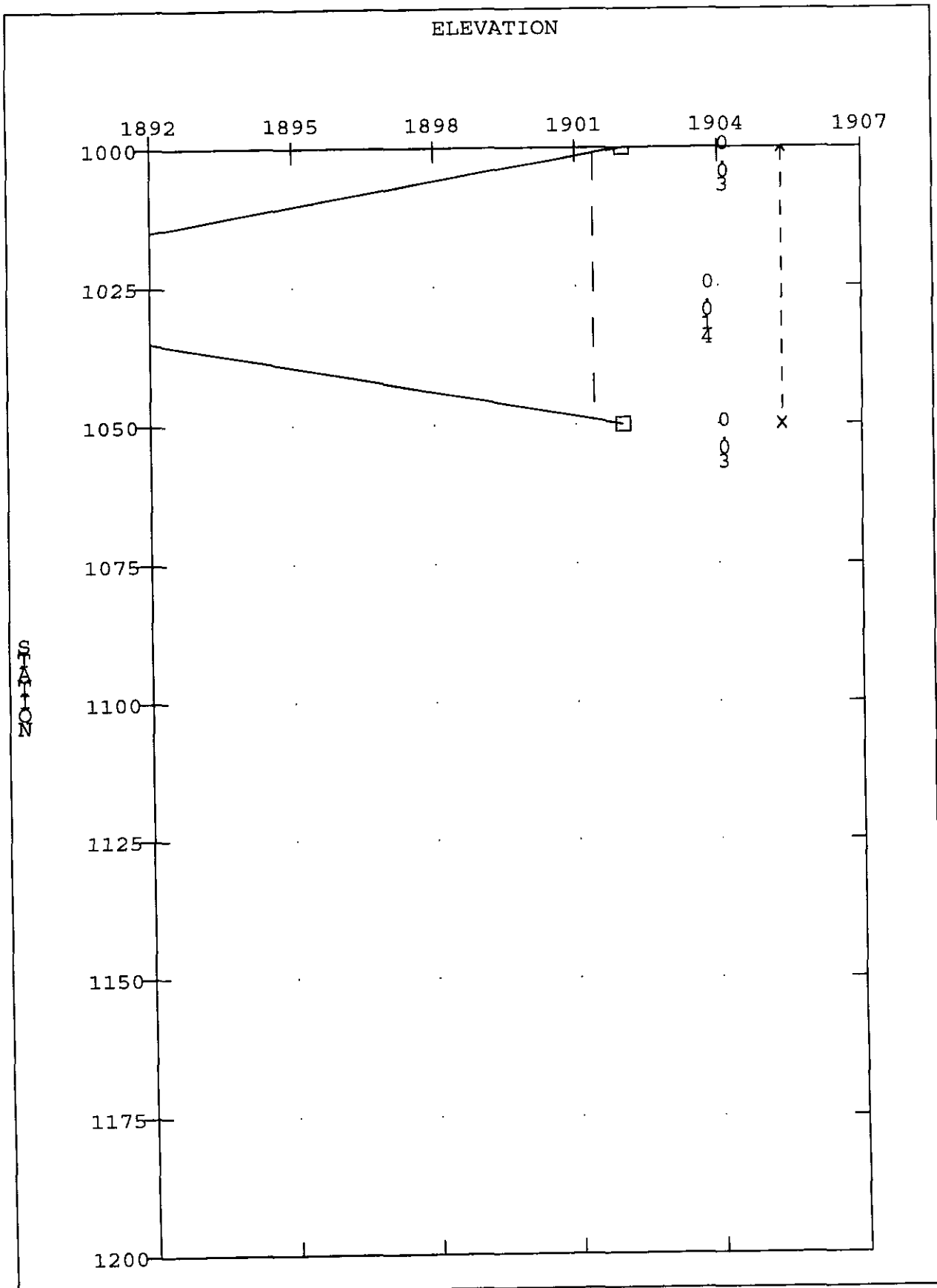
SECTION : 1200

LNLV WASH WITH DIVERSION



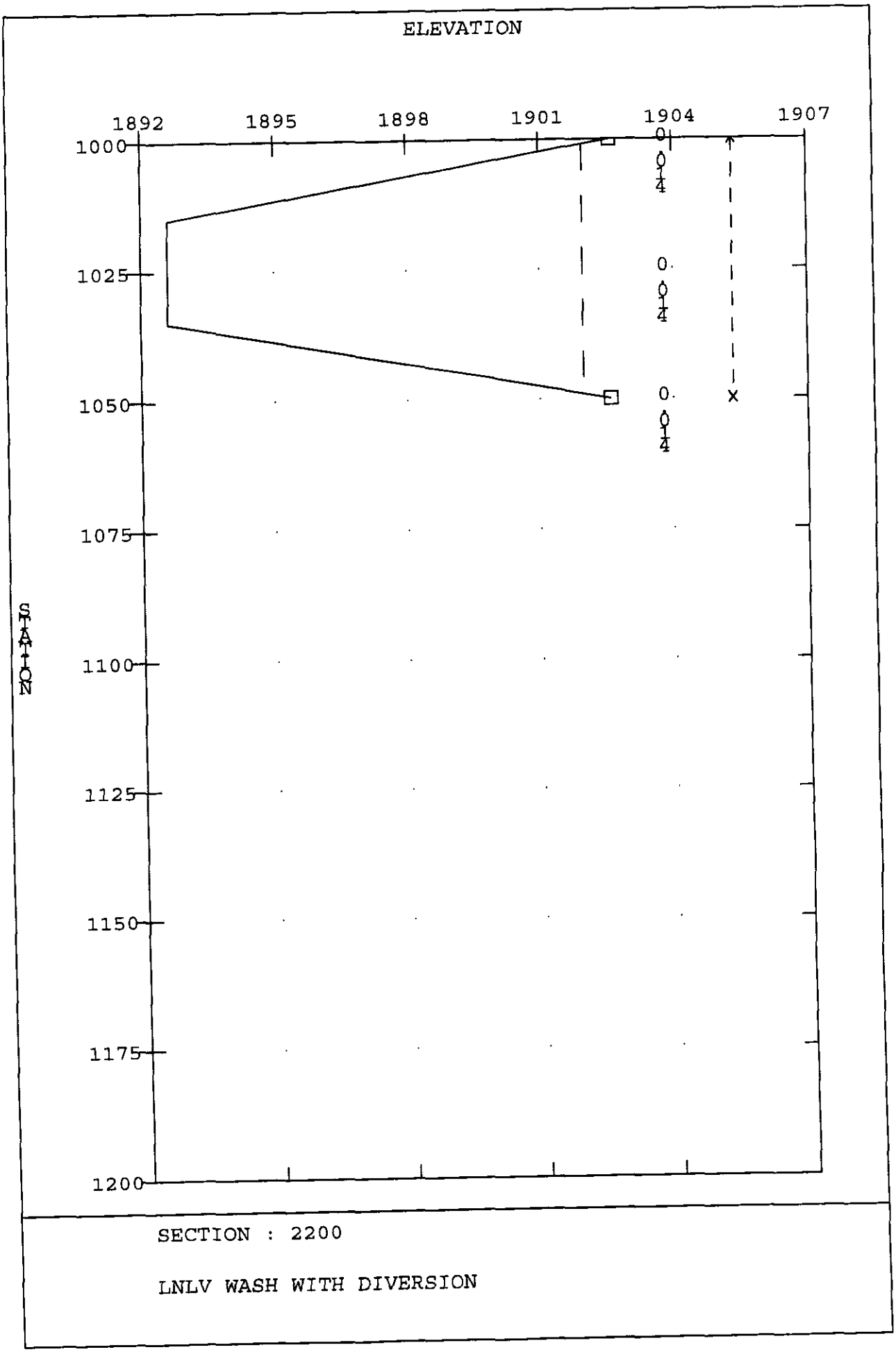
SECTION : 1700

LNLV WASH WITH DIVERSION



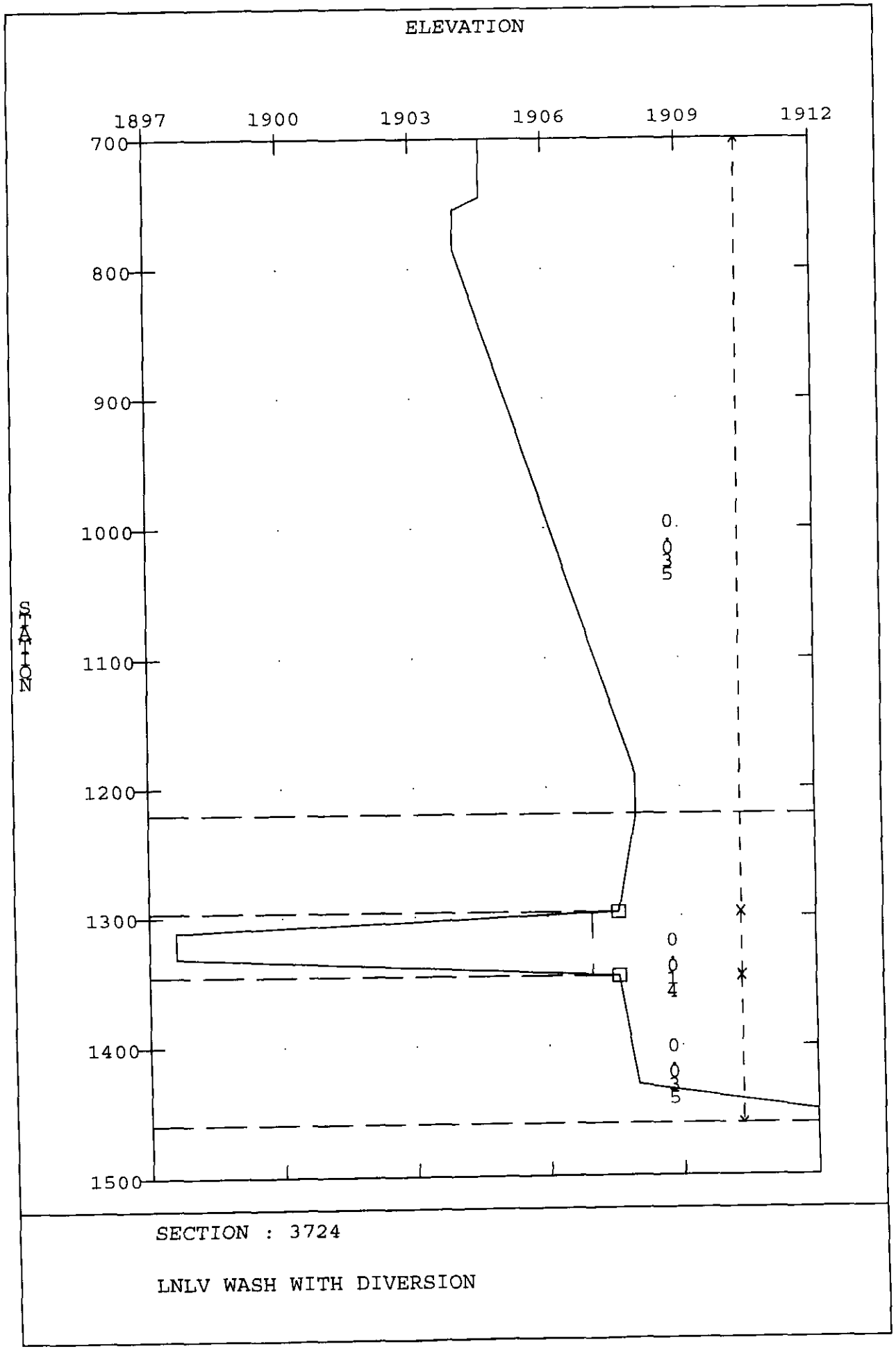
SECTION : 2000

LNLV WASH WITH DIVERSION



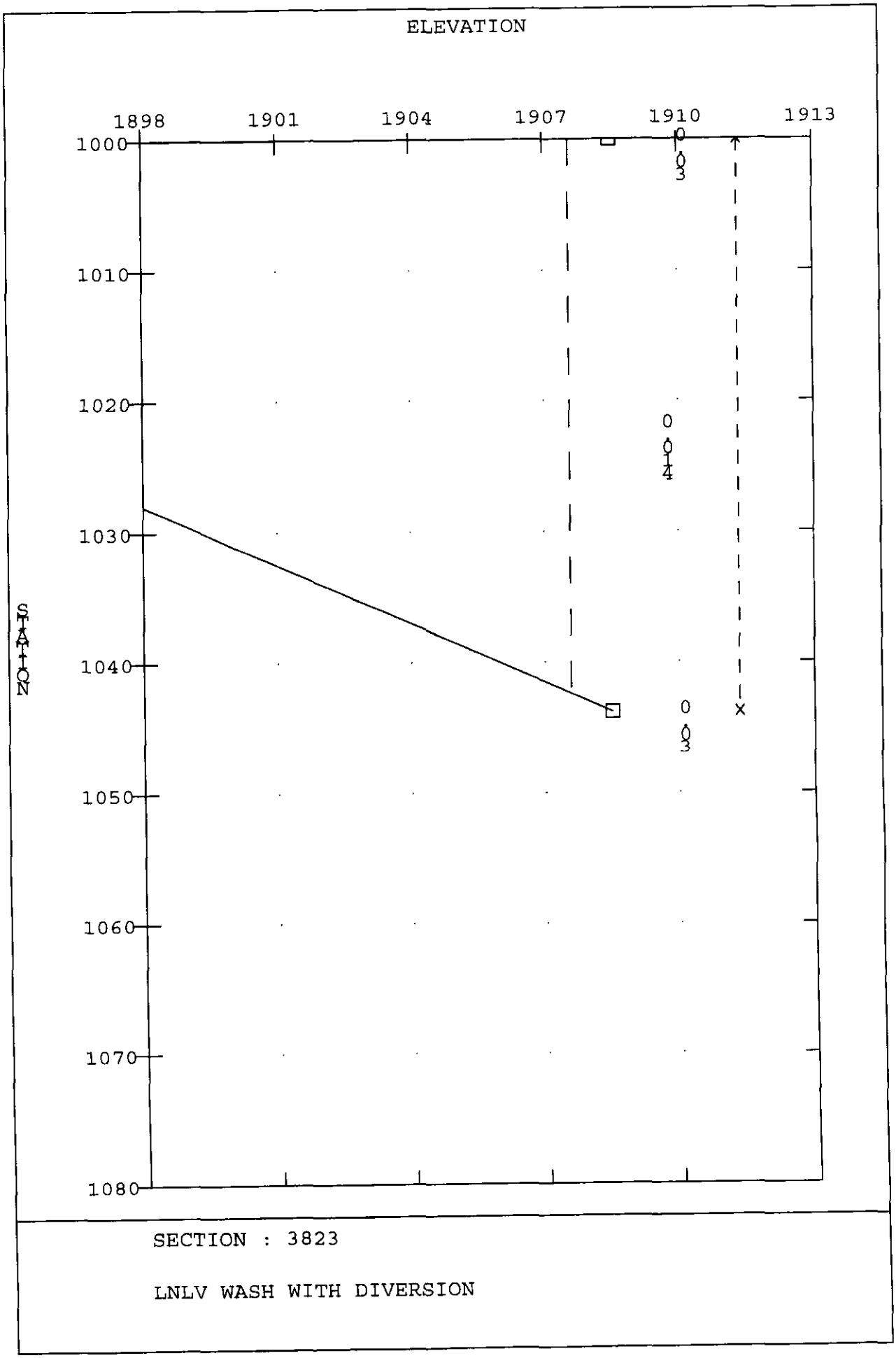
SECTION : 2200

LNLV WASH WITH DIVERSION



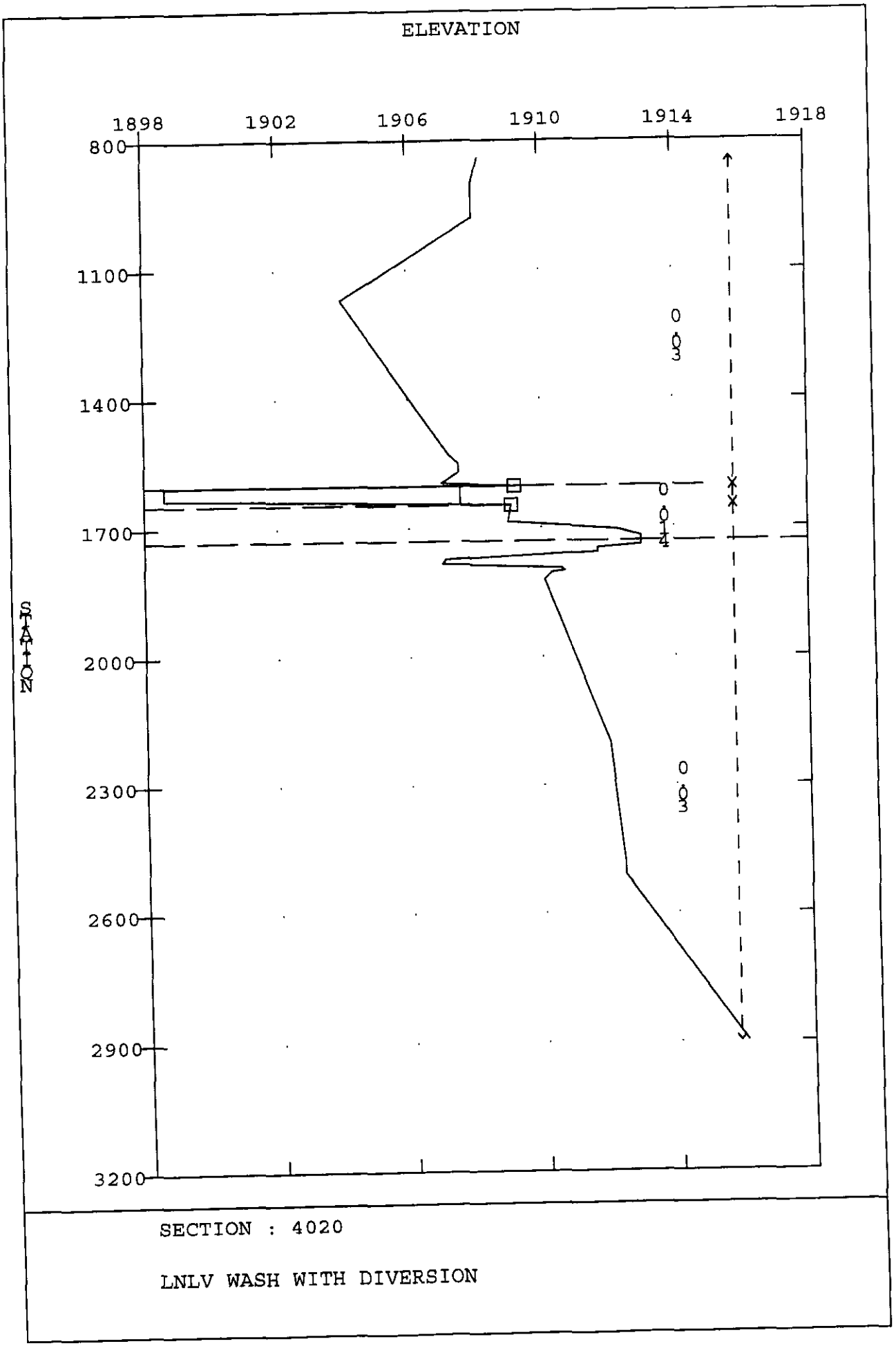
SECTION : 3724

LNLV WASH WITH DIVERSION



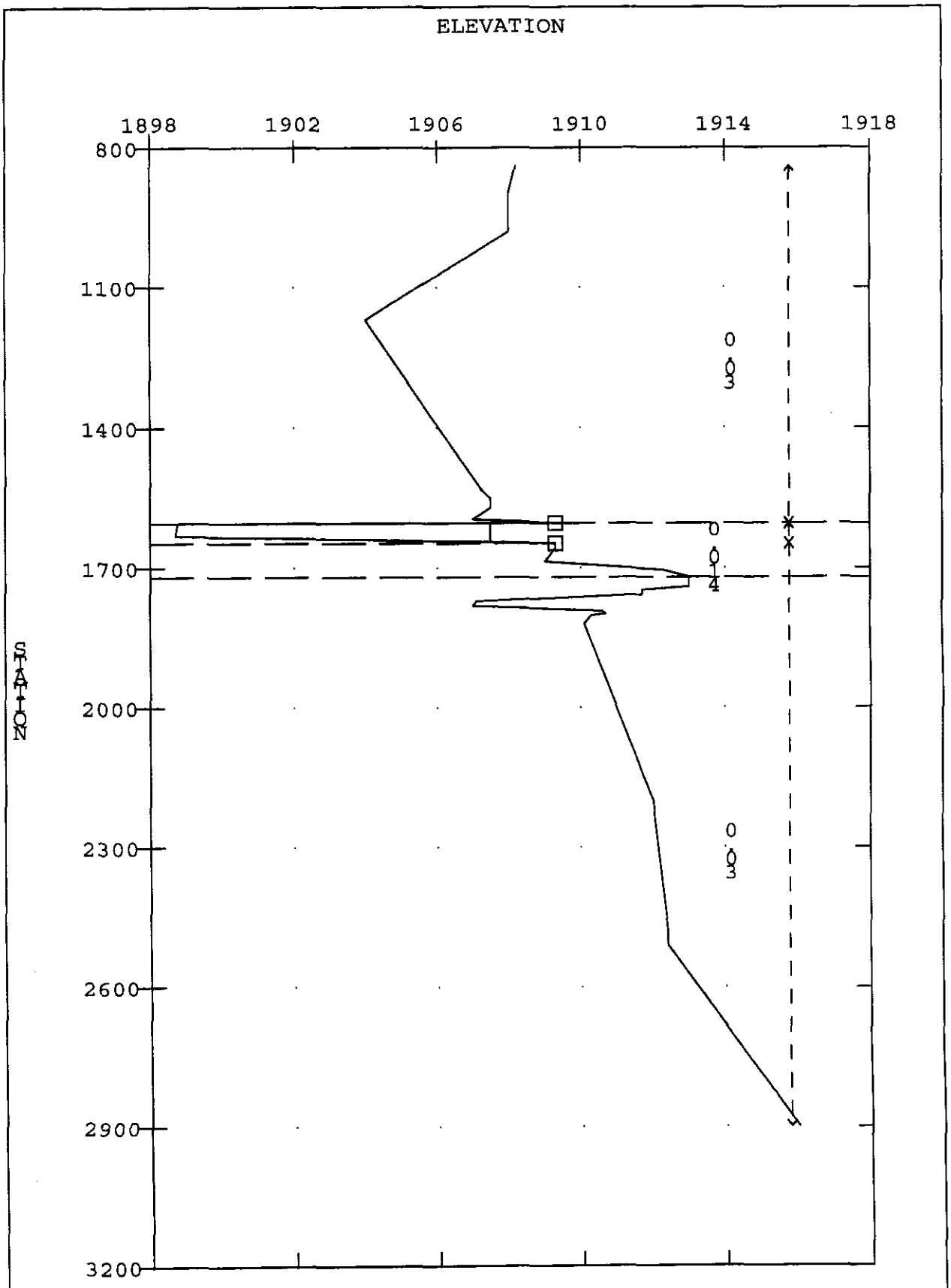
SECTION : 3823

LNLV WASH WITH DIVERSION



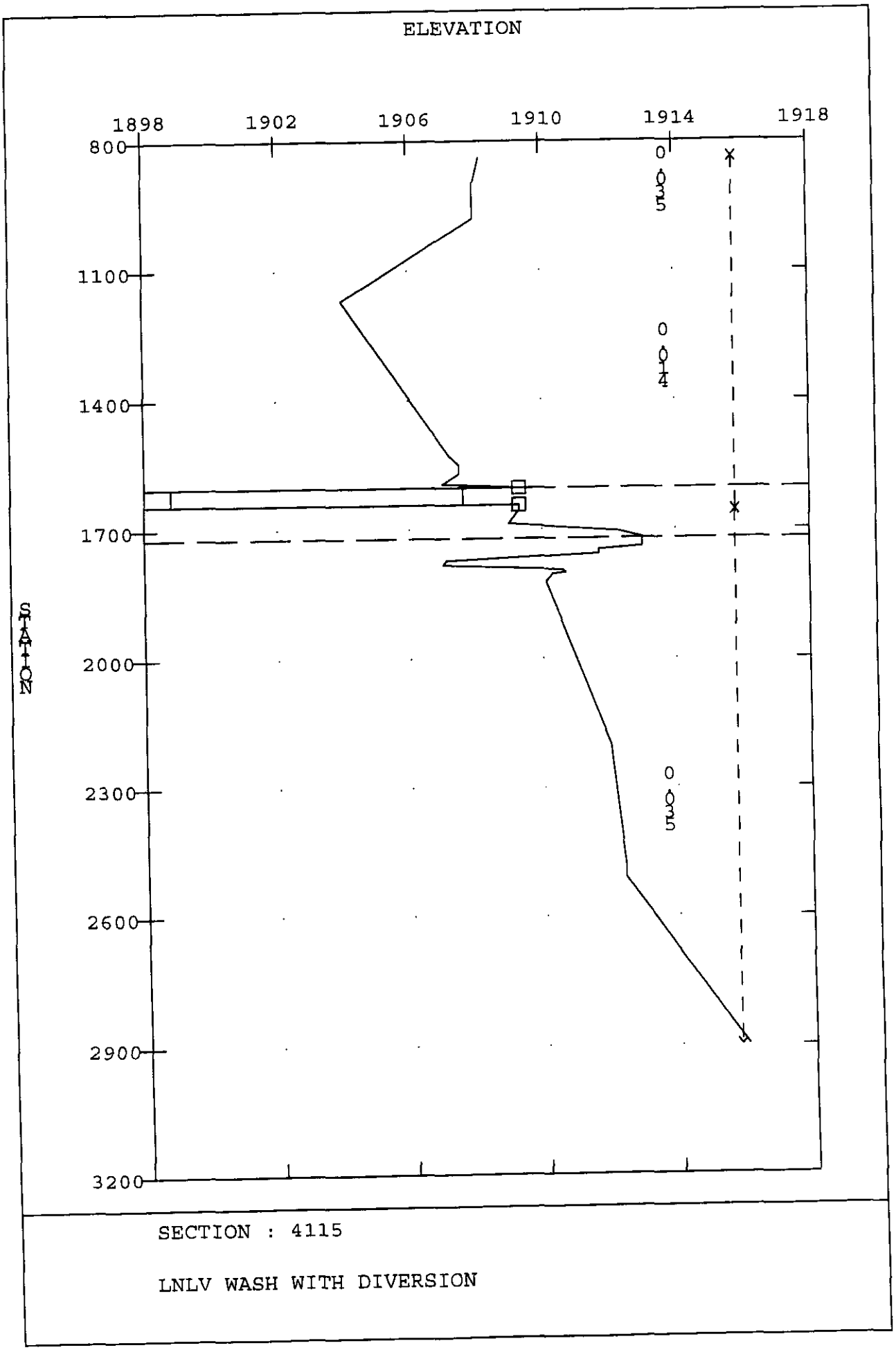
SECTION : 4020

LNLV WASH WITH DIVERSION



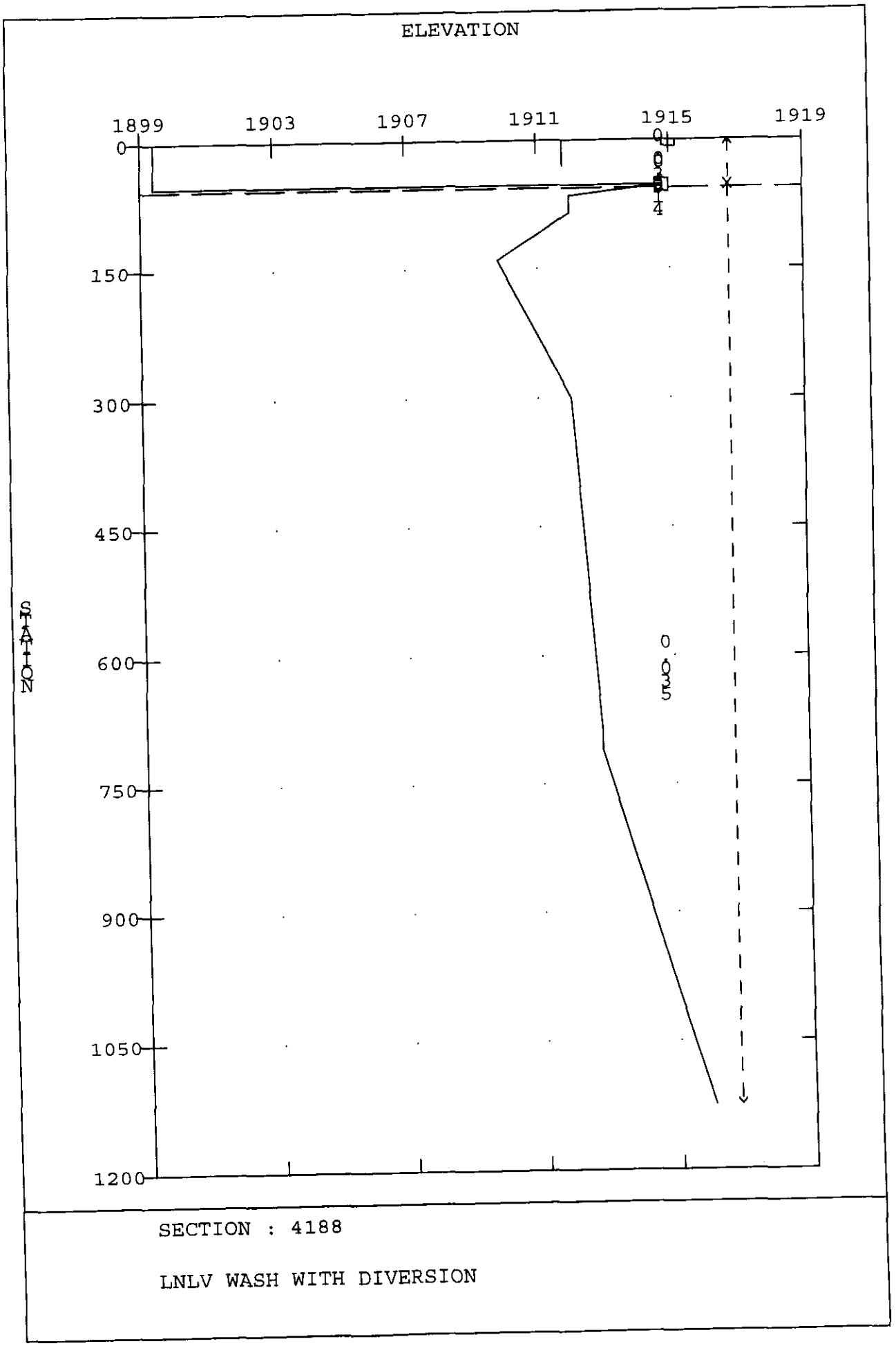
SECTION : 4060

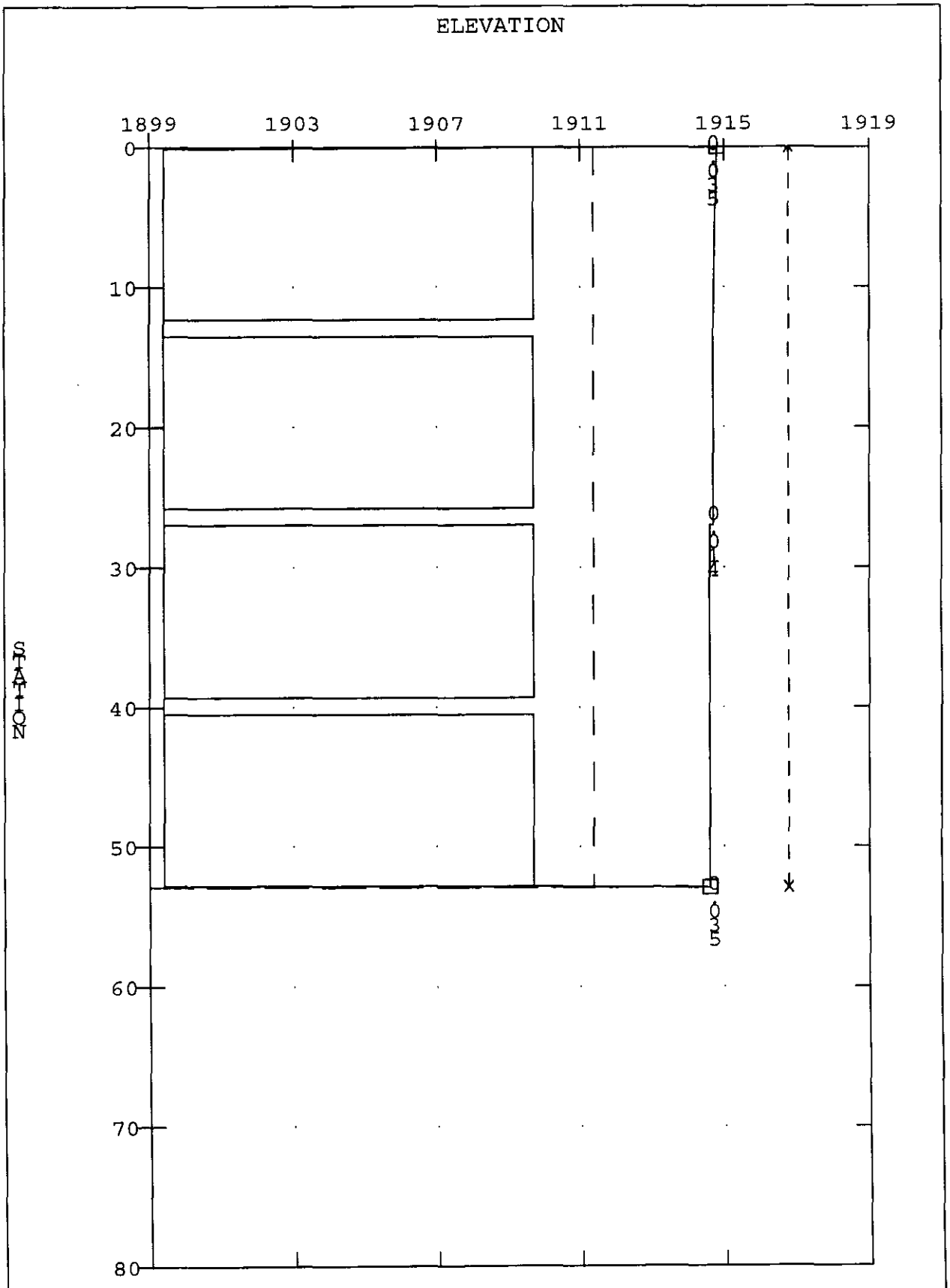
LNLV WASH WITH DIVERSION

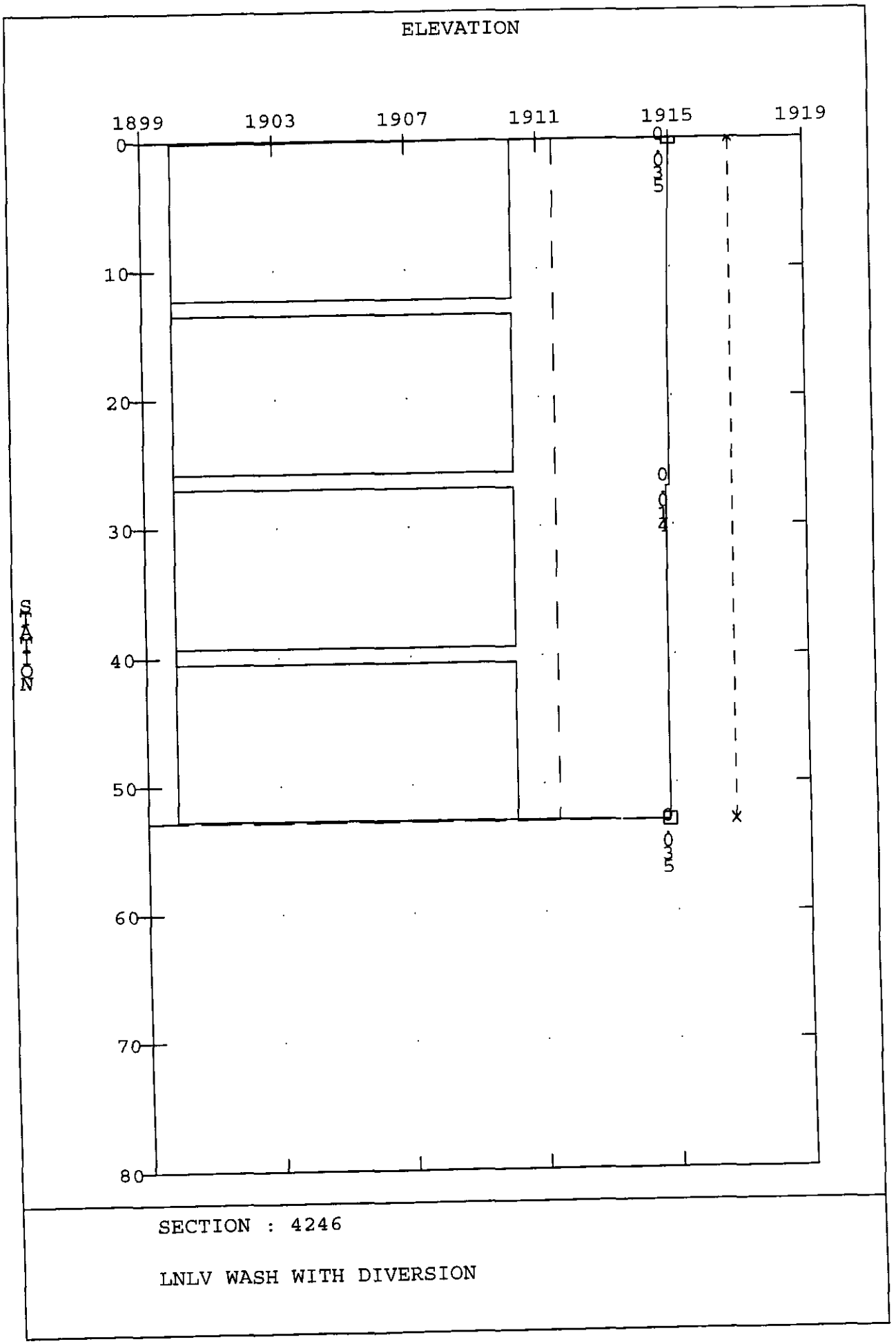


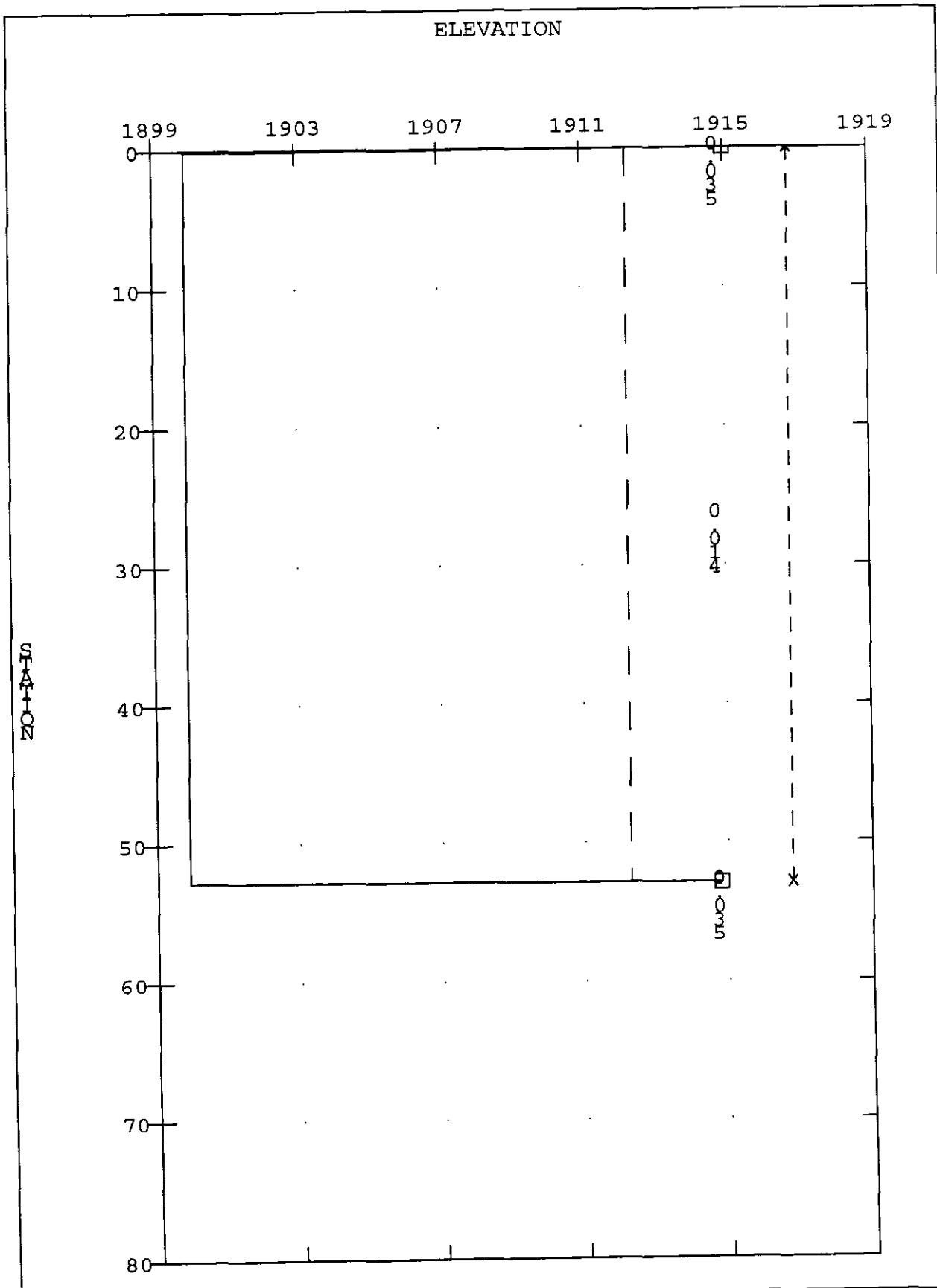
SECTION : 4115

LNLV WASH WITH DIVERSION


ELEVATION
1899
1903
1907
1911
1915
1919
0
150
300
450
600
750
900
1050
1200
STATION
Q
100
4
0
5
SECTION : 4188
LNLV WASH WITH DIVERSION

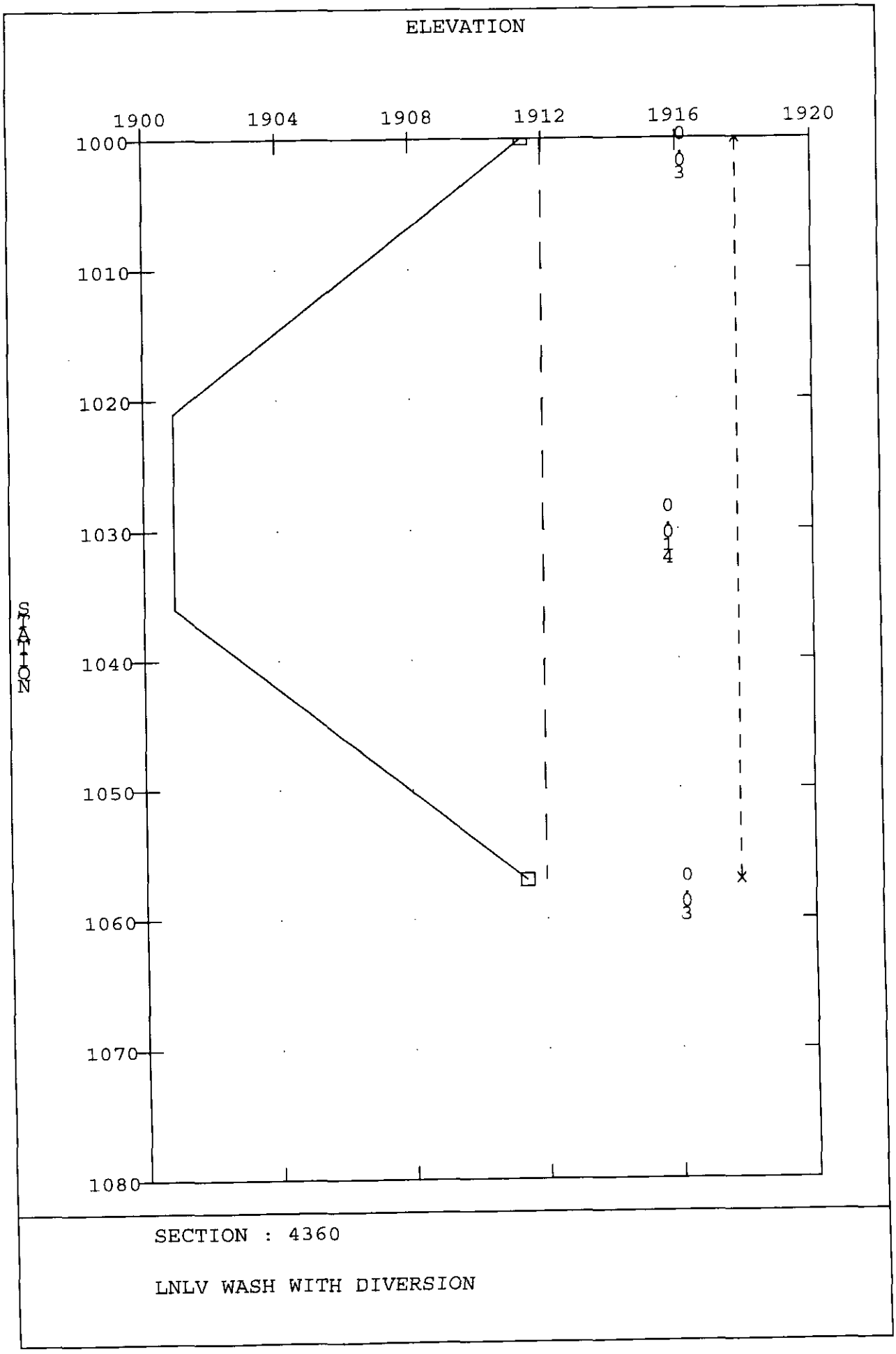

ELEVATION
1899
1903
1907
1911
1915
1919
0
10
20
30
40
50
60
70
80
STATION
SECTION : 4189
LNLV WASH WITH DIVERSION


ELEVATION
1899
1903
1907
1911
1915
1919
0
10
20
30
40
50
60
70
80
STATION
SECTION : 4246
LNLV WASH WITH DIVERSION



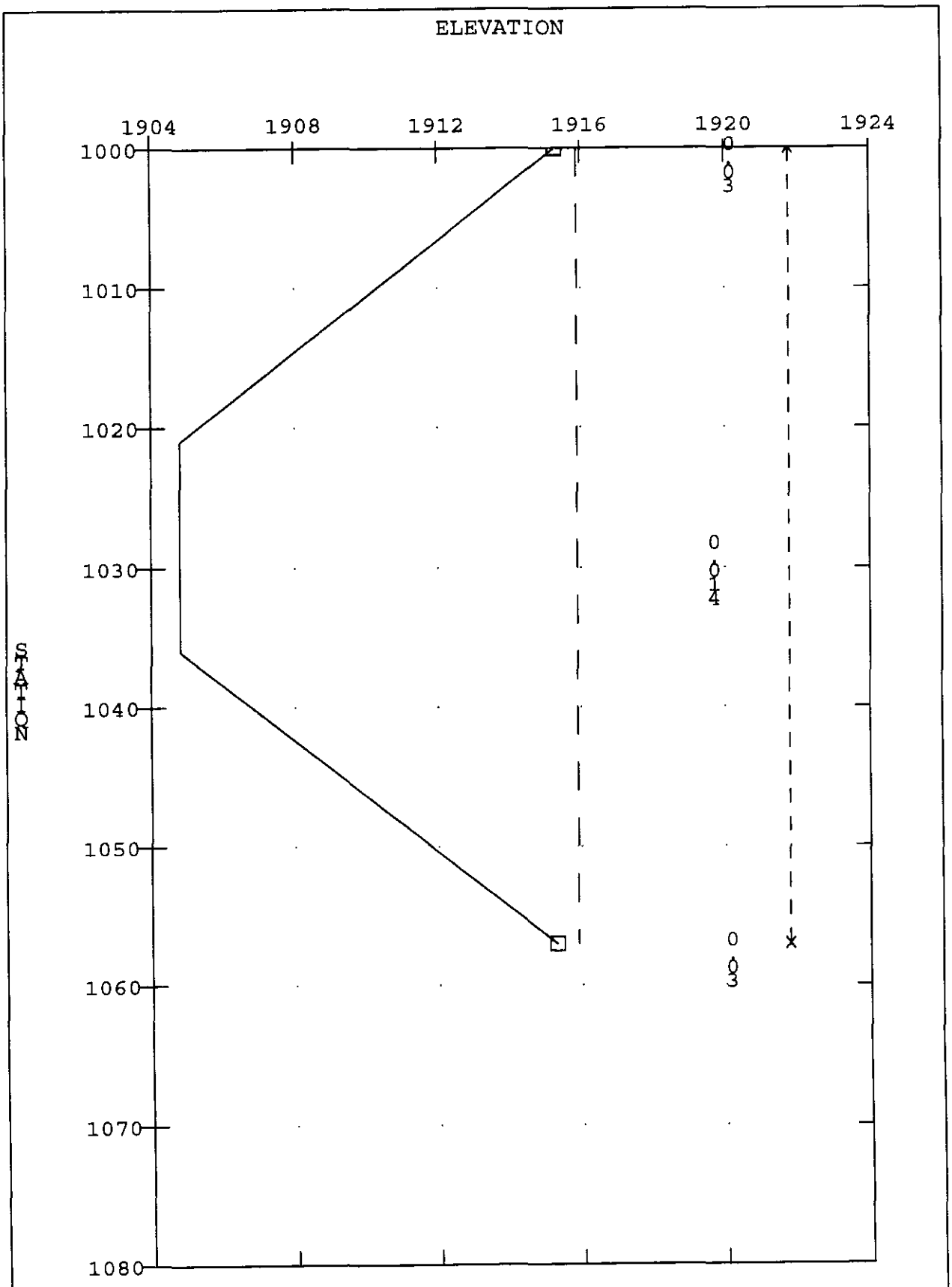
SECTION : 4247

LNLV WASH WITH DIVERSION



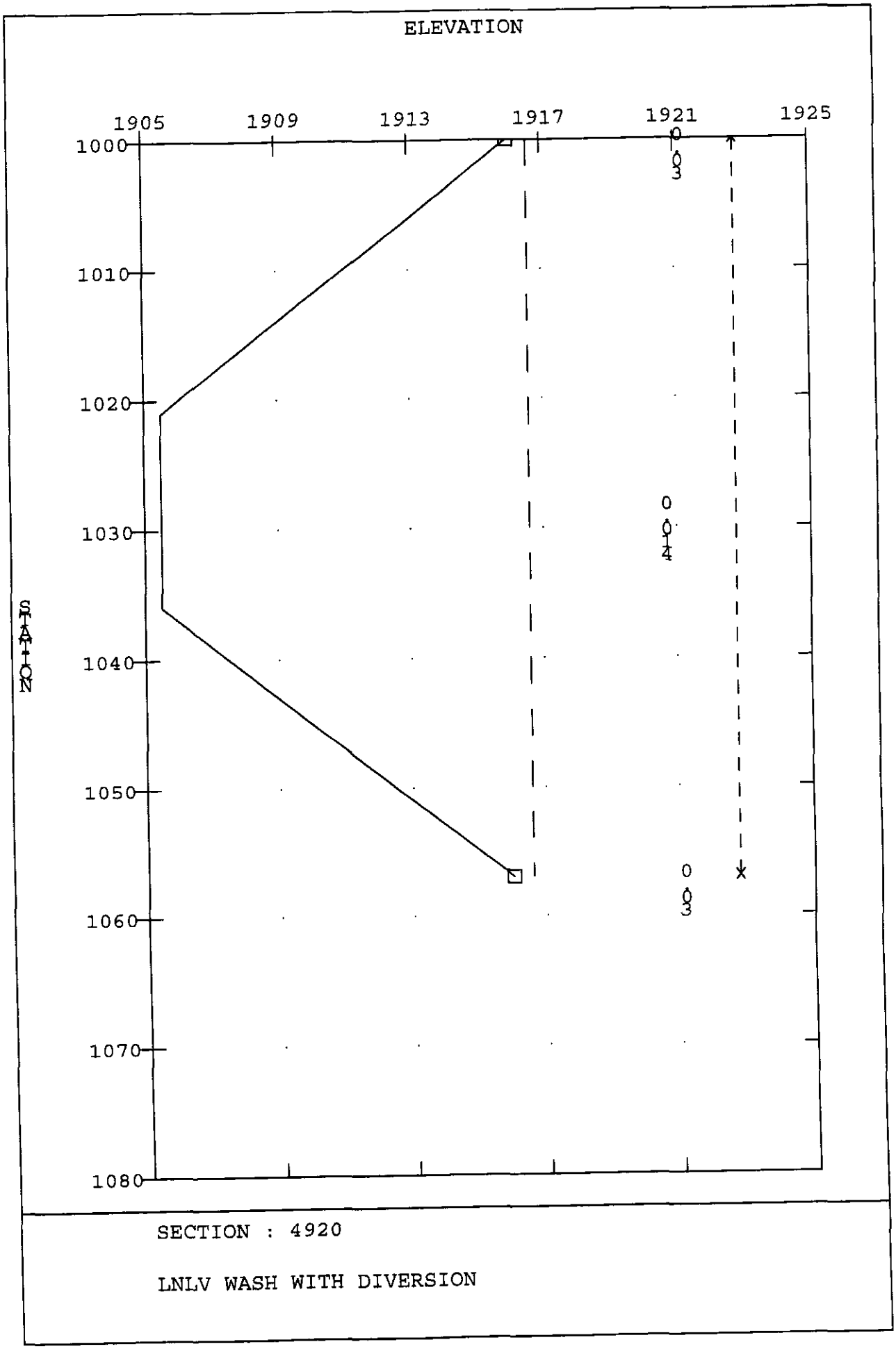
SECTION : 4360

LNLV WASH WITH DIVERSION



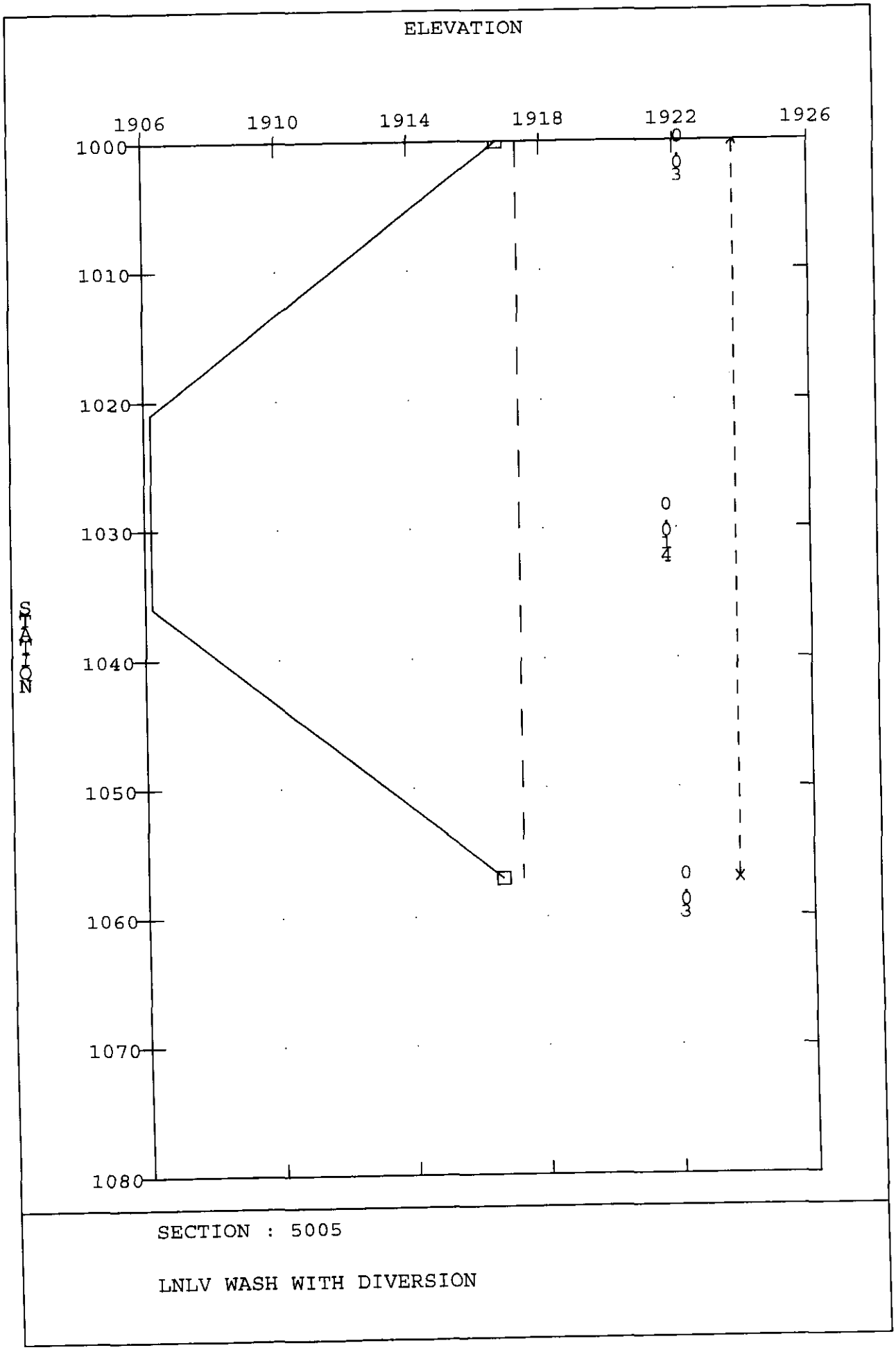
SECTION : 4831

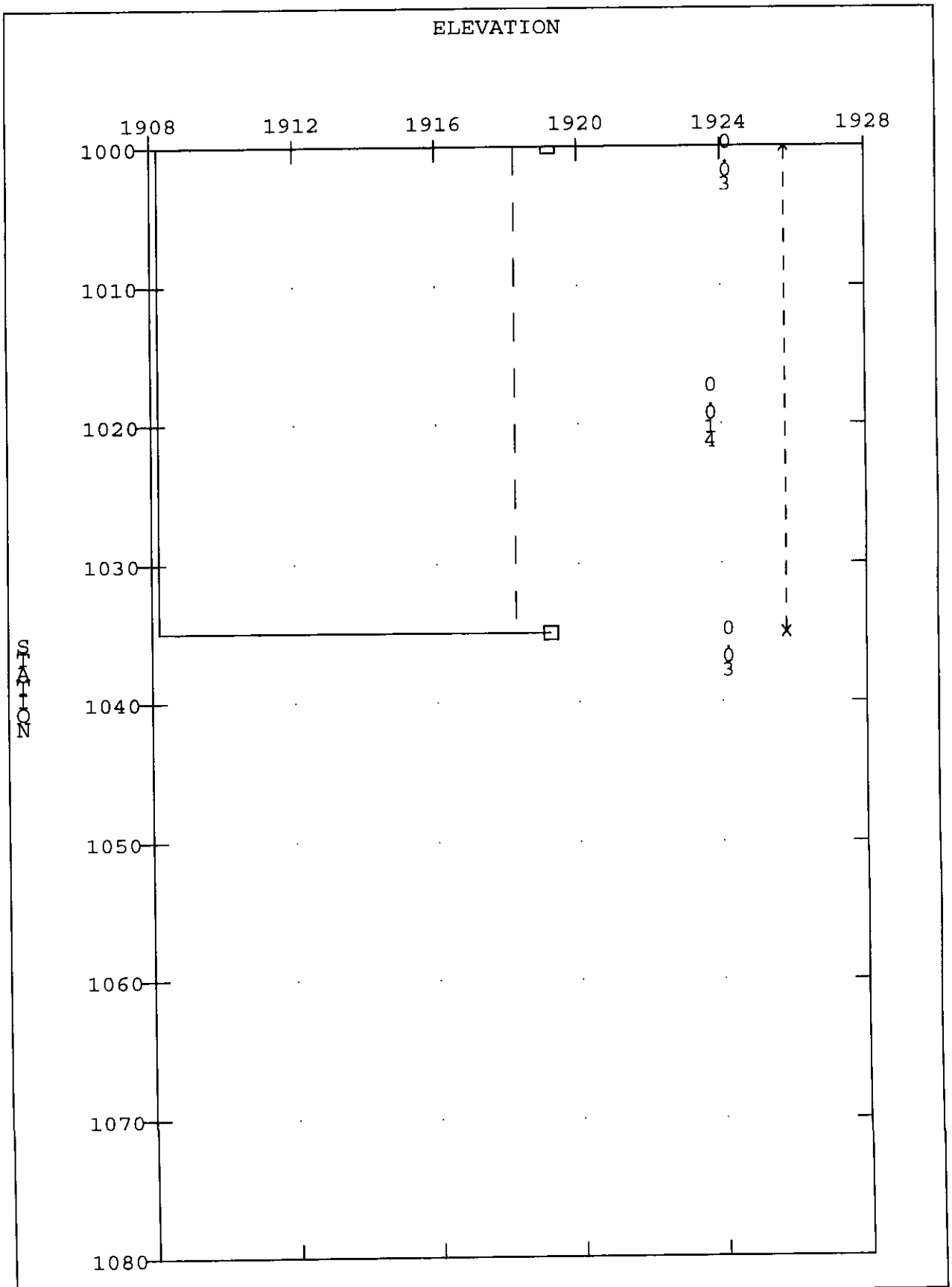
LNLV WASH WITH DIVERSION



SECTION : 4920

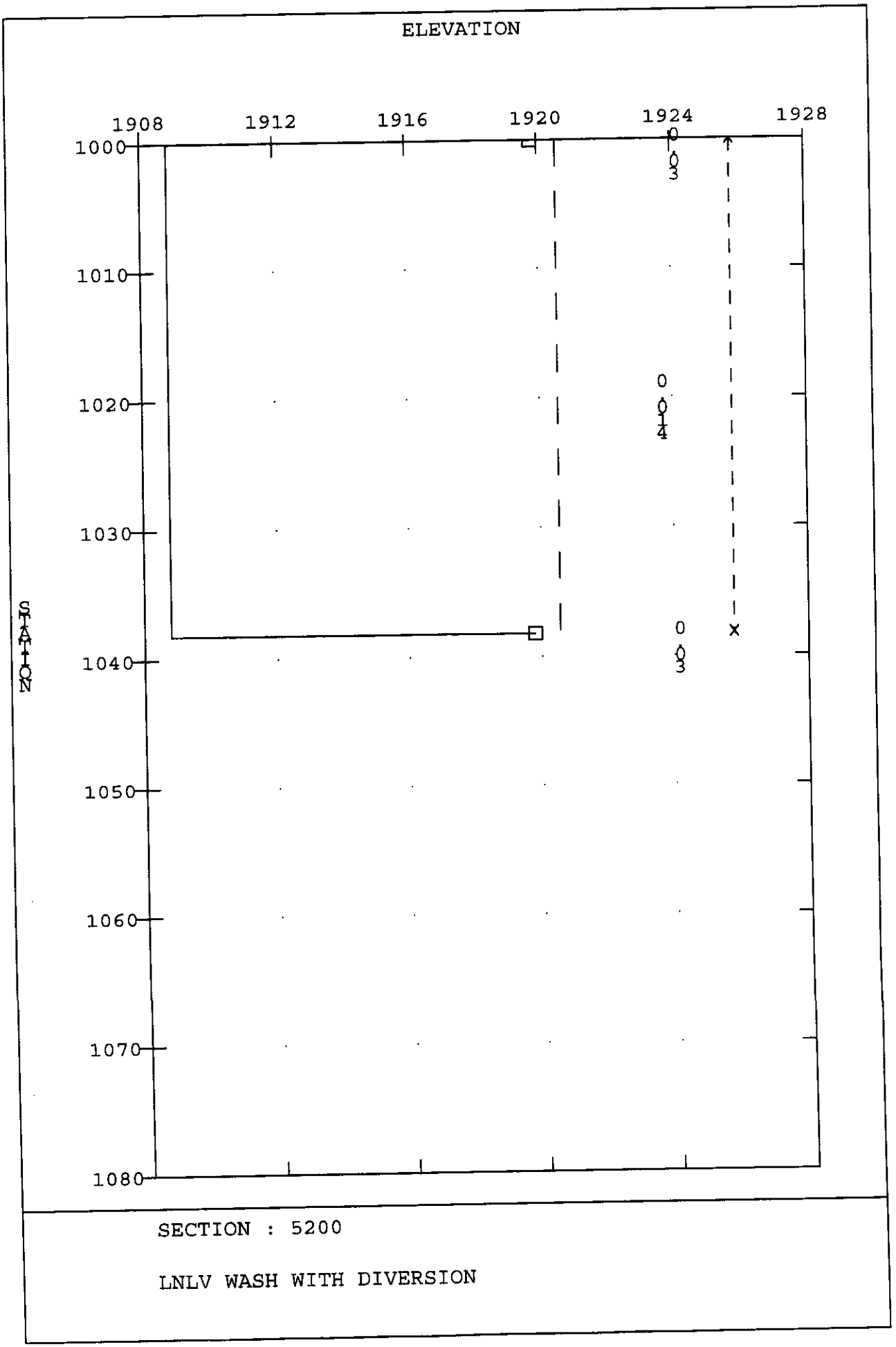
LNLV WASH WITH DIVERSION


ELEVATION
1906
1910
1914
1918
1922
1926
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 5005
LNLV WASH WITH DIVERSION



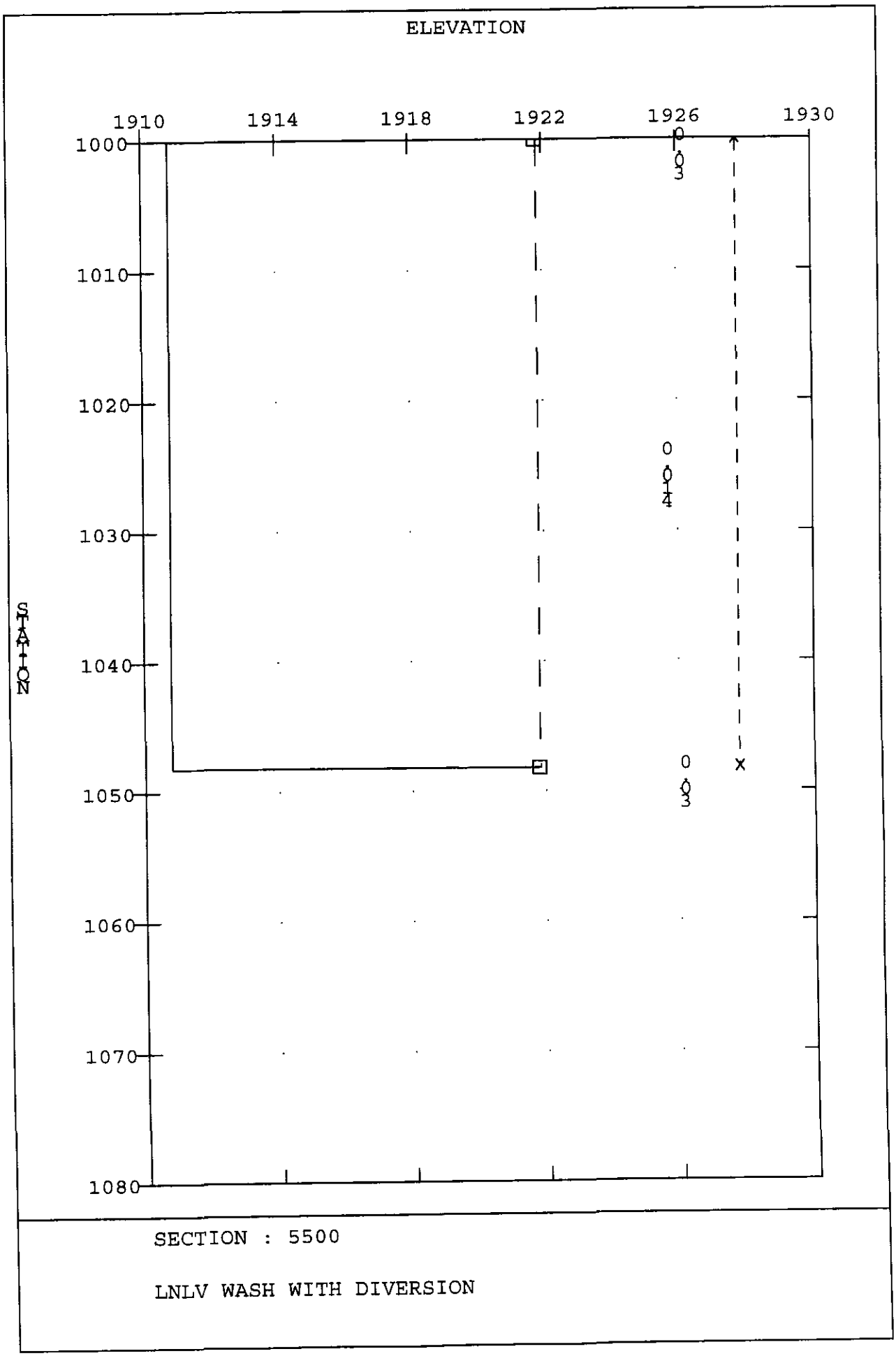
SECTION : 5105

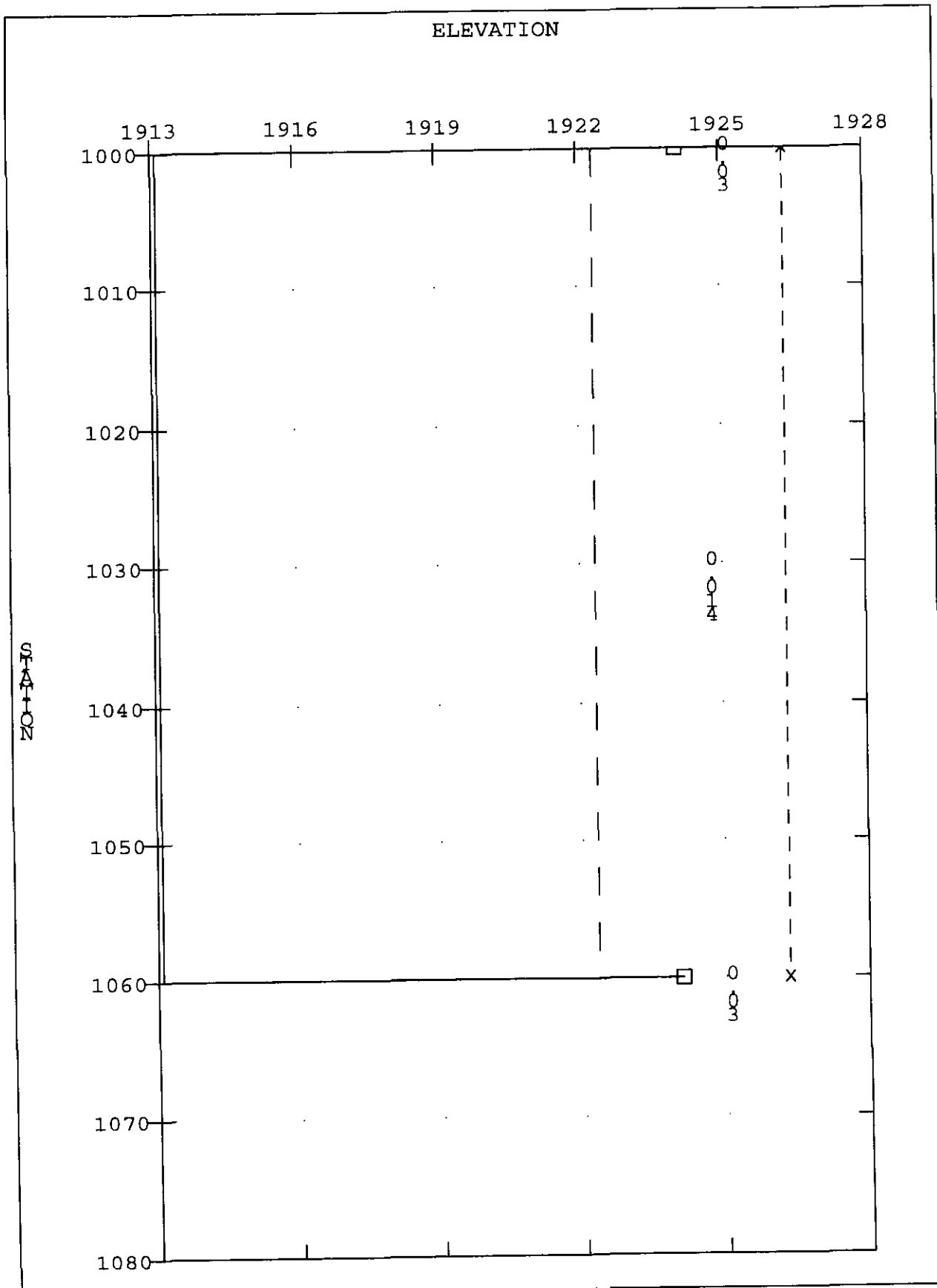
LNLV WASH WITH DIVERSION



SECTION : 5200

LNLV WASH WITH DIVERSION

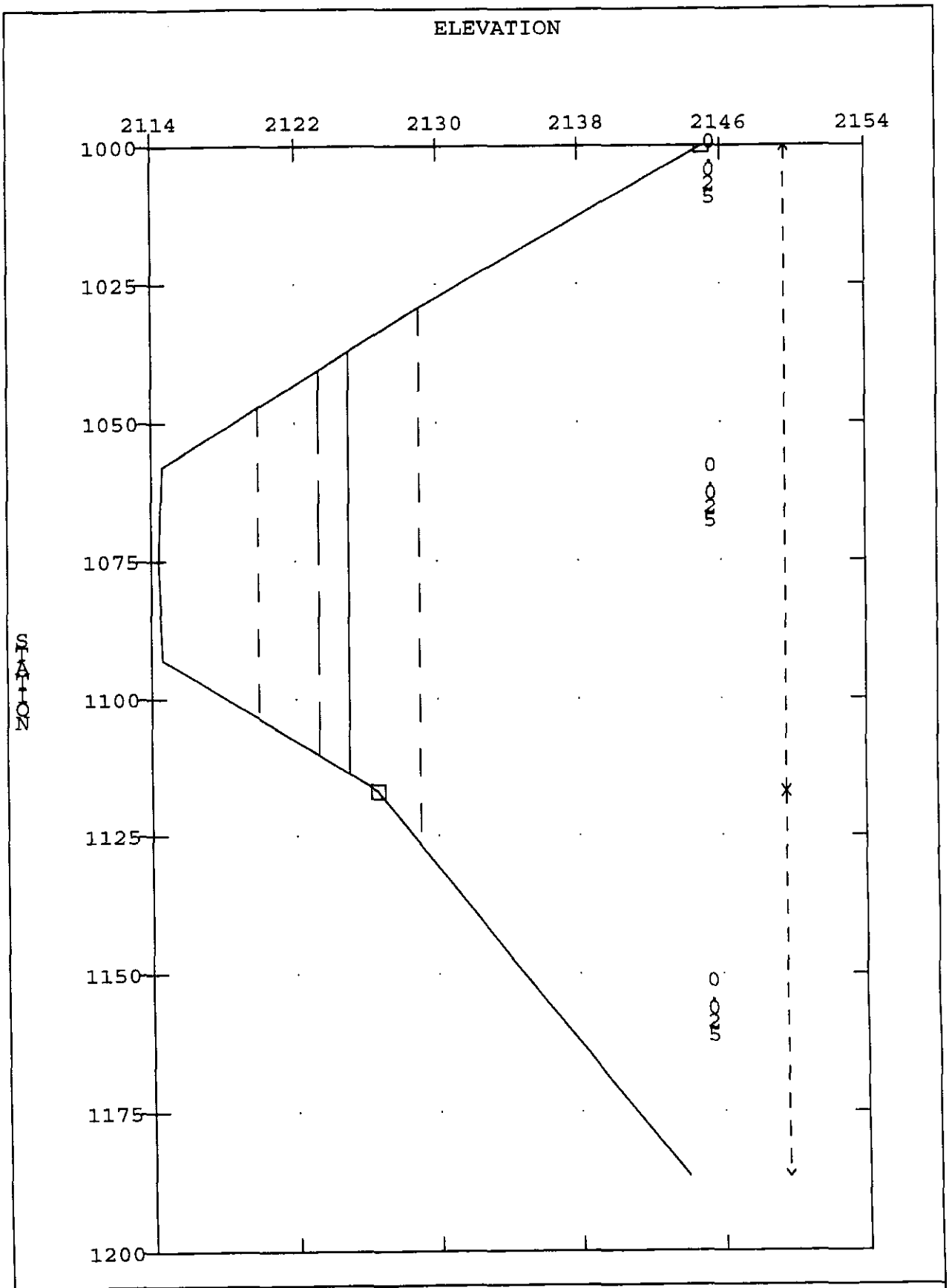

ELEVATION
1910
1914
1918
1922
1926
1930
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 5500
LNLV WASH WITH DIVERSION

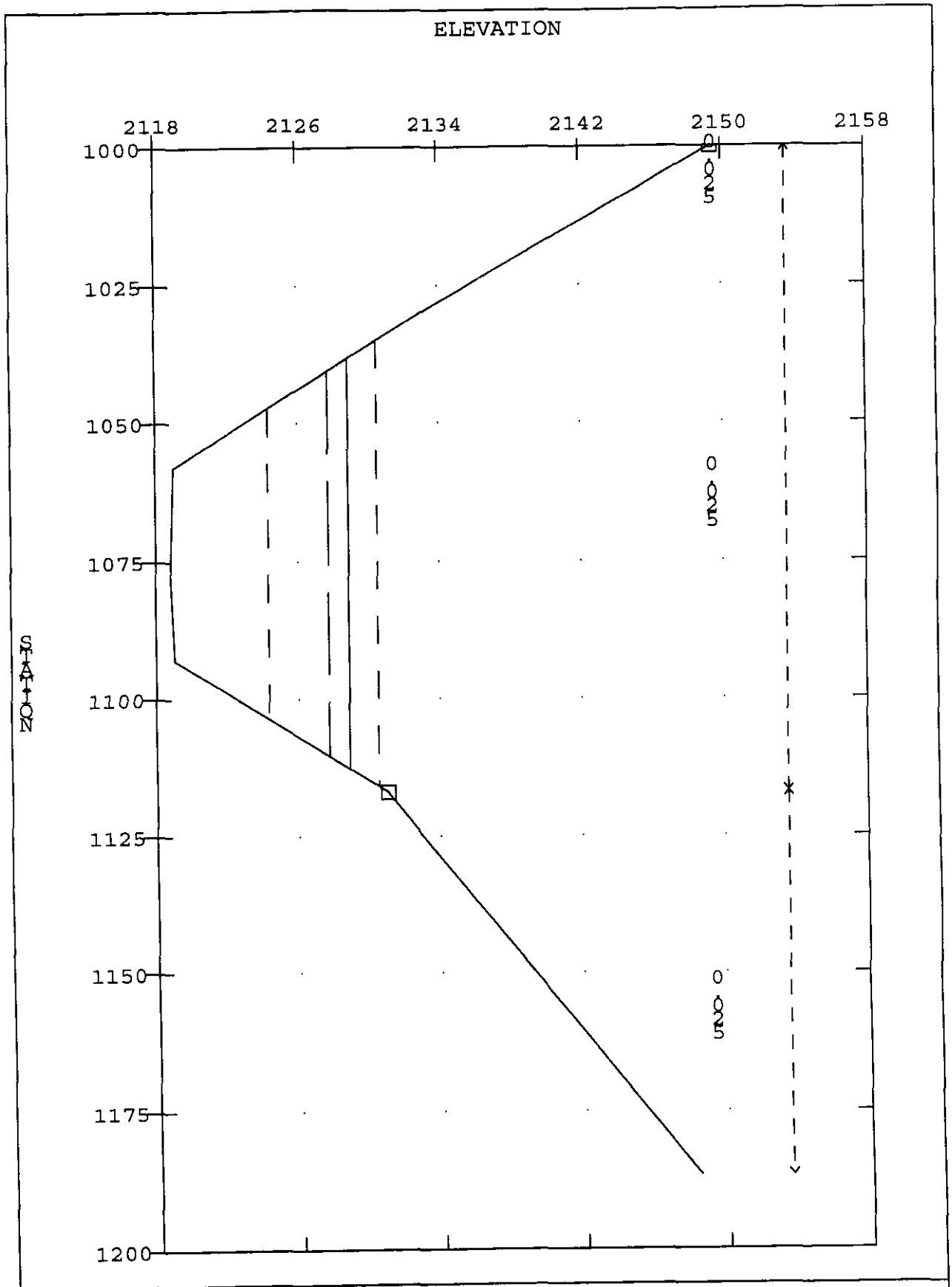


SECTION : 5852

LNLV WASH WITH DIVERSION

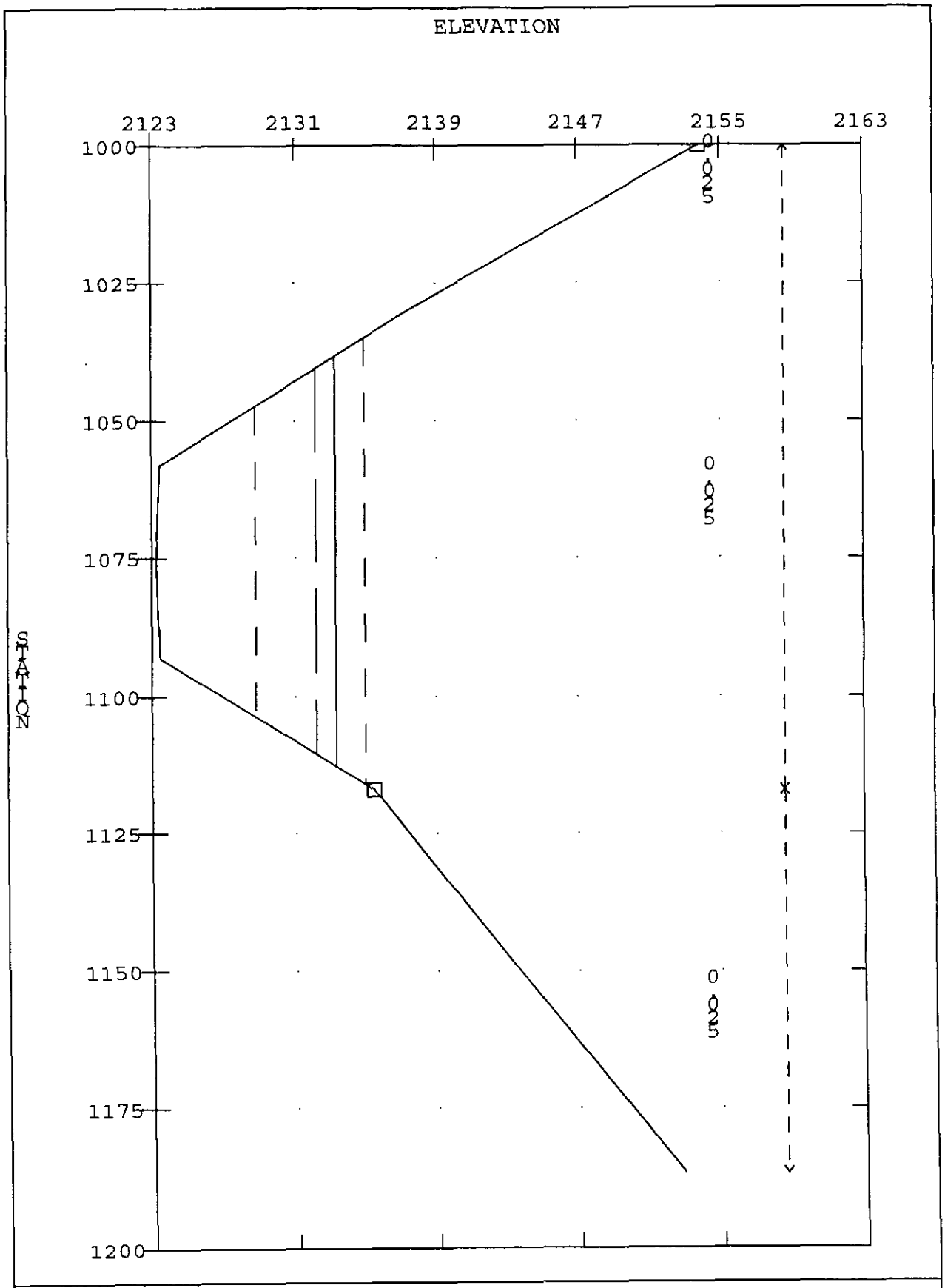
Cross Section Plots
NLVDBV6B


ELEVATION
2114
2122
2130
2138
2146
2154
1000
1025
1050
1075
1100
1125
1150
1175
1200
STATION
SECTION : 28903
MIDDLE NO. LAS VEGAS WASH



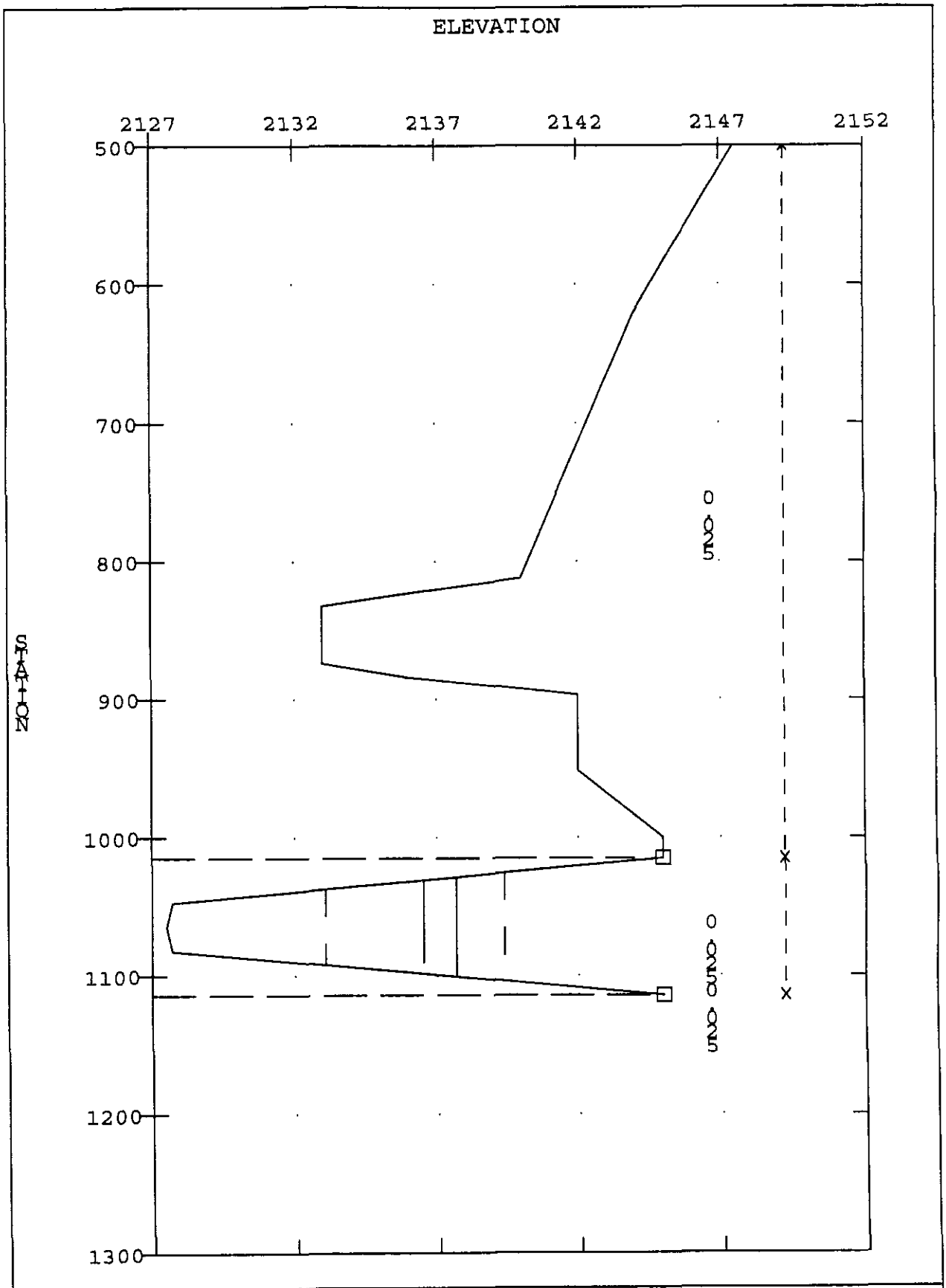
SECTION : 29486

MIDDLE NO. LAS VEGAS WASH



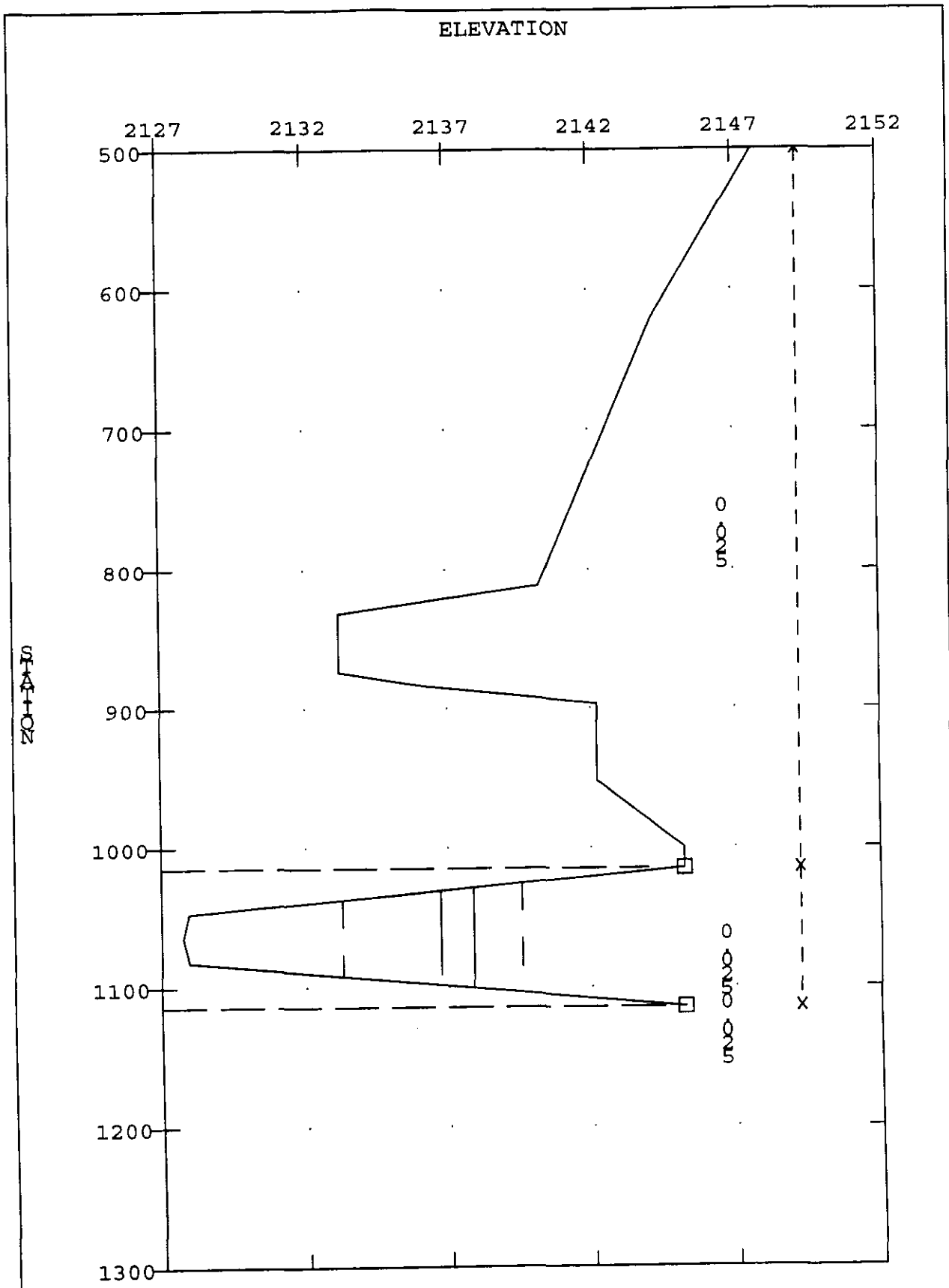
SECTION : 30067

MIDDLE NO. LAS VEGAS WASH



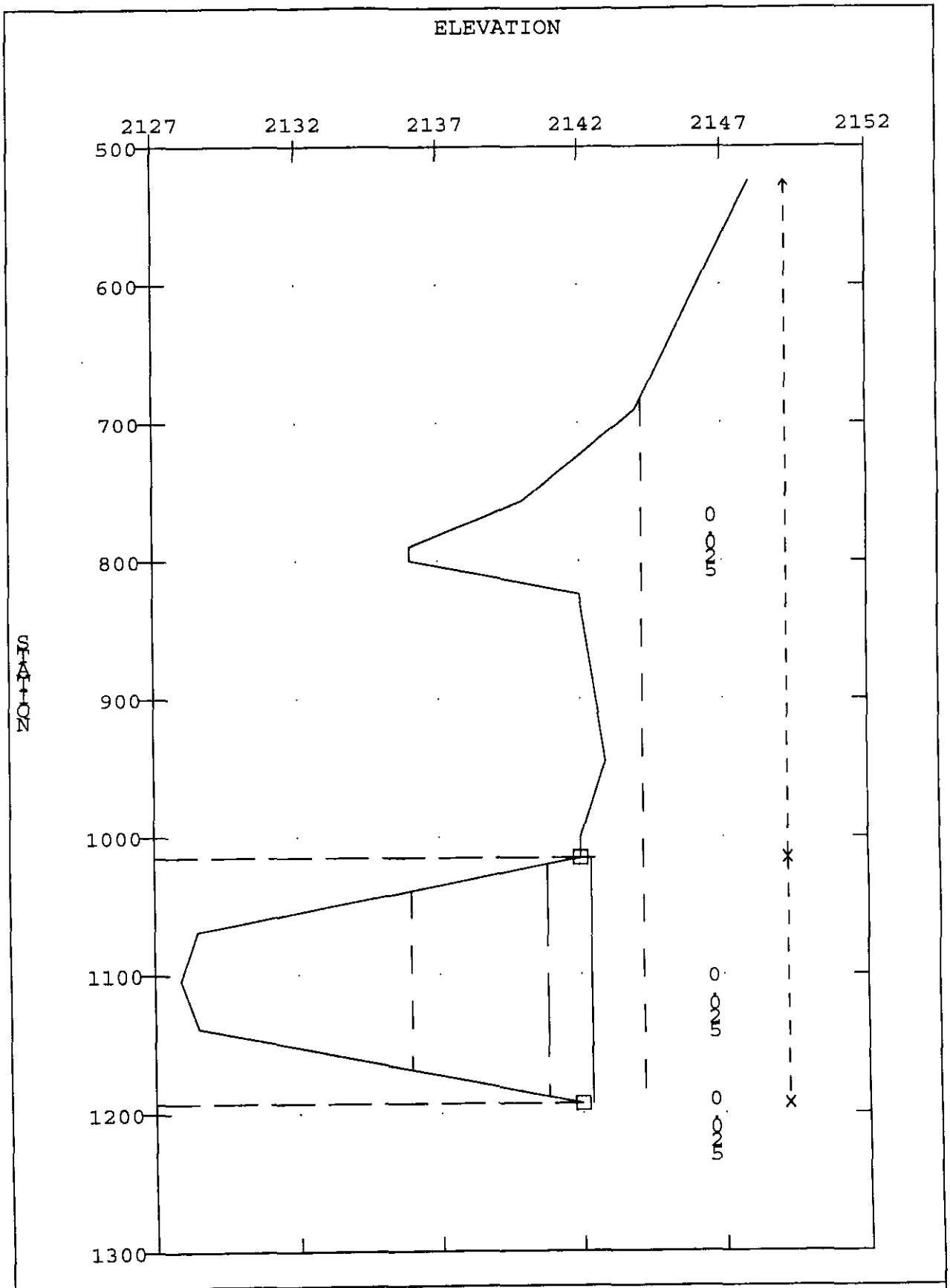
SECTION : 30650

MIDDLE NO. LAS VEGAS WASH



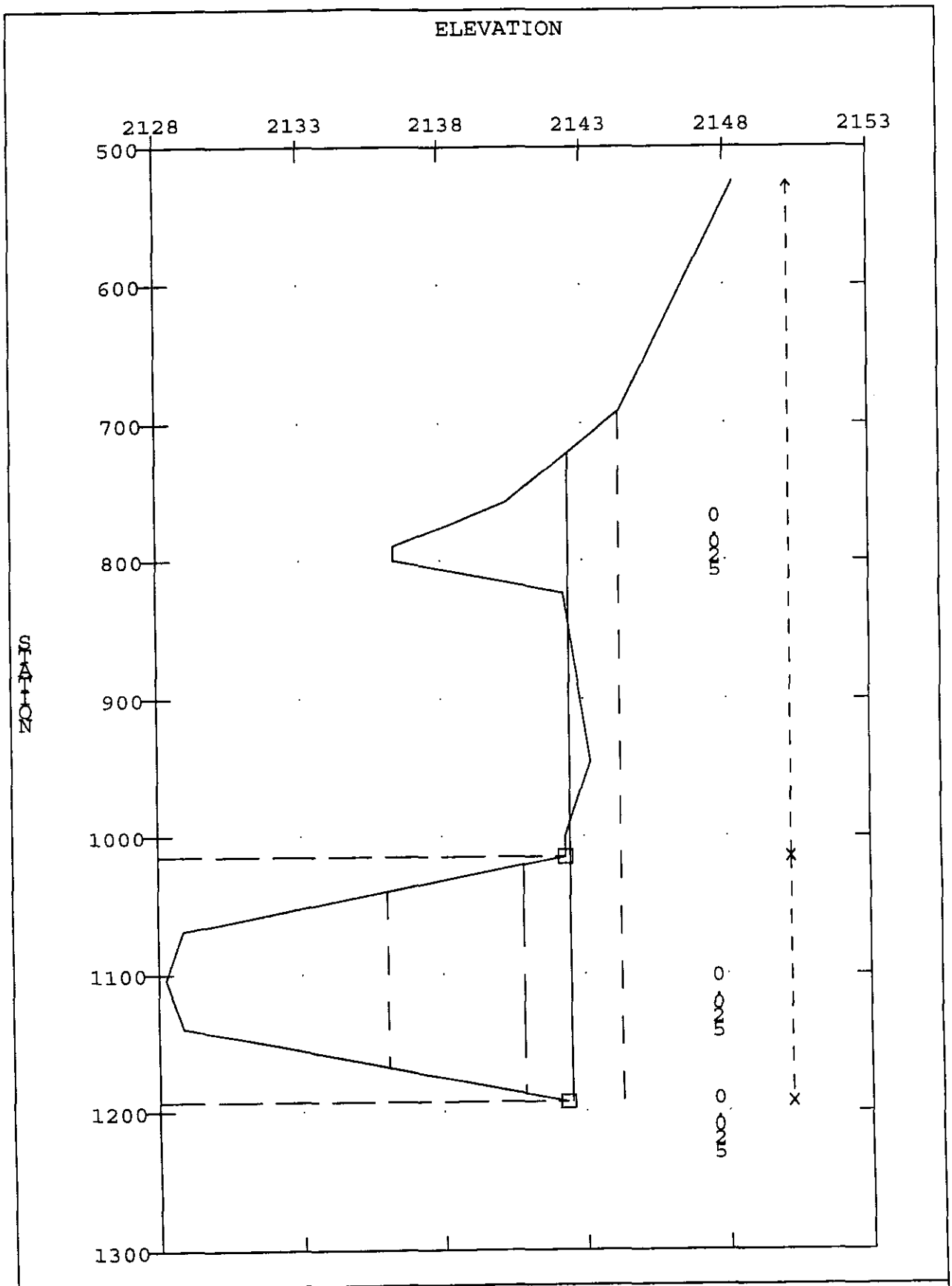
SECTION : 30680

MIDDLE NO. LAS VEGAS WASH



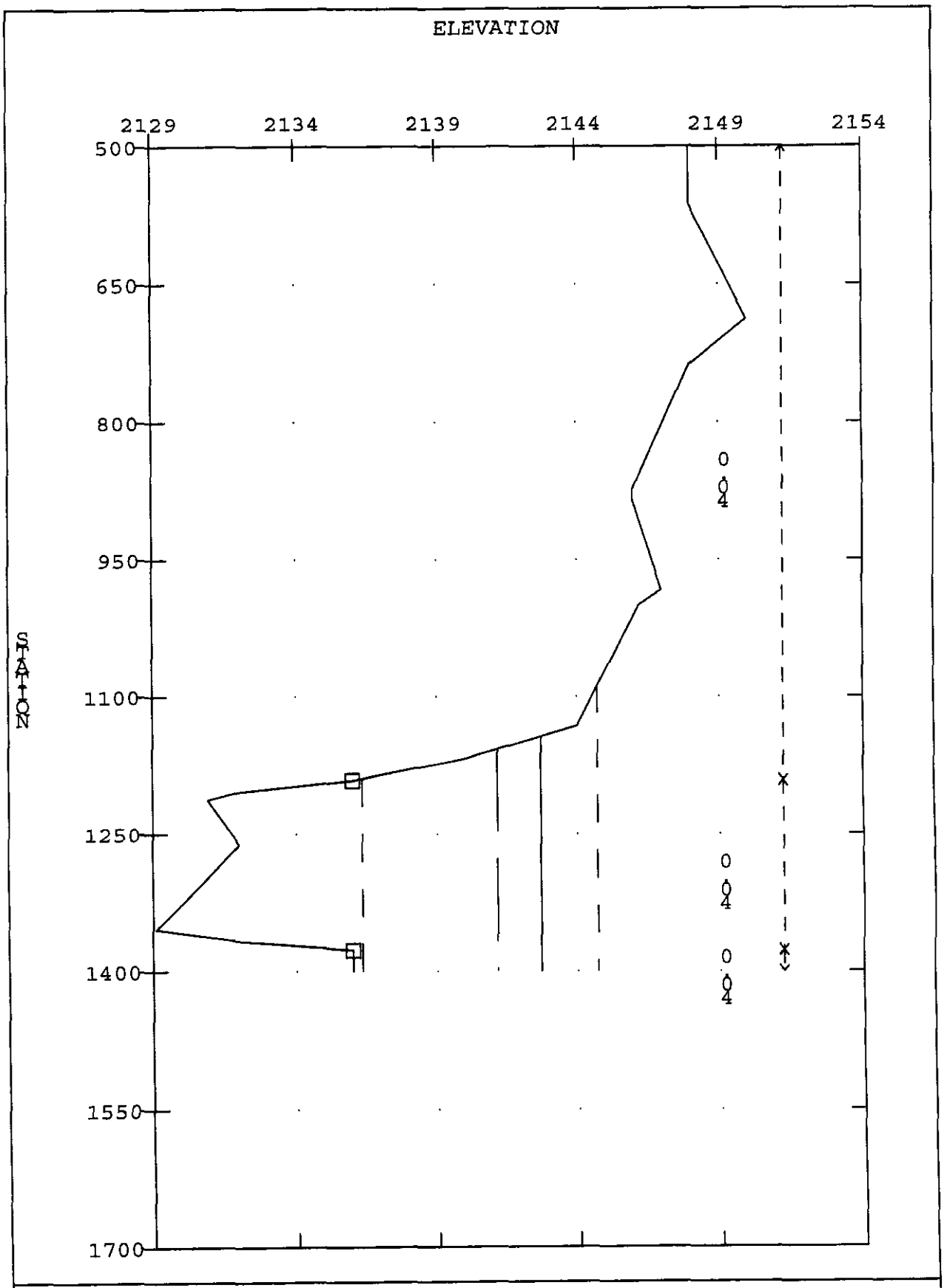
SECTION : 30765

MIDDLE NO. LAS VEGAS WASH



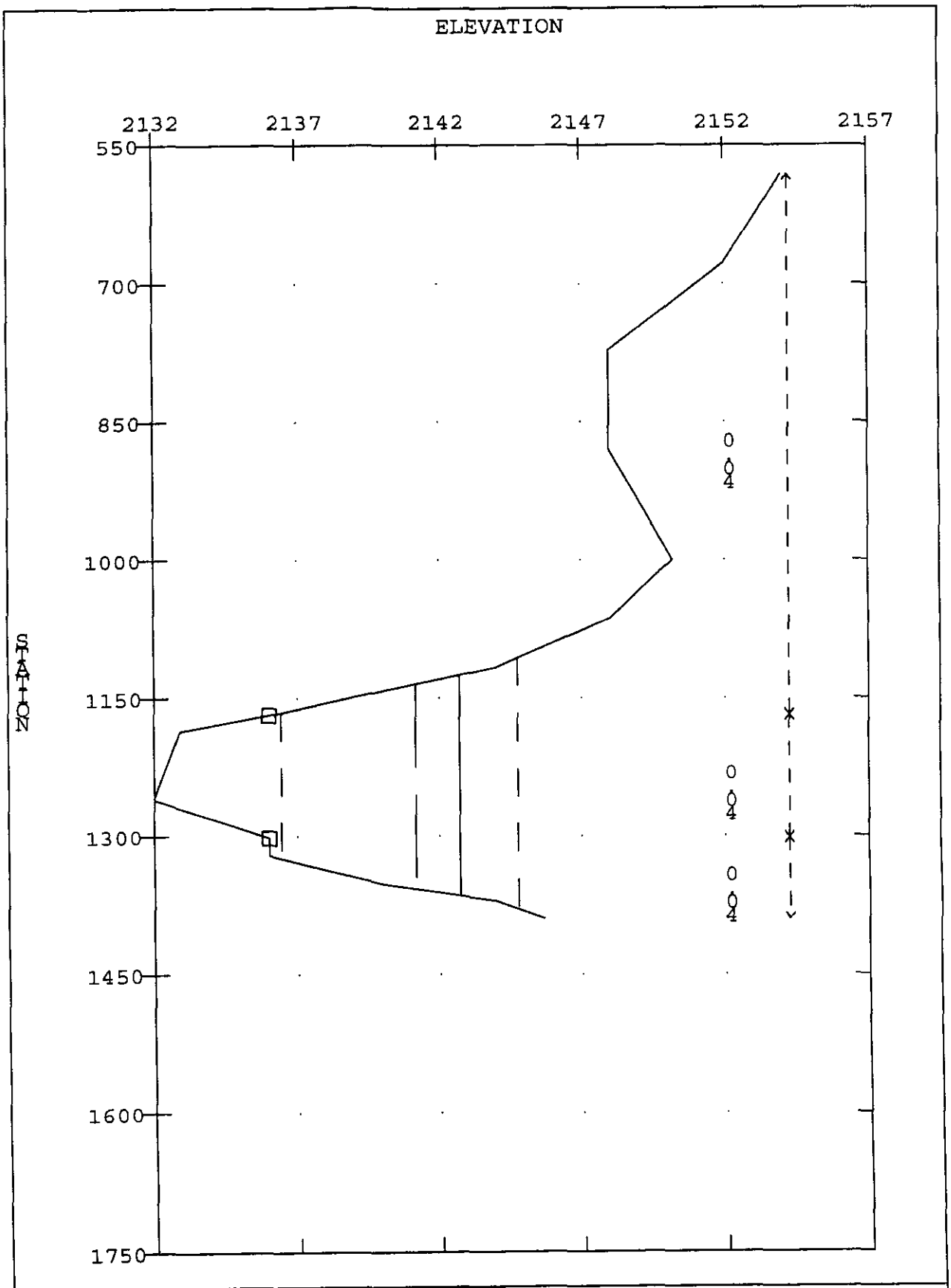
SECTION : 30935

MIDDLE NO. LAS VEGAS WASH



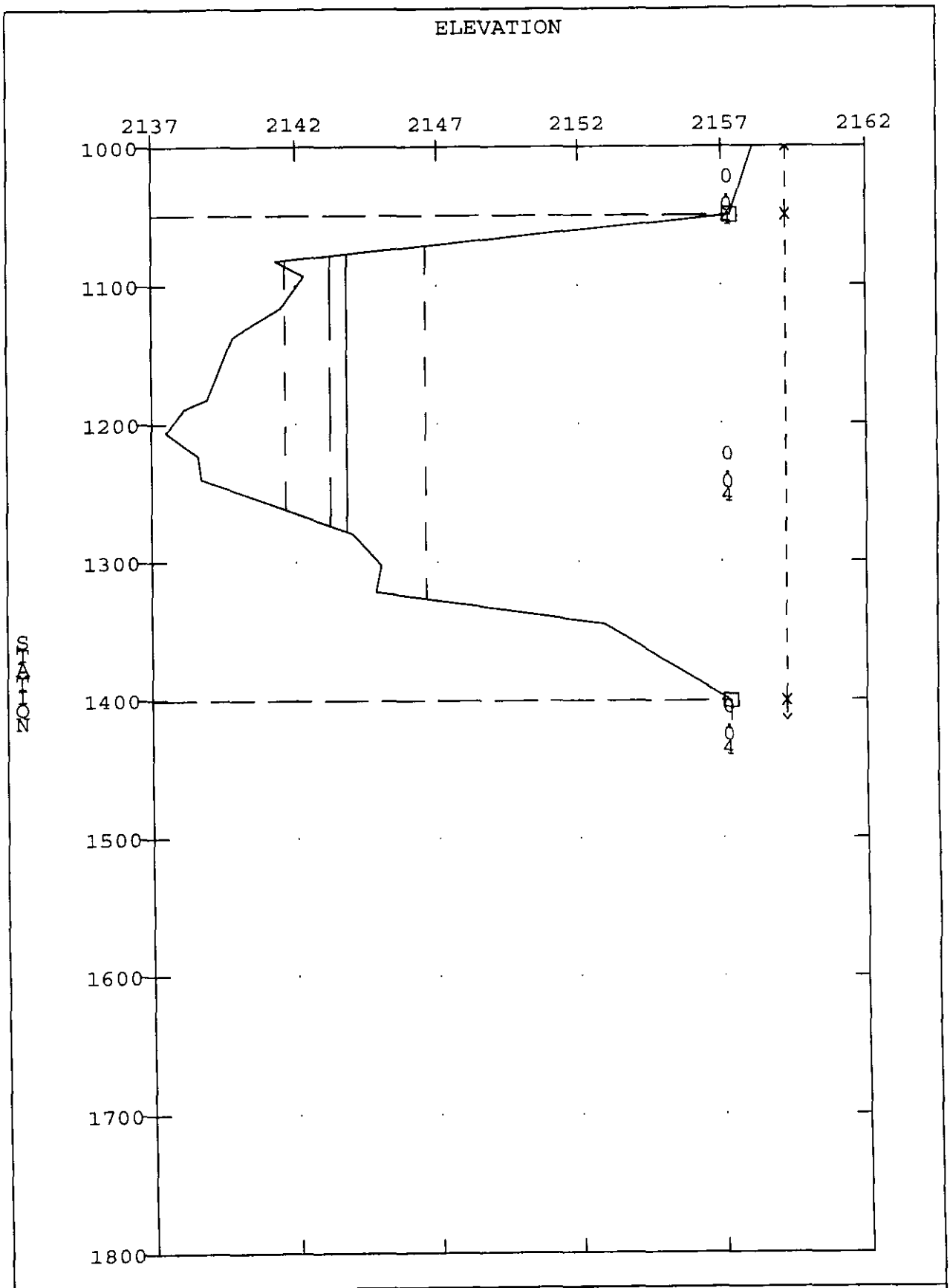
SECTION : 31235

MIDDLE NO. LAS VEGAS WASH



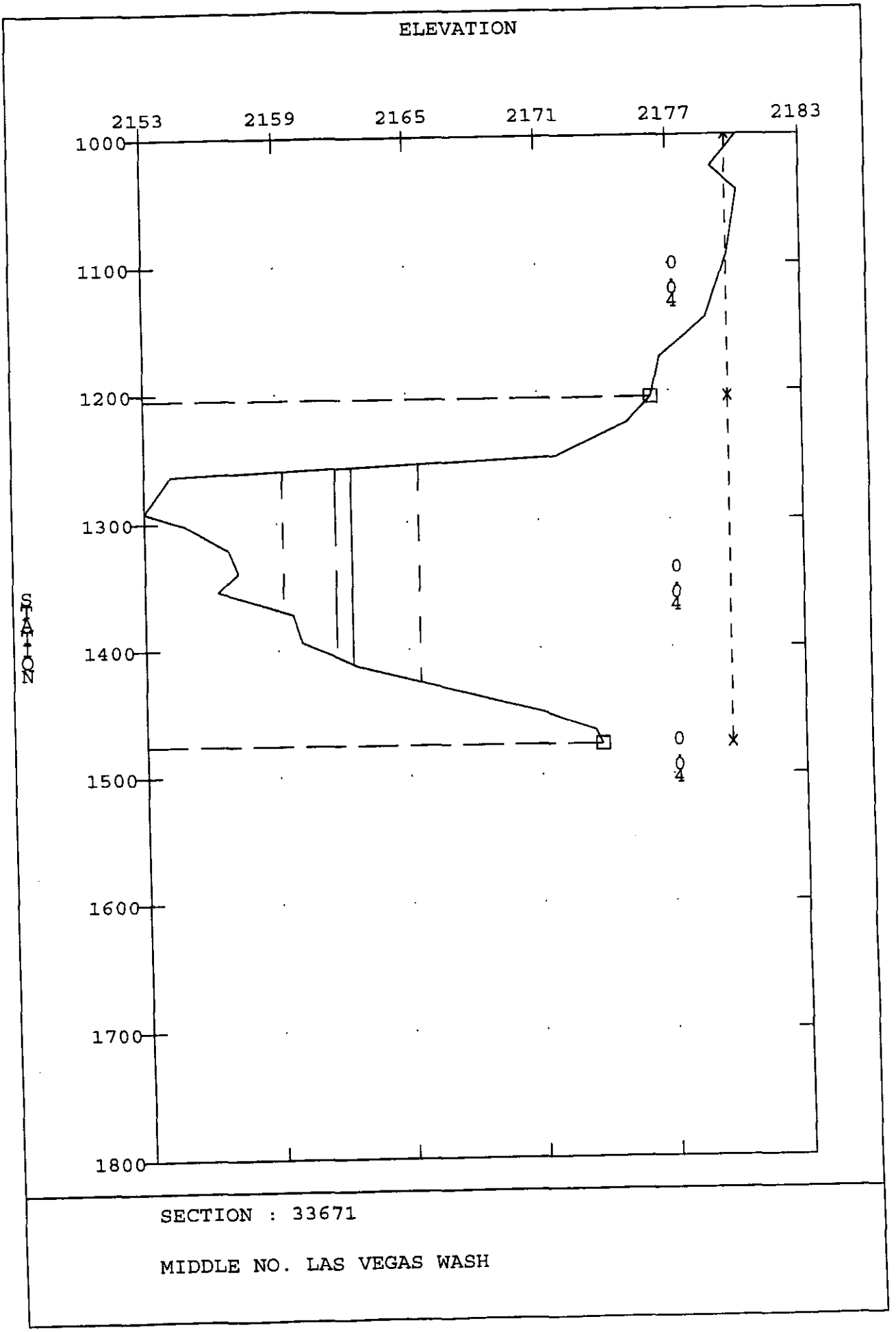
SECTION : 31500

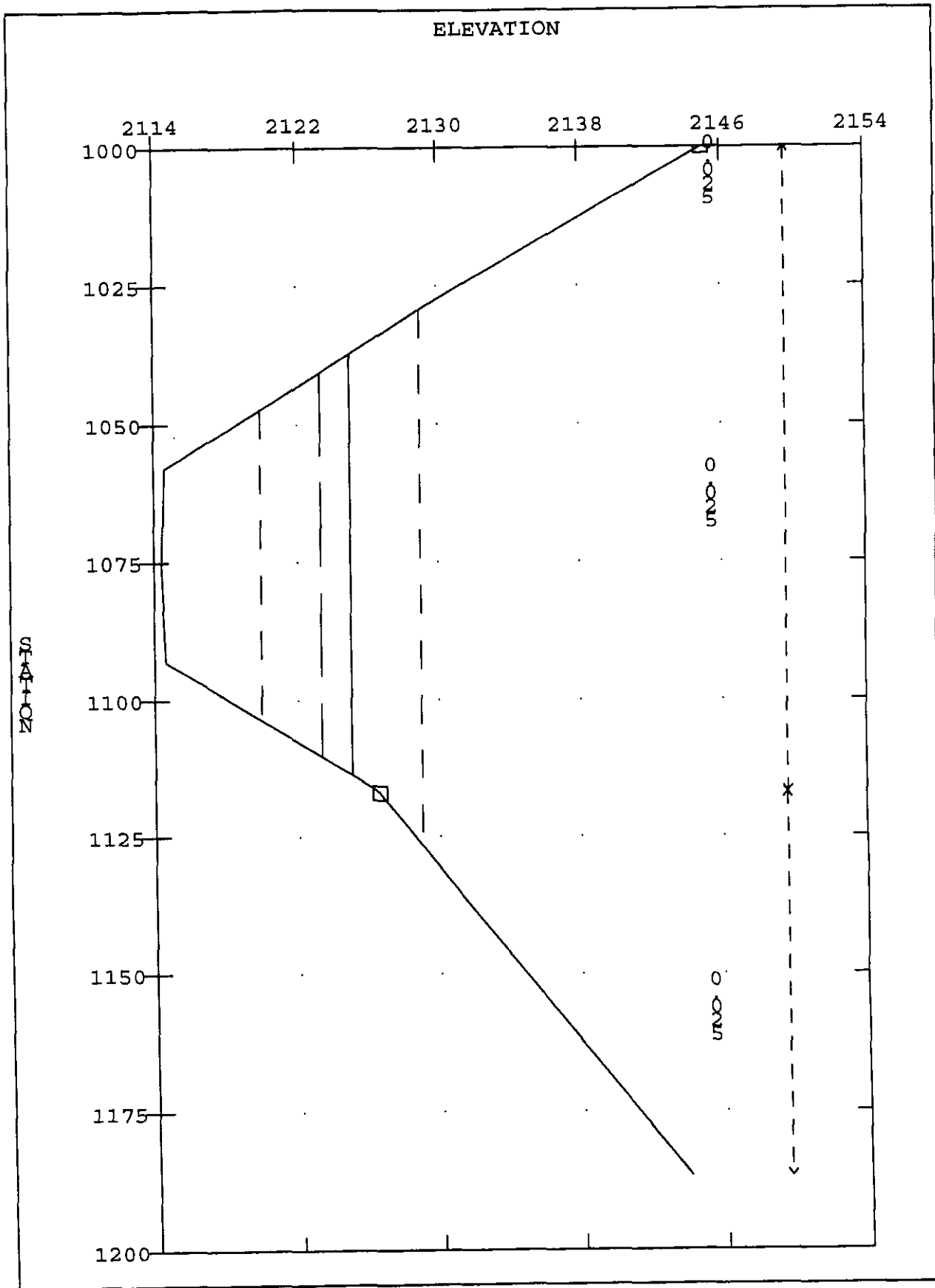
MIDDLE NO. LAS VEGAS WASH



SECTION : 32044

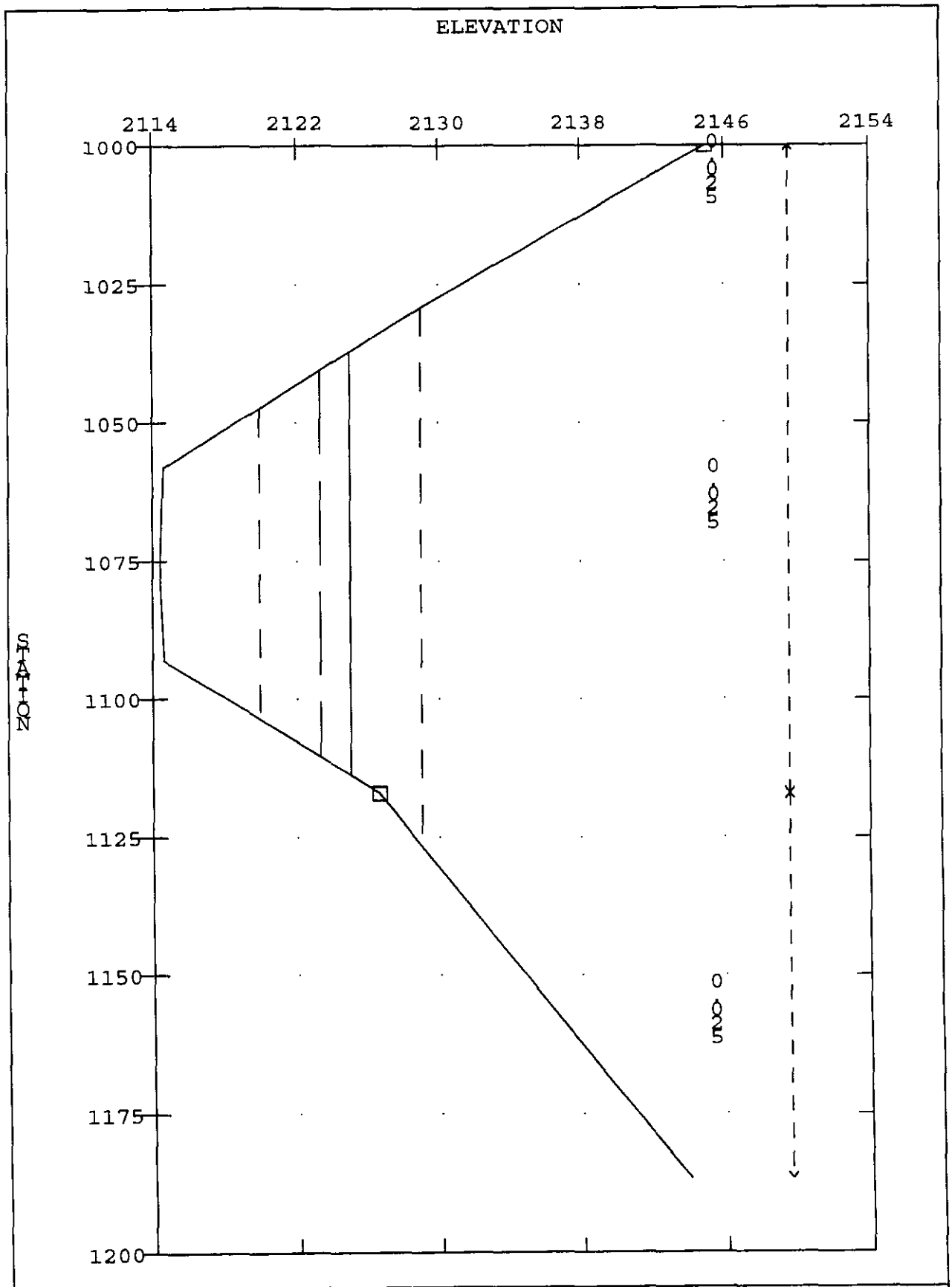
MIDDLE NO. LAS VEGAS WASH


ELEVATION
2153
2159
2165
2171
2177
2183
1000
1100
1200
1300
1400
1500
1600
1700
1800
STATION
SECTION : 33671
MIDDLE NO. LAS VEGAS WASH



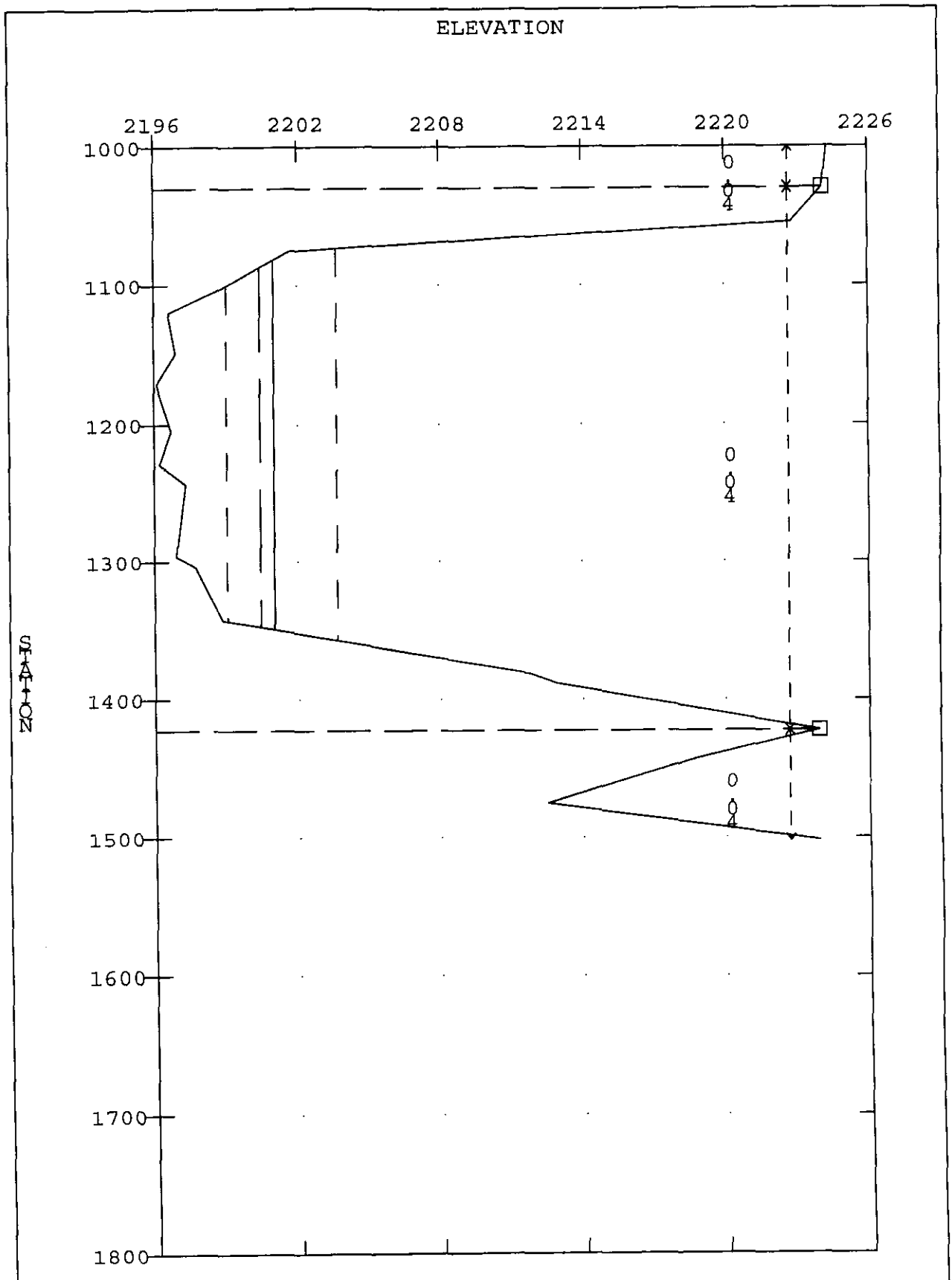
SECTION : 35645

MIDDLE NO. LAS VEGAS WASH



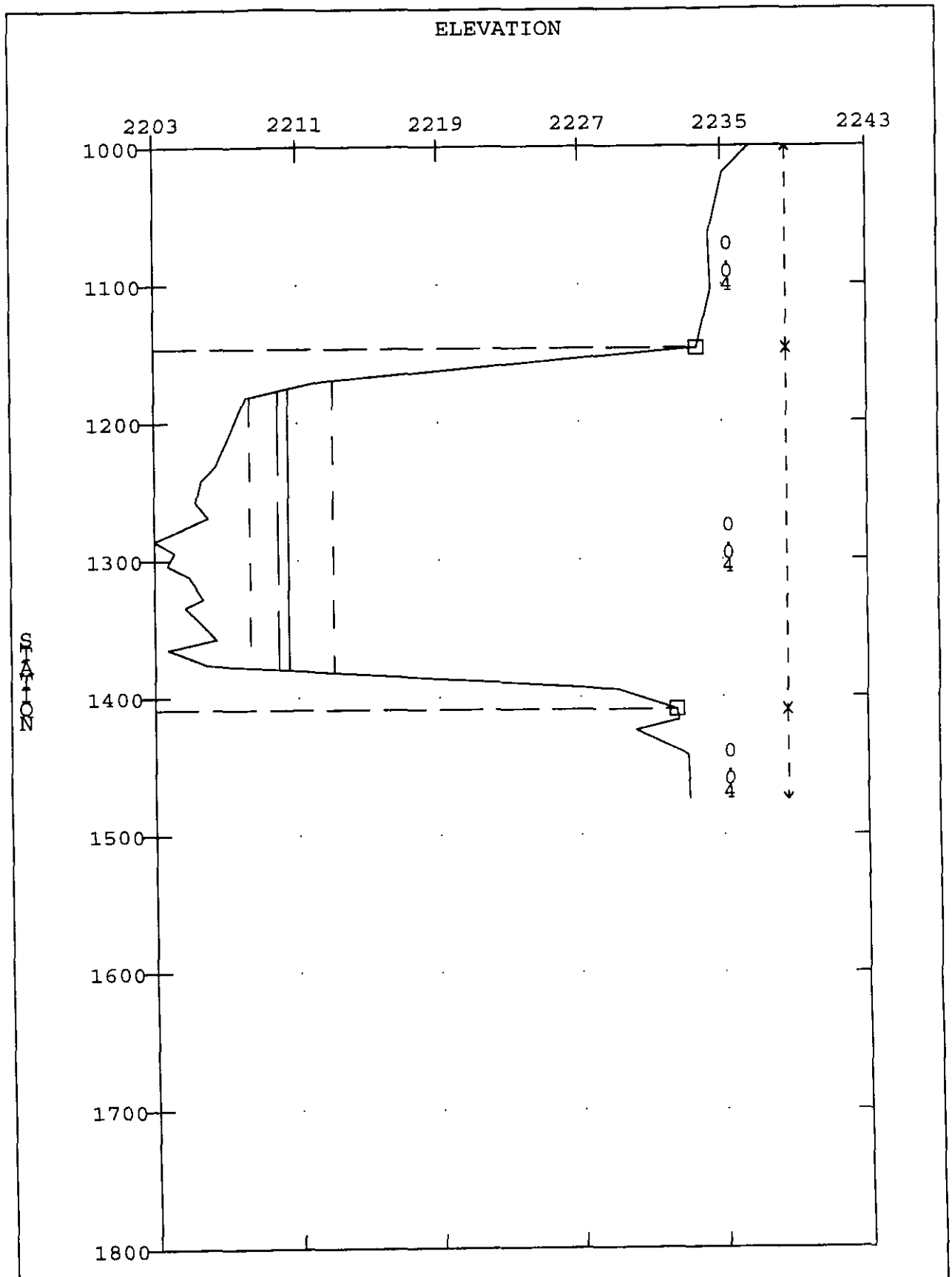
SECTION : 36822

MIDDLE NO. LAS VEGAS WASH



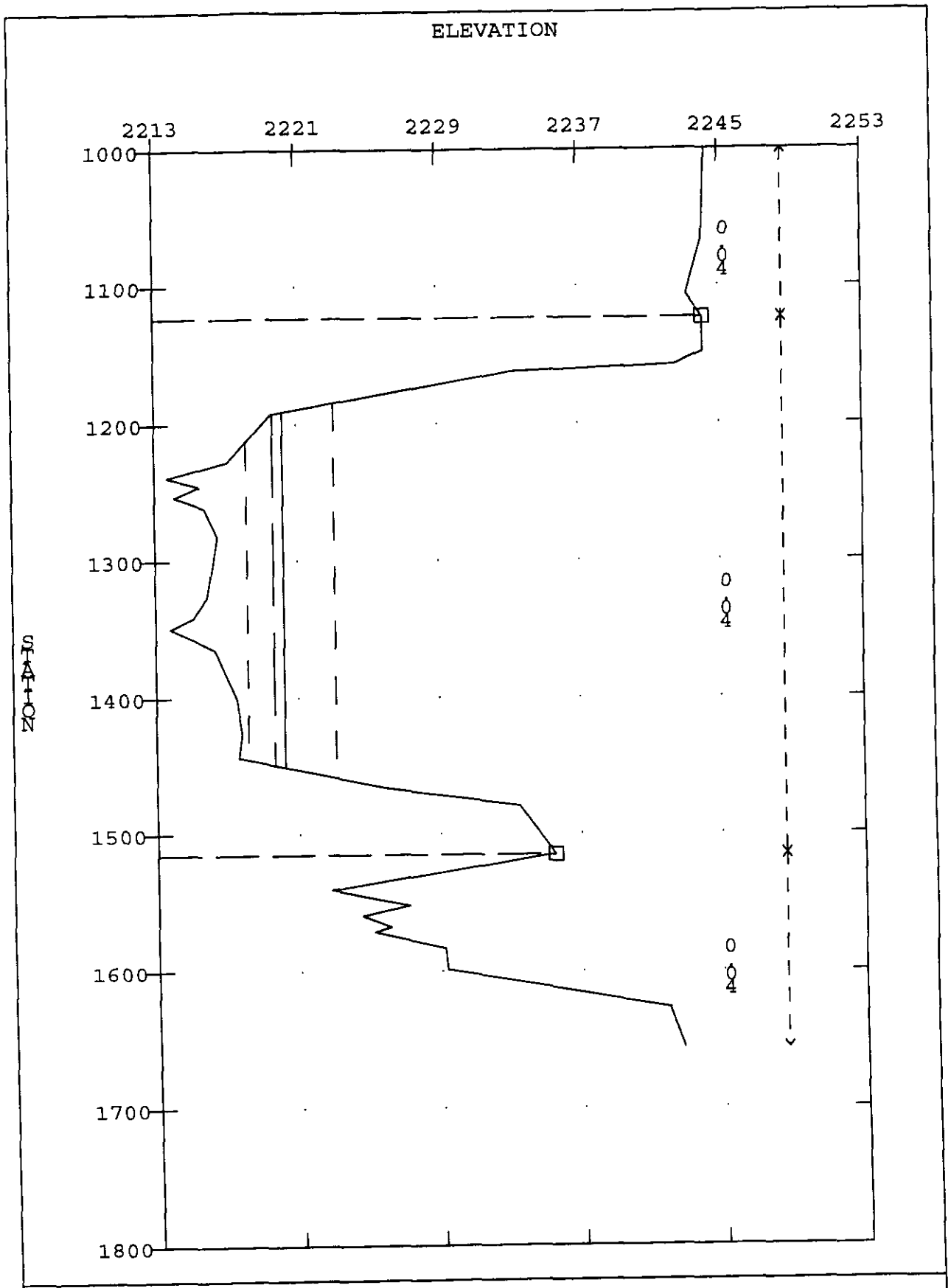
SECTION : 38410

MIDDLE NO. LAS VEGAS WASH



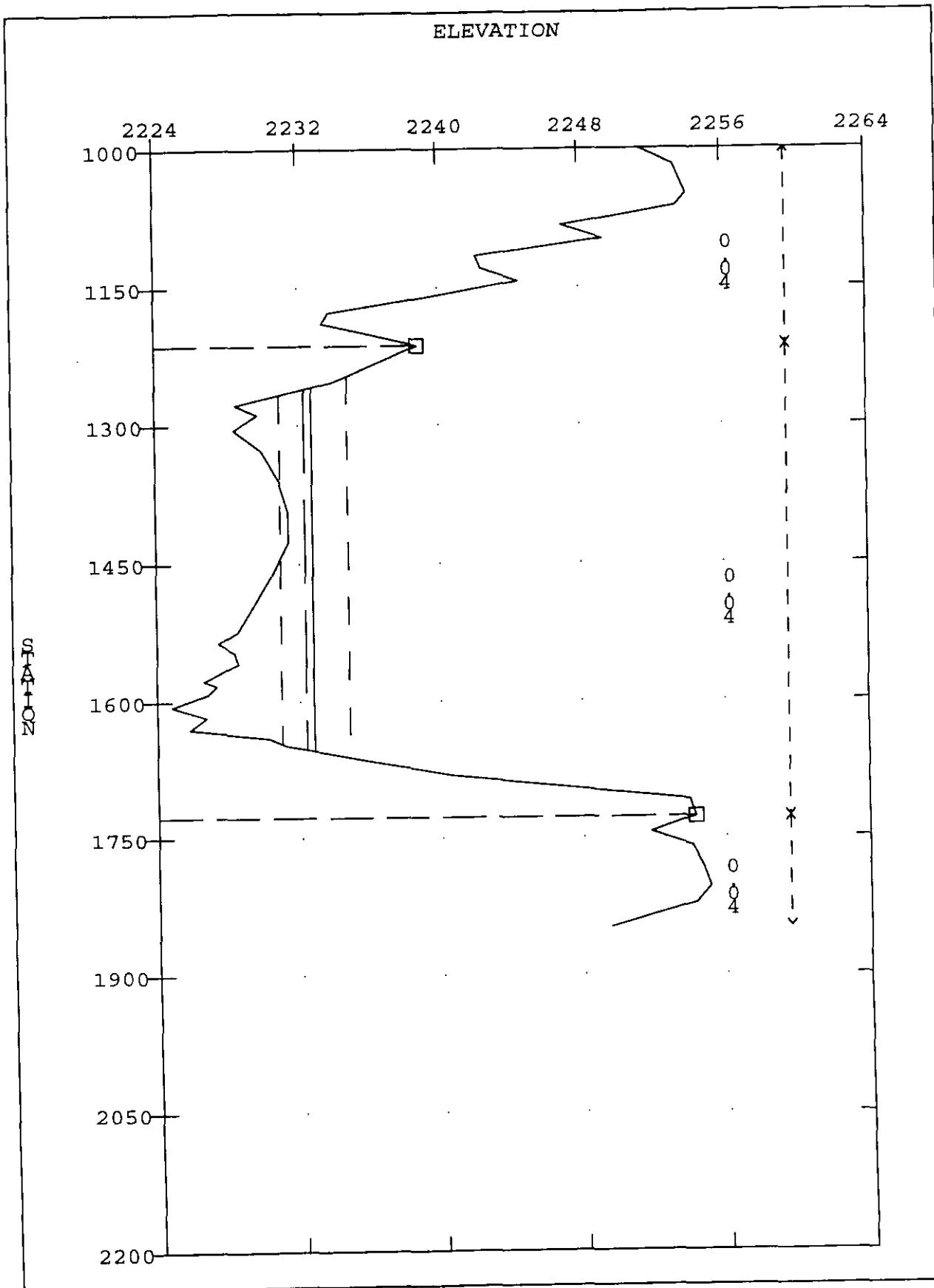
SECTION : 39519

MIDDLE NO. LAS VEGAS WASH



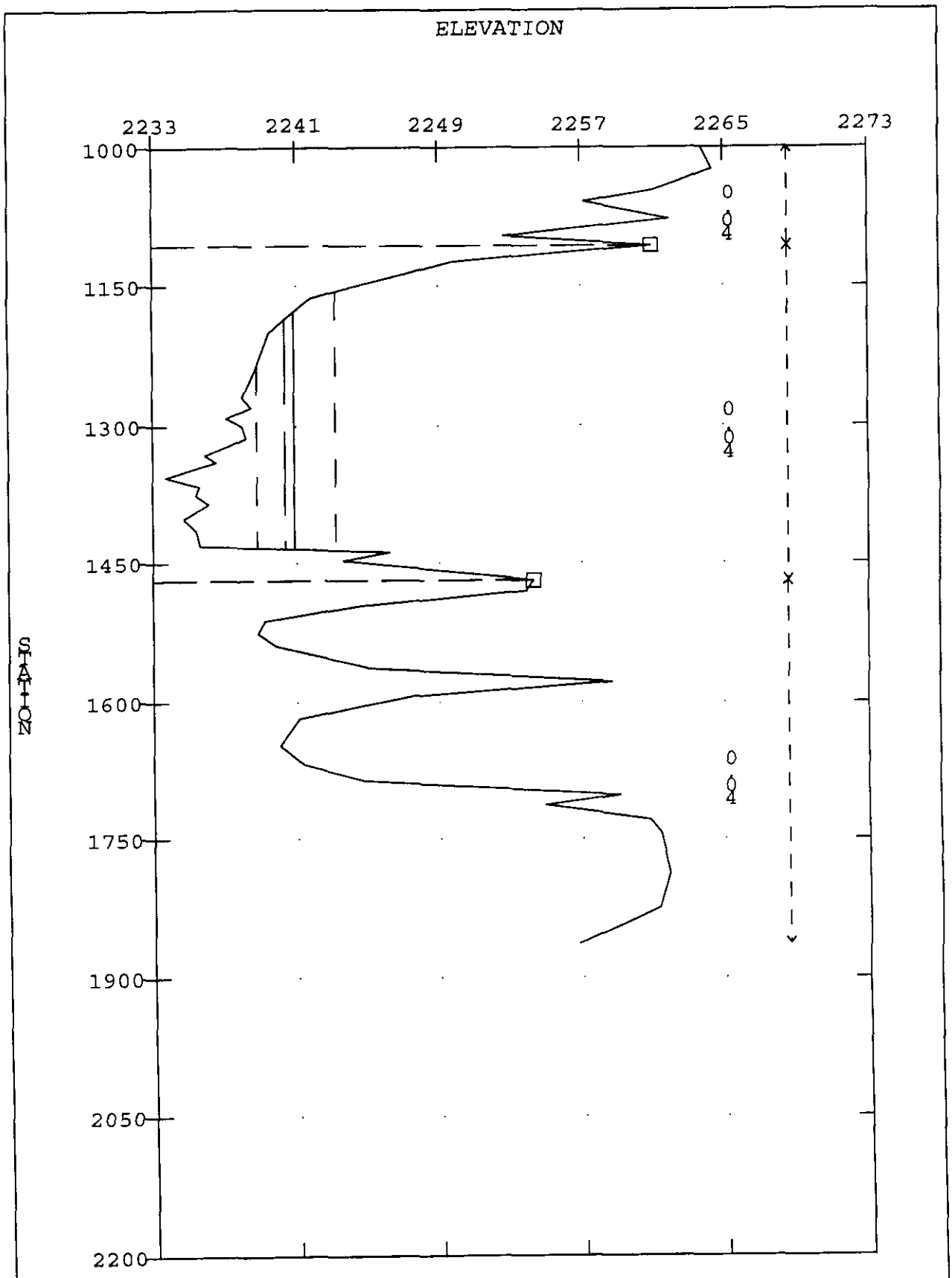
SECTION : 40616

MIDDLE NO. LAS VEGAS WASH



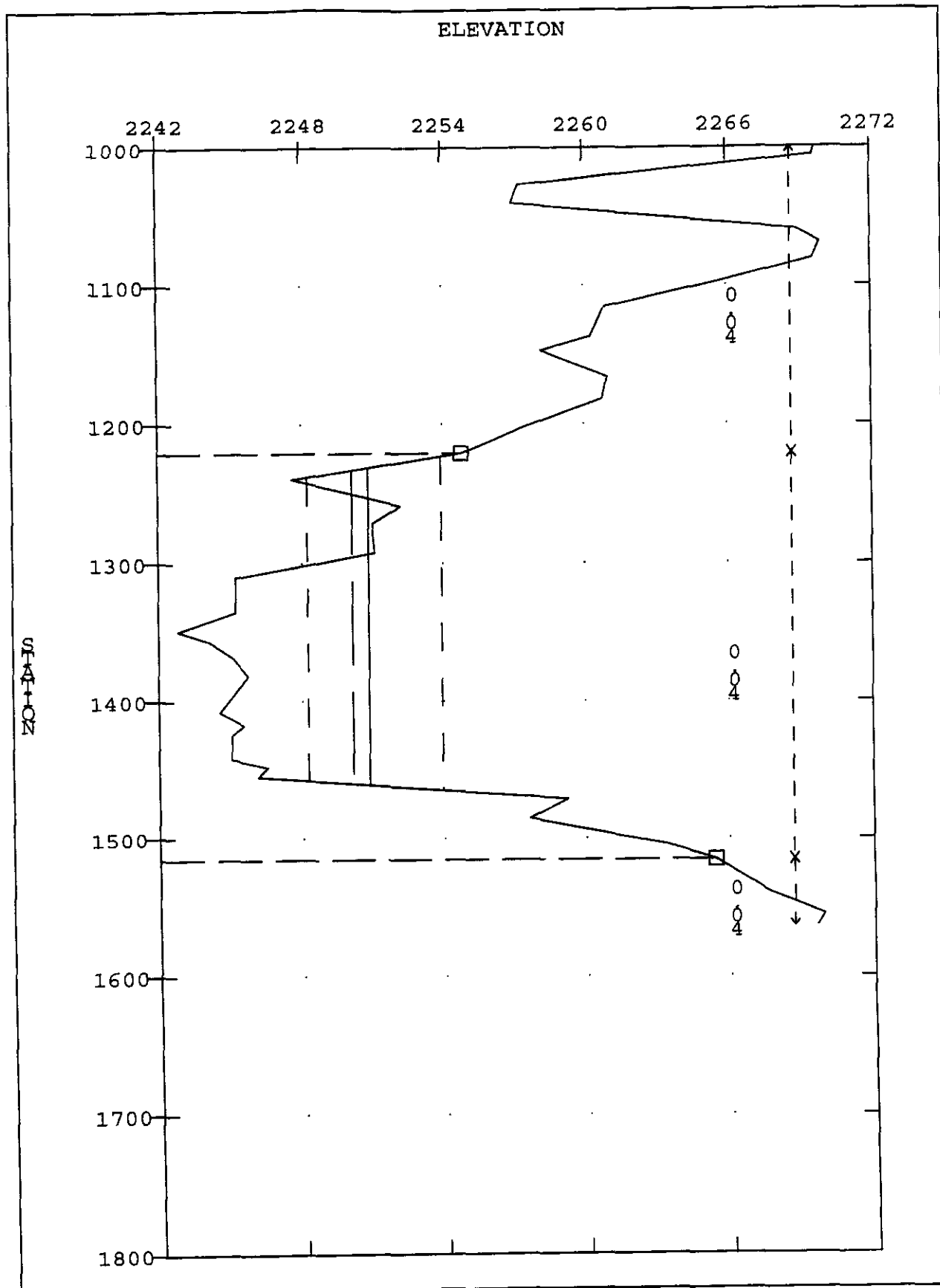
SECTION : 42138

MIDDLE NO. LAS VEGAS WASH



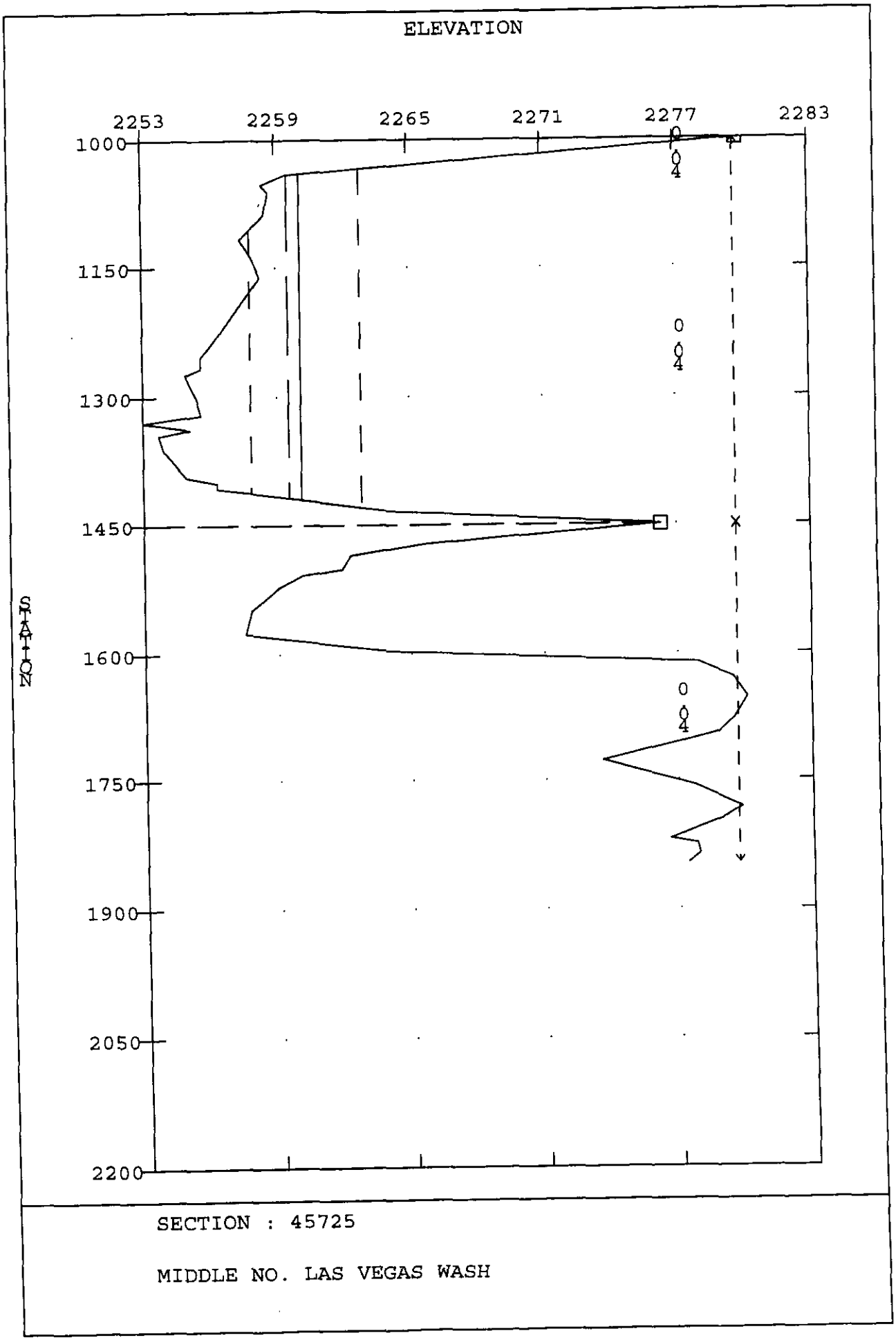
SECTION : 43231

MIDDLE NO. LAS VEGAS WASH



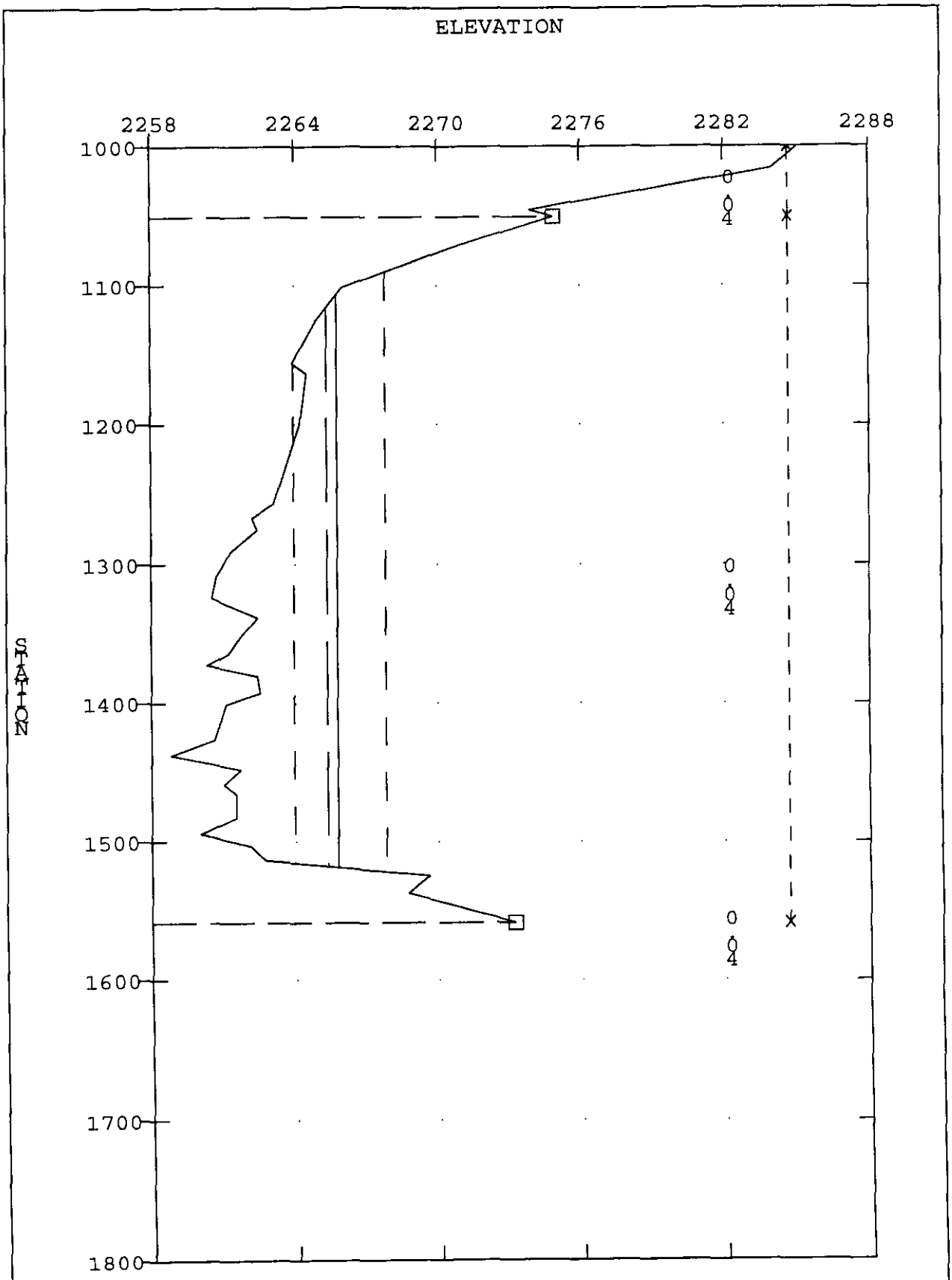
SECTION : 44345

MIDDLE NO. LAS VEGAS WASH



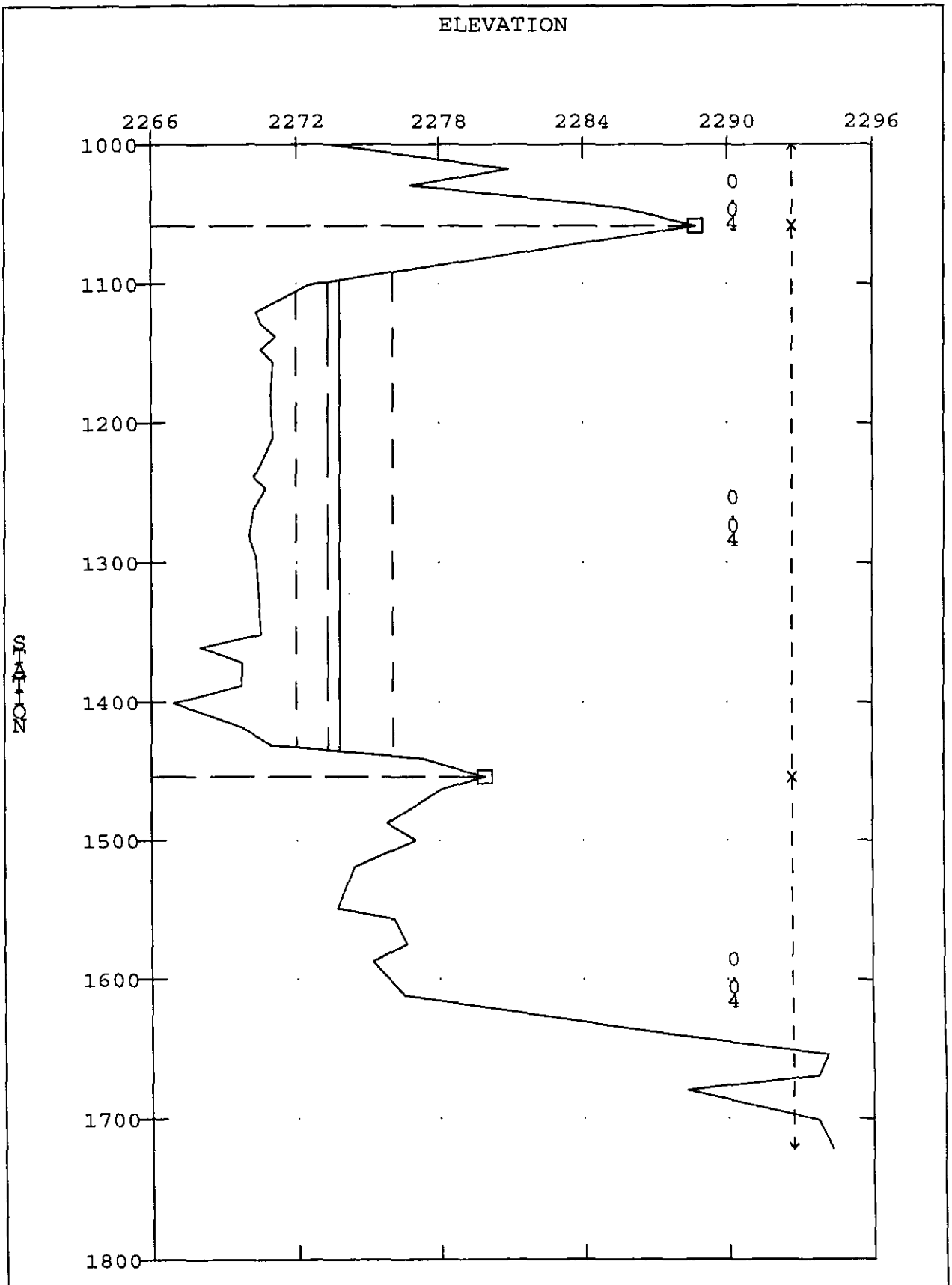
SECTION : 45725

MIDDLE NO. LAS VEGAS WASH



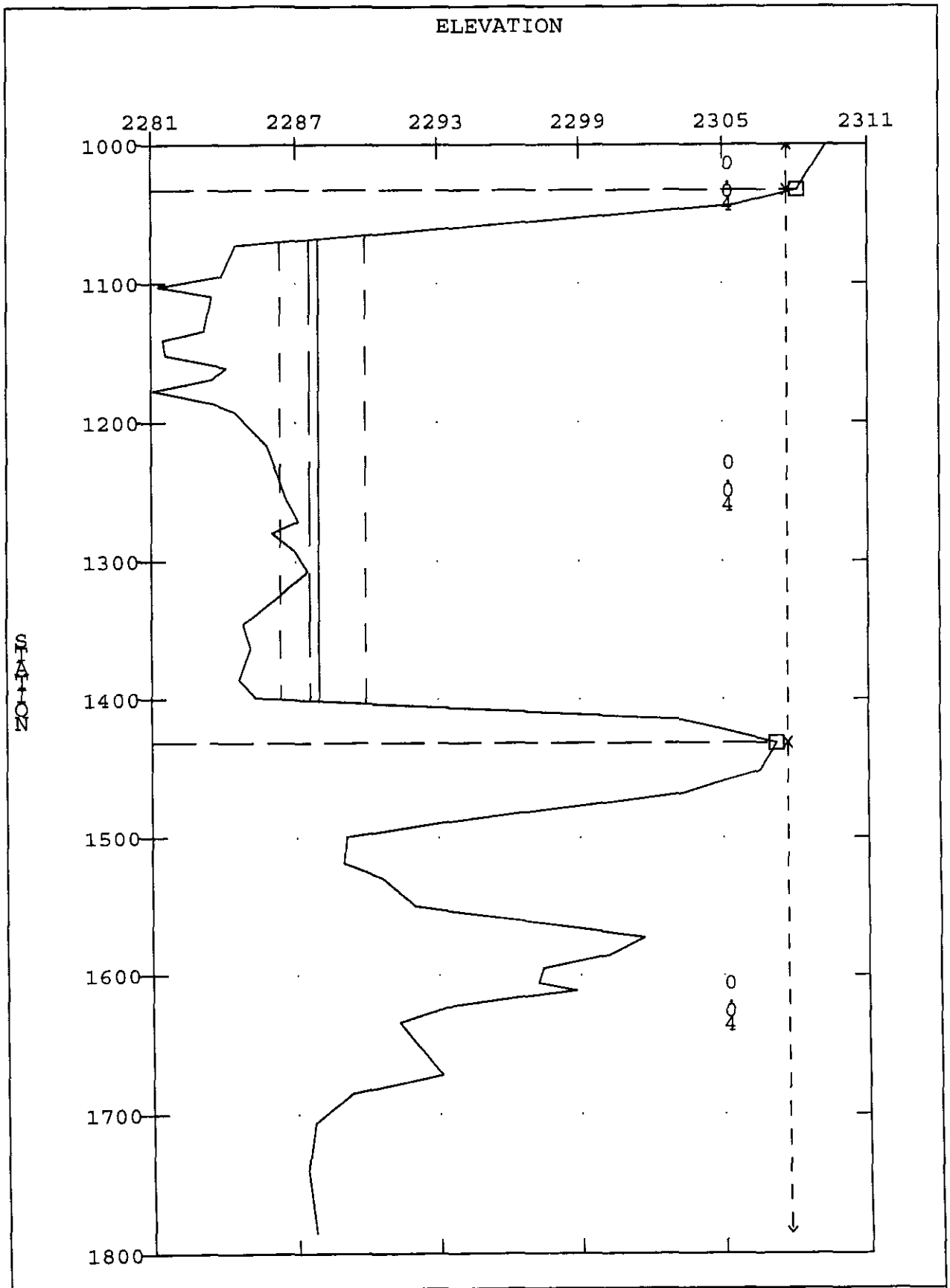
SECTION : 46746

MIDDLE NO. LAS VEGAS WASH



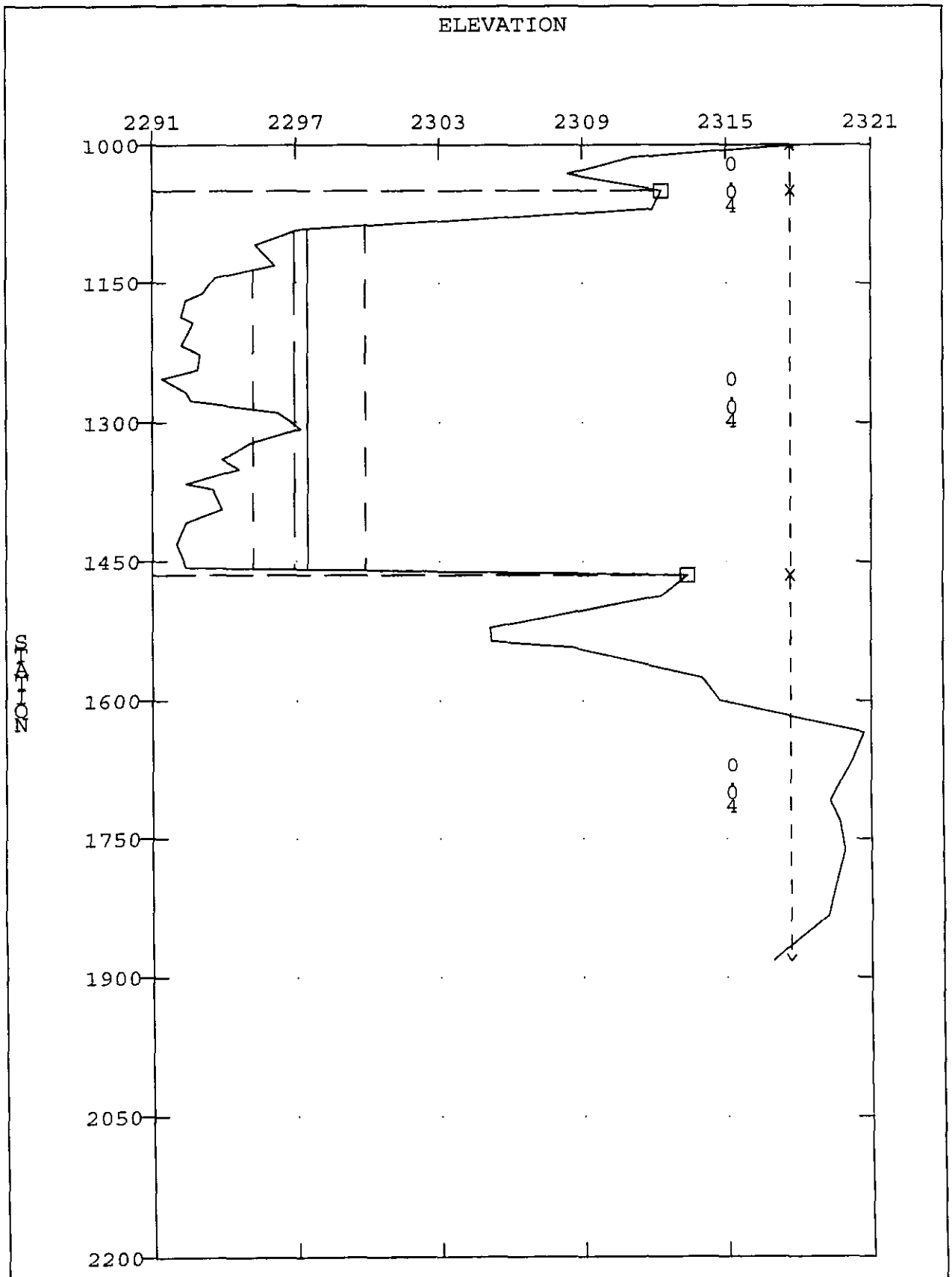
SECTION : 48046

MIDDLE NO. LAS VEGAS WASH



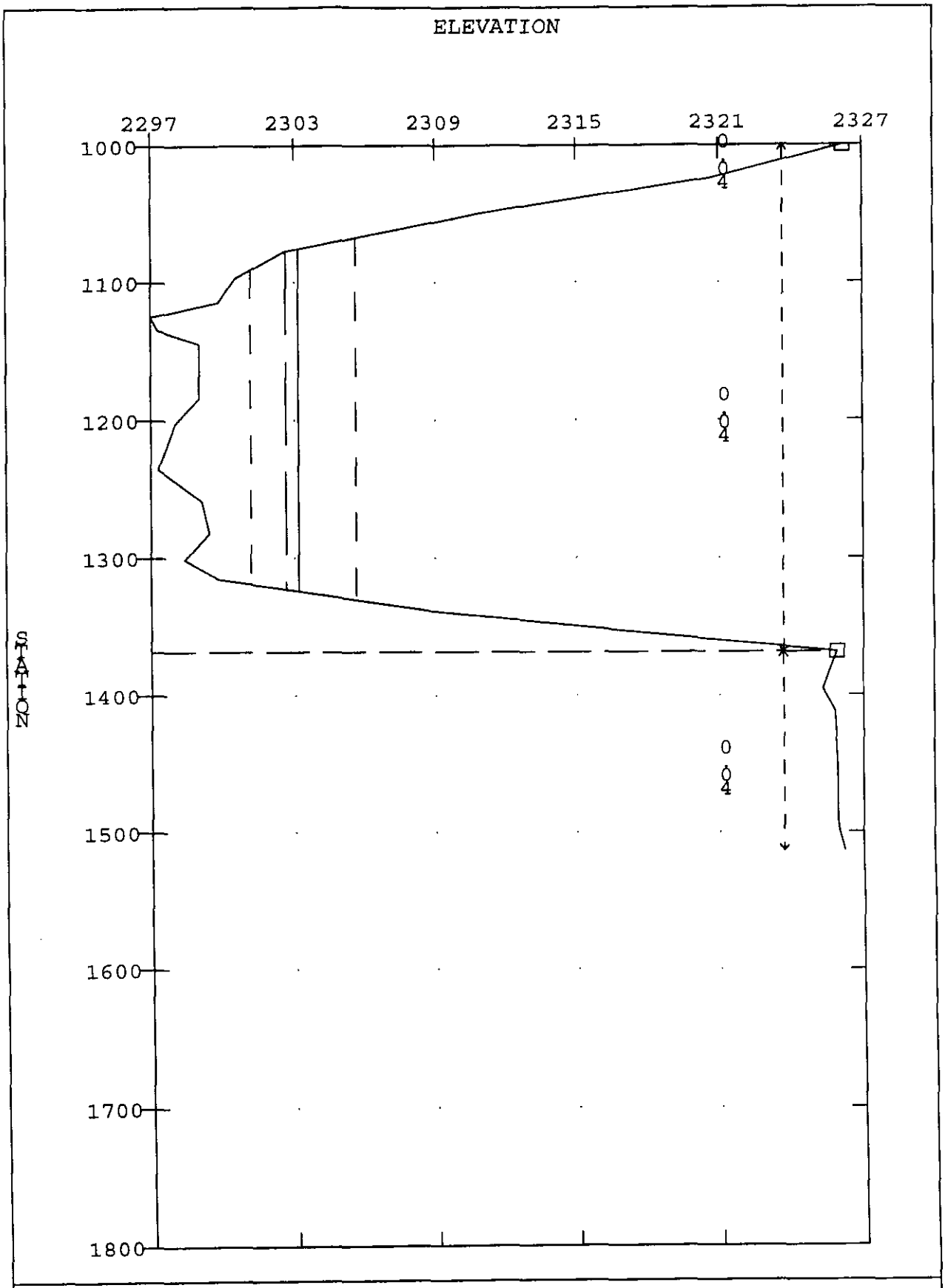
SECTION : 49654

MIDDLE NO. LAS VEGAS WASH



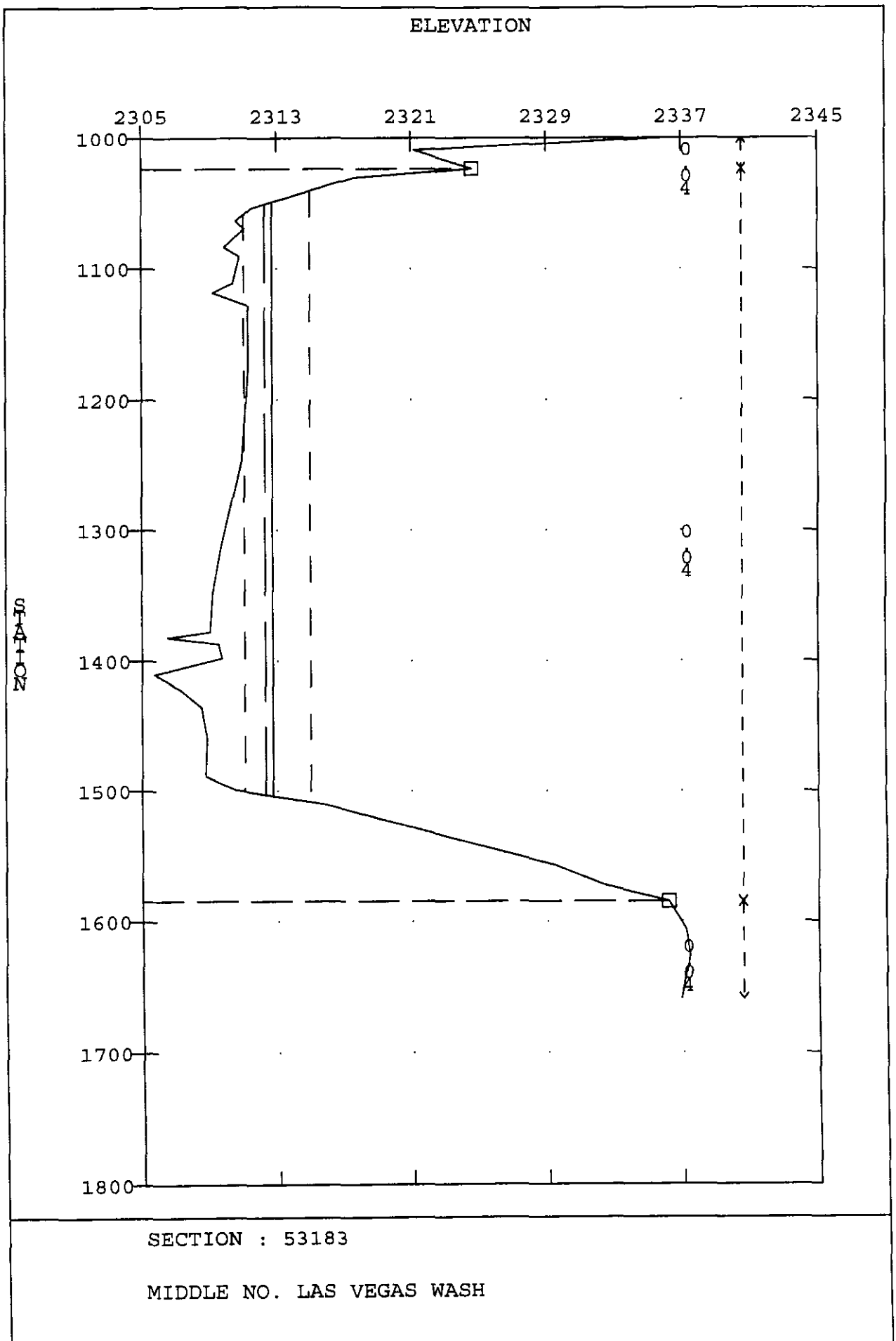
SECTION : 50964

MIDDLE NO. LAS VEGAS WASH



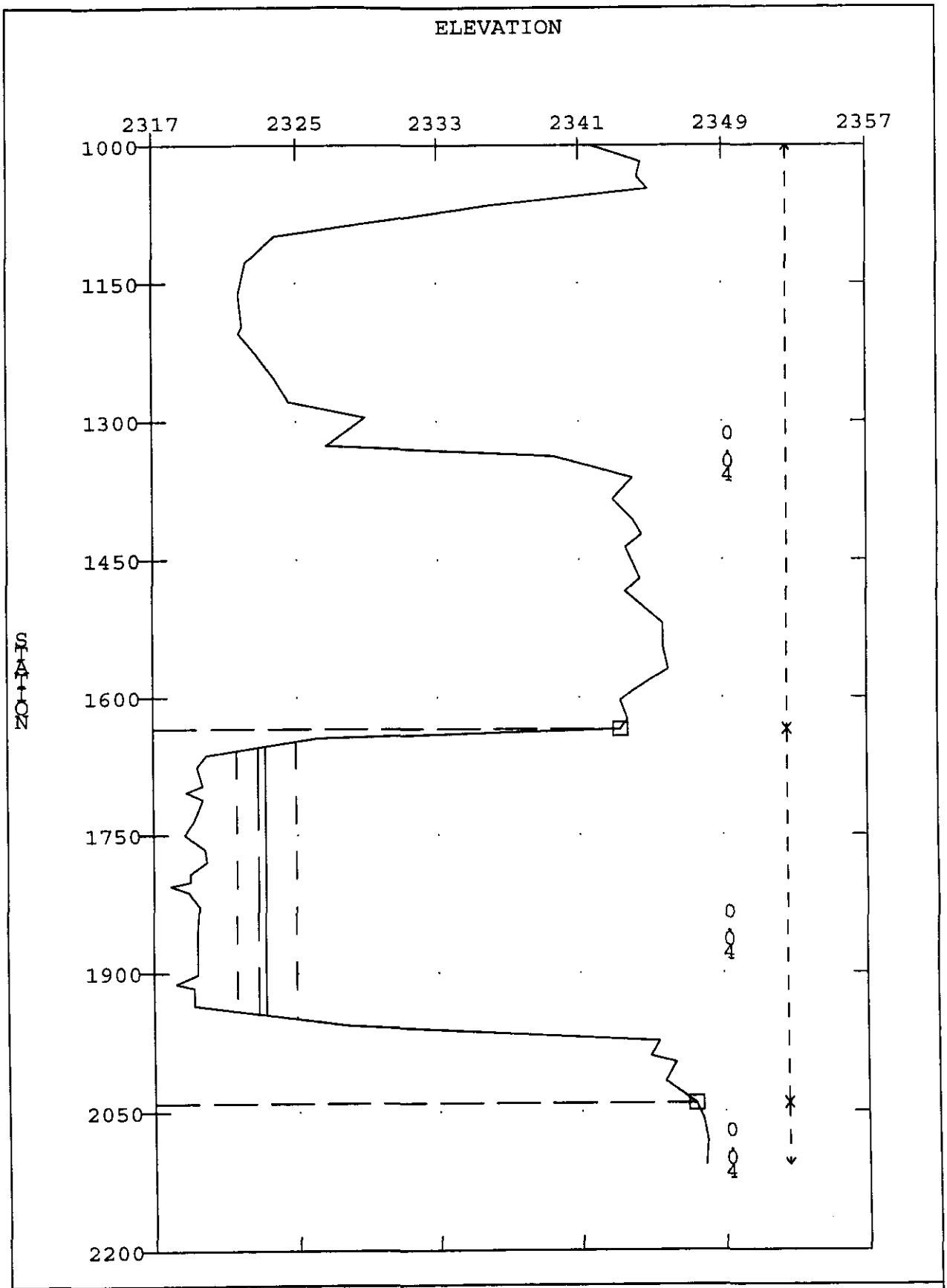
SECTION : 52020

MIDDLE NO. LAS VEGAS WASH



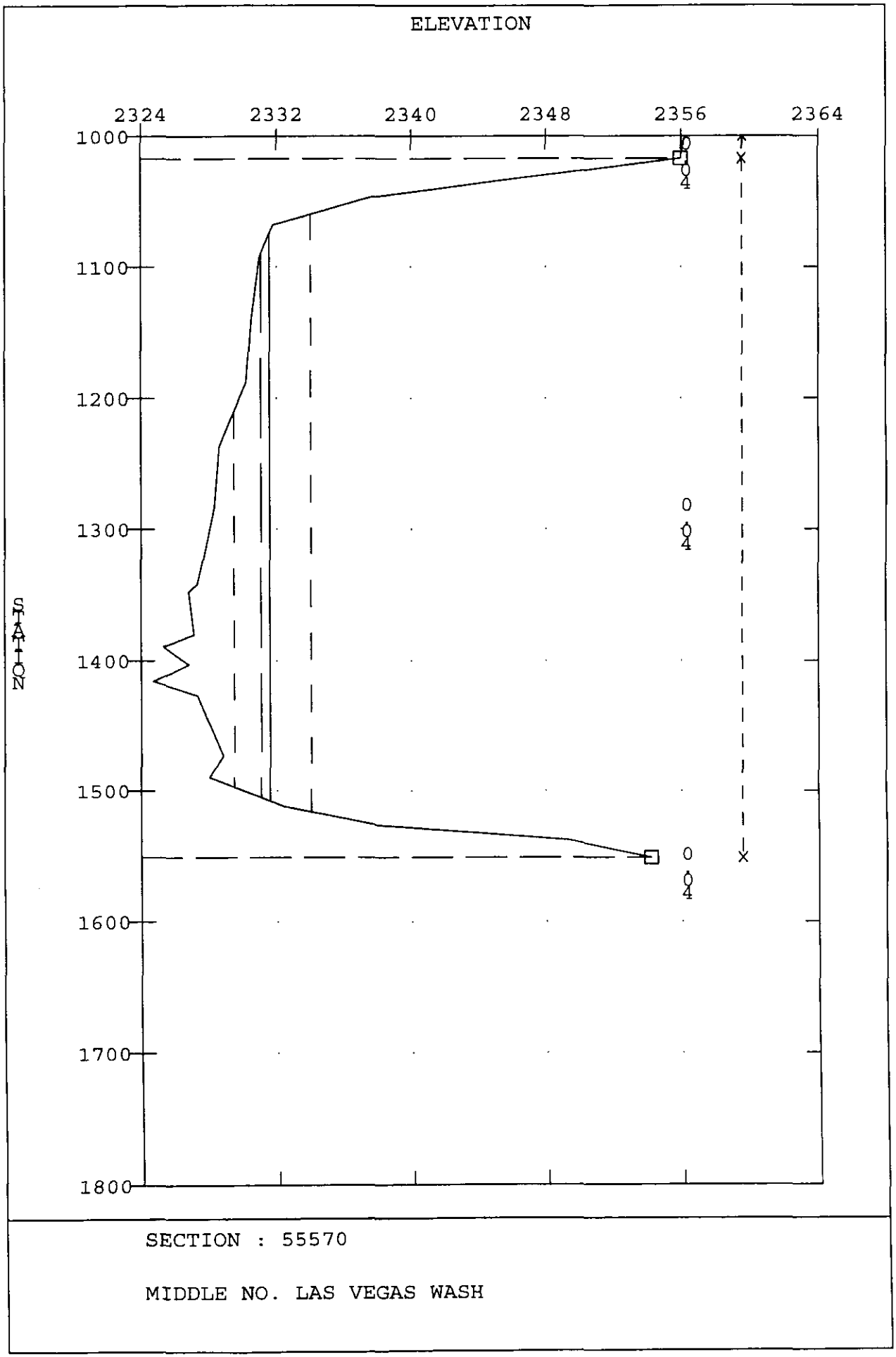
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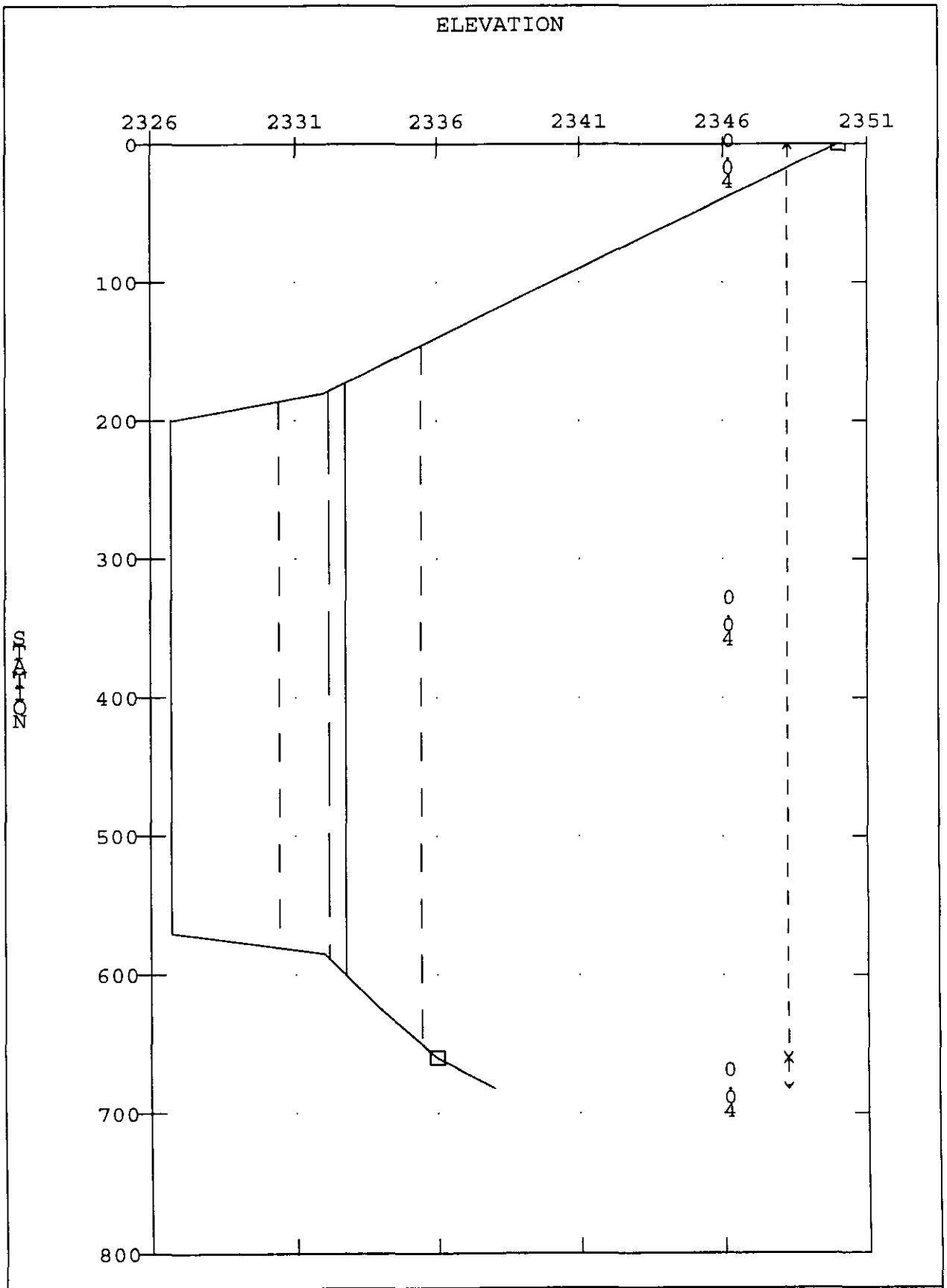
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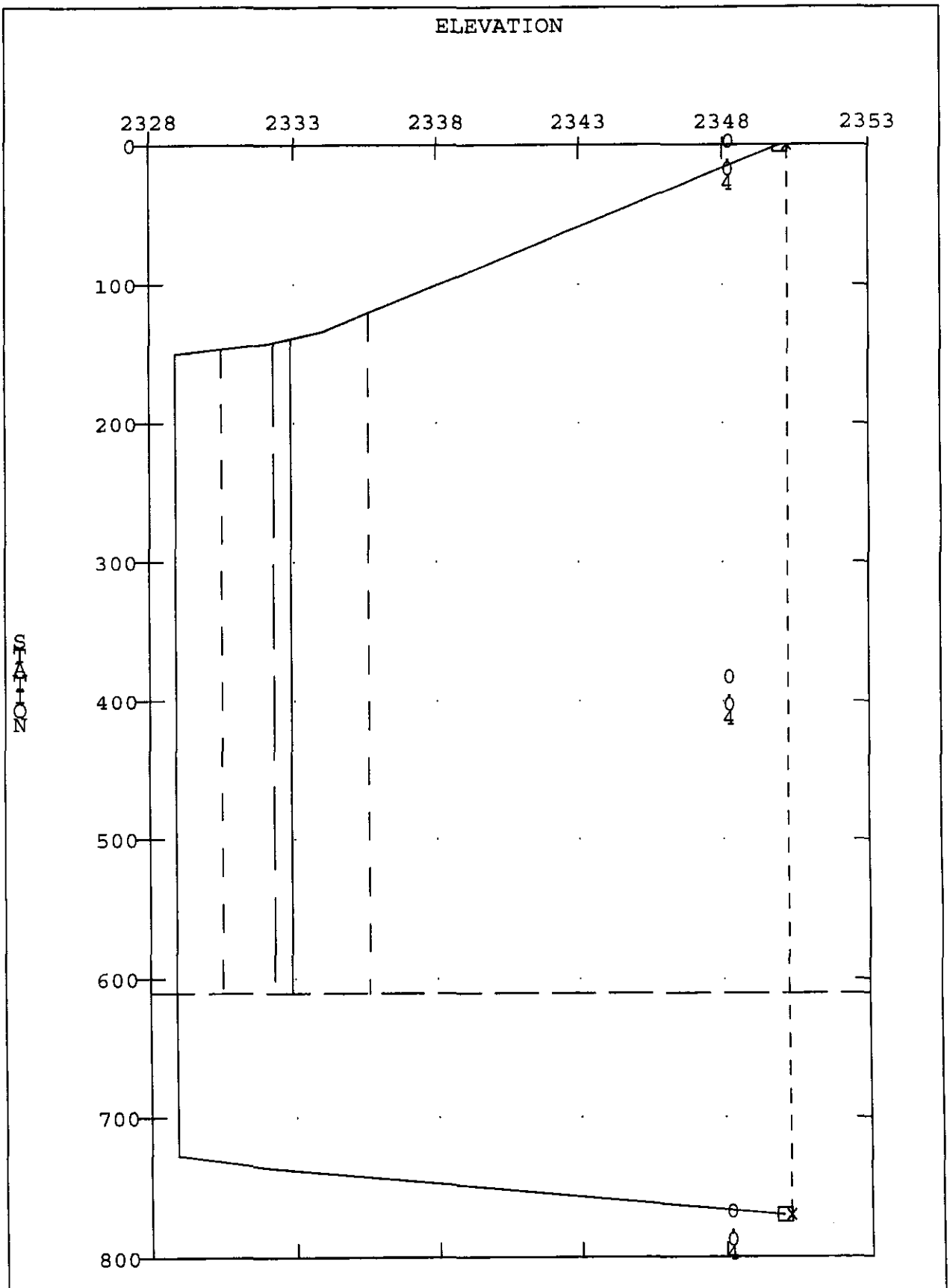
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2340
2348
2356
2364
1000
1100
1200
1300
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1500
1600
1700
1800
STATION
SECTION : 55570
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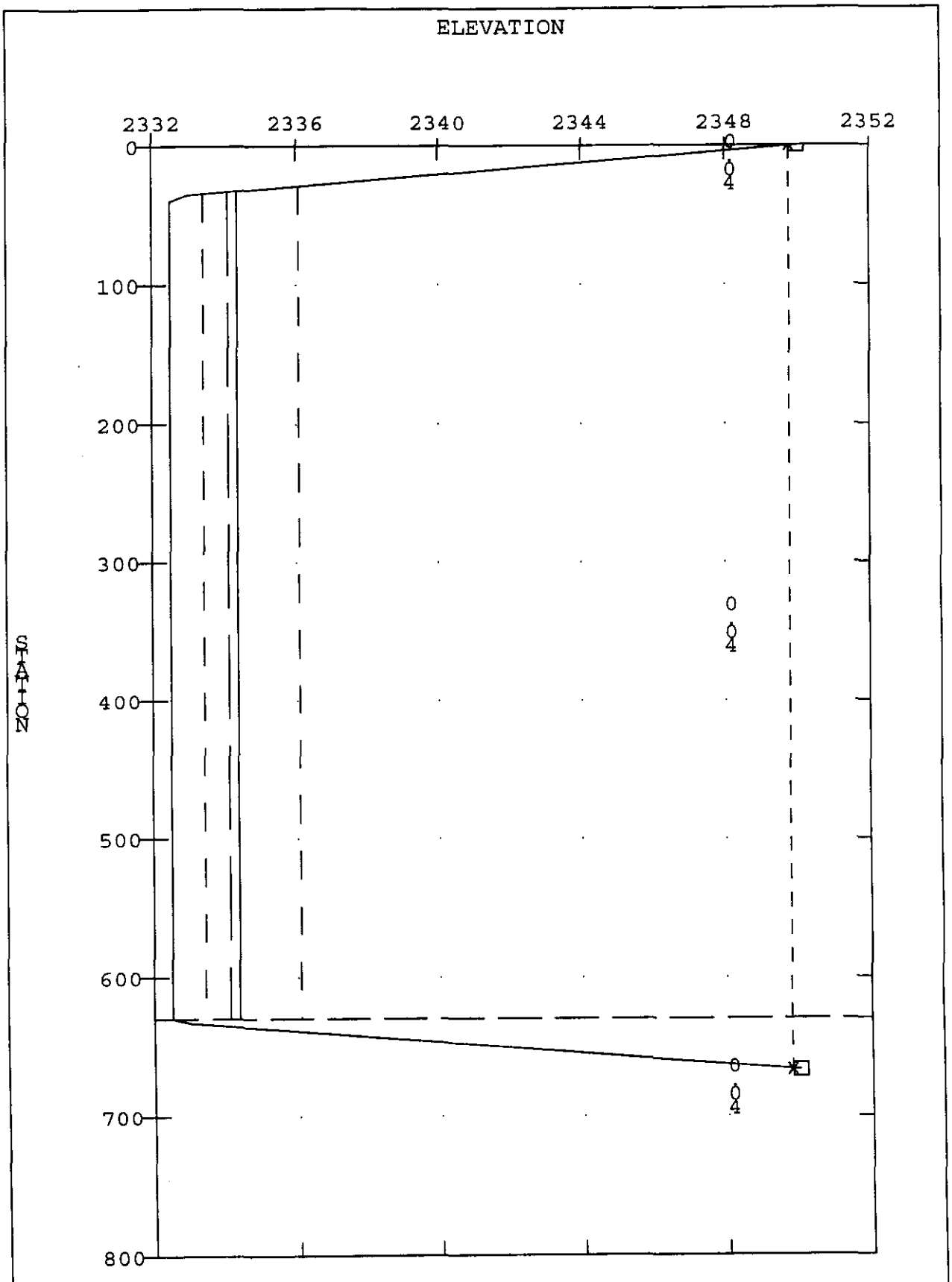
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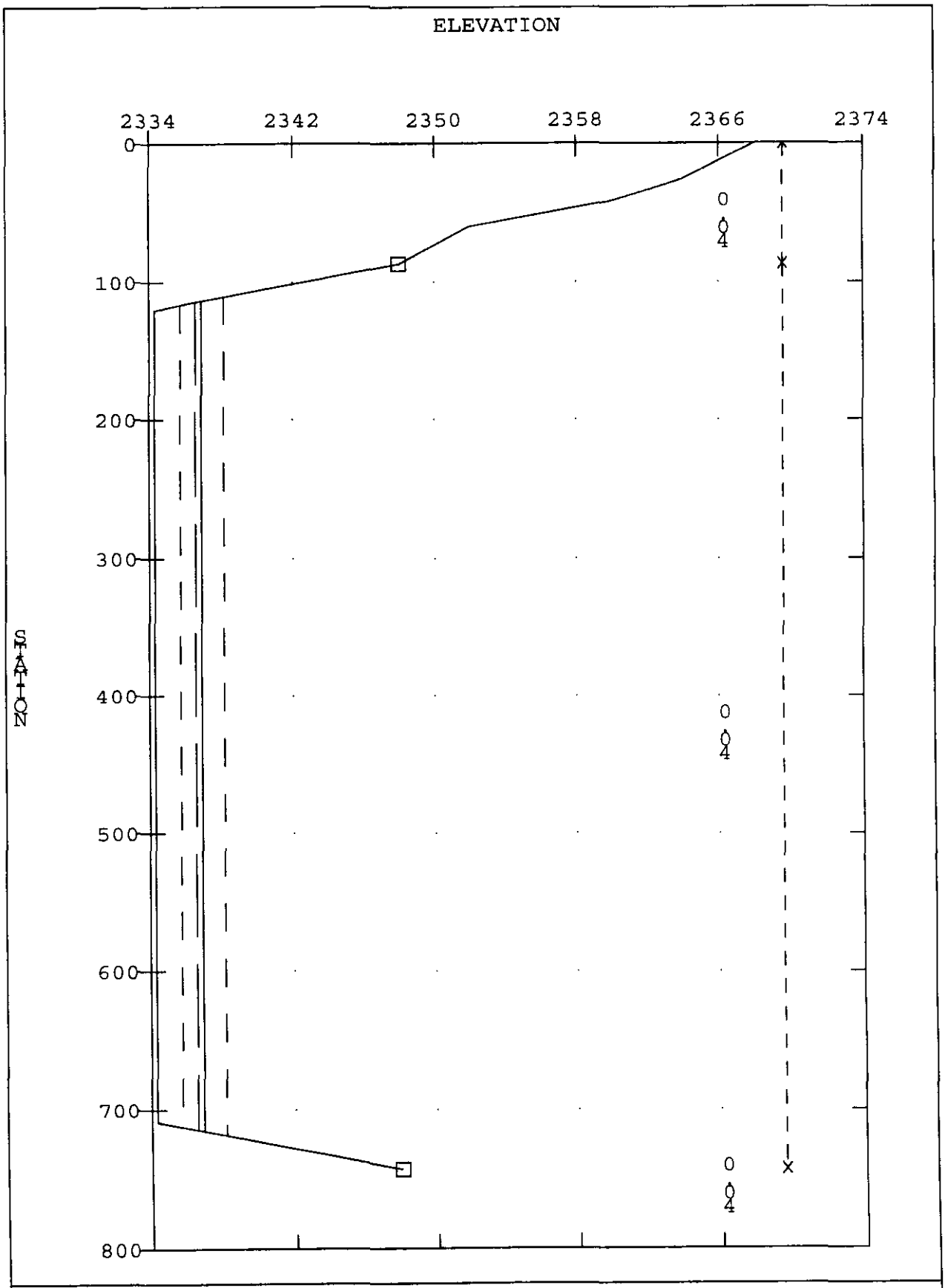
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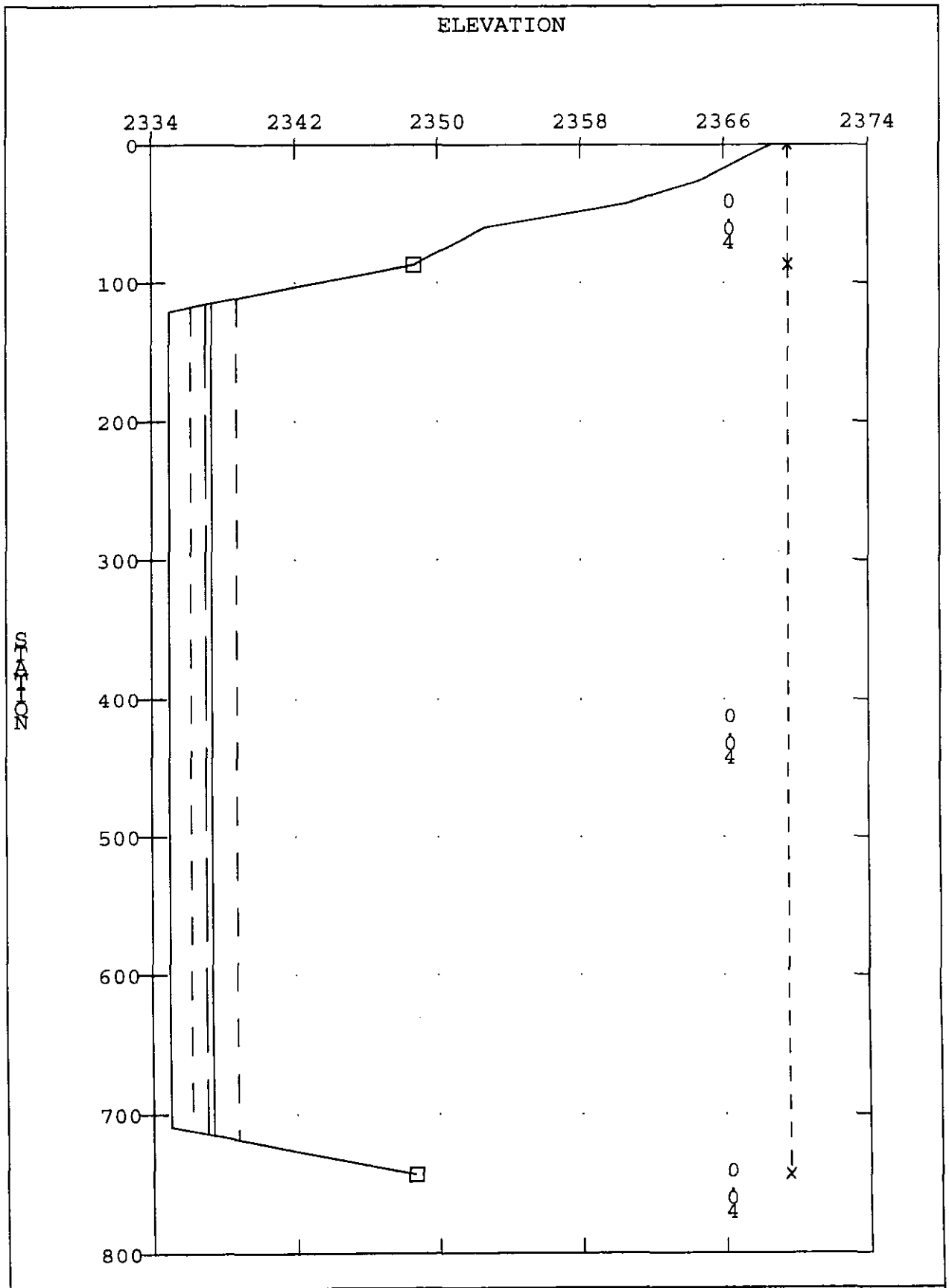
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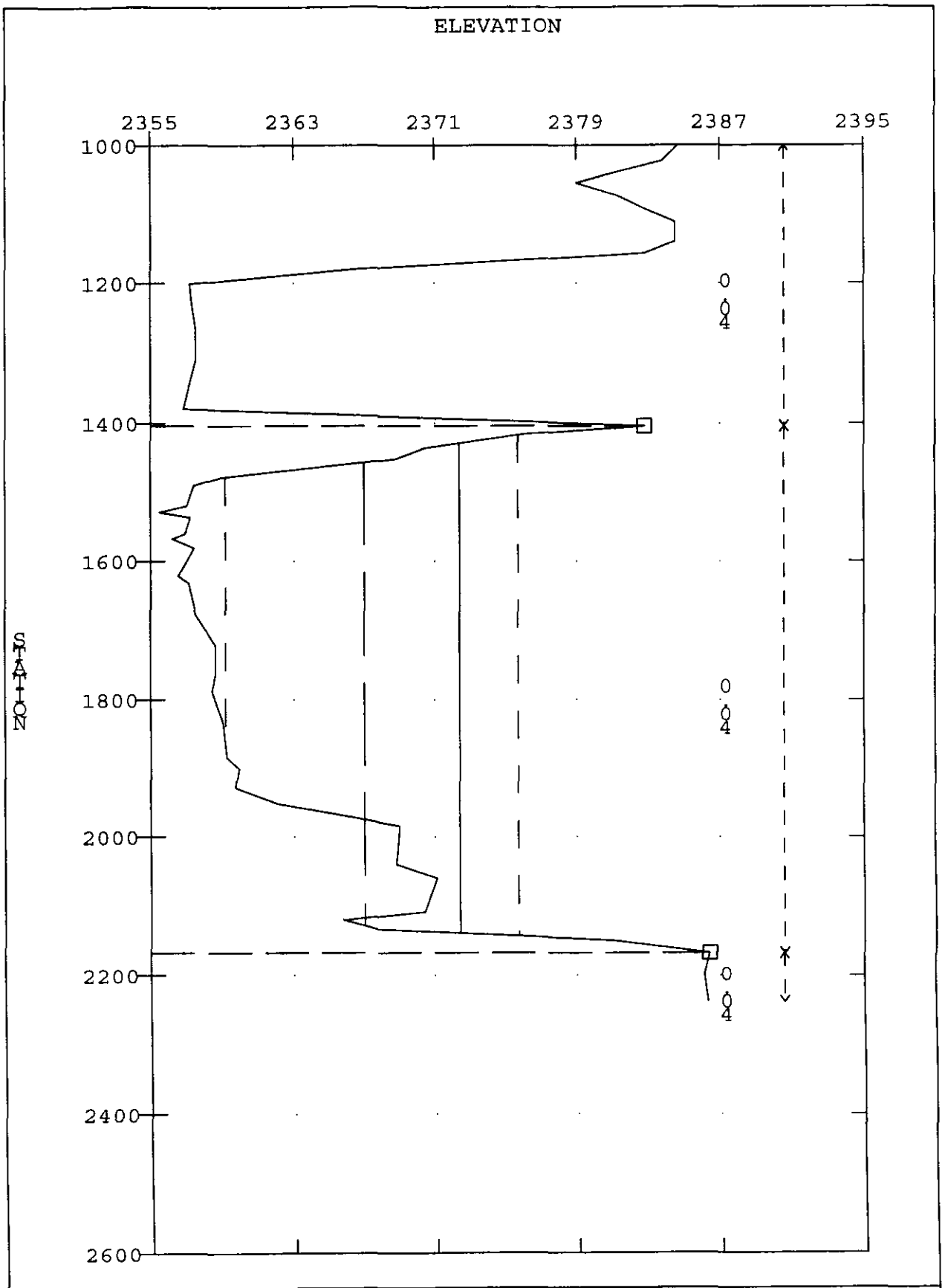
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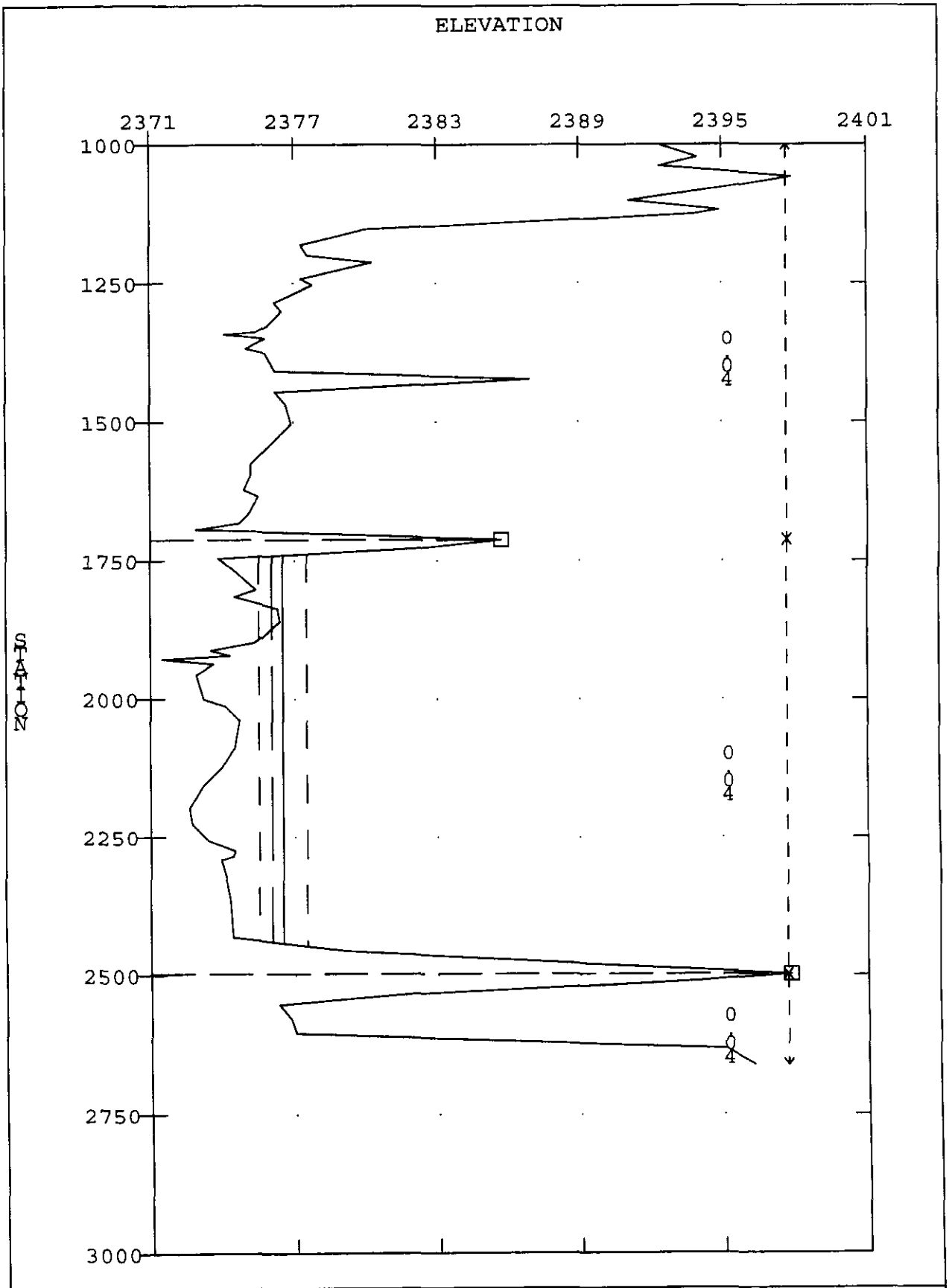
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Cross Section Plots
ULCDV5



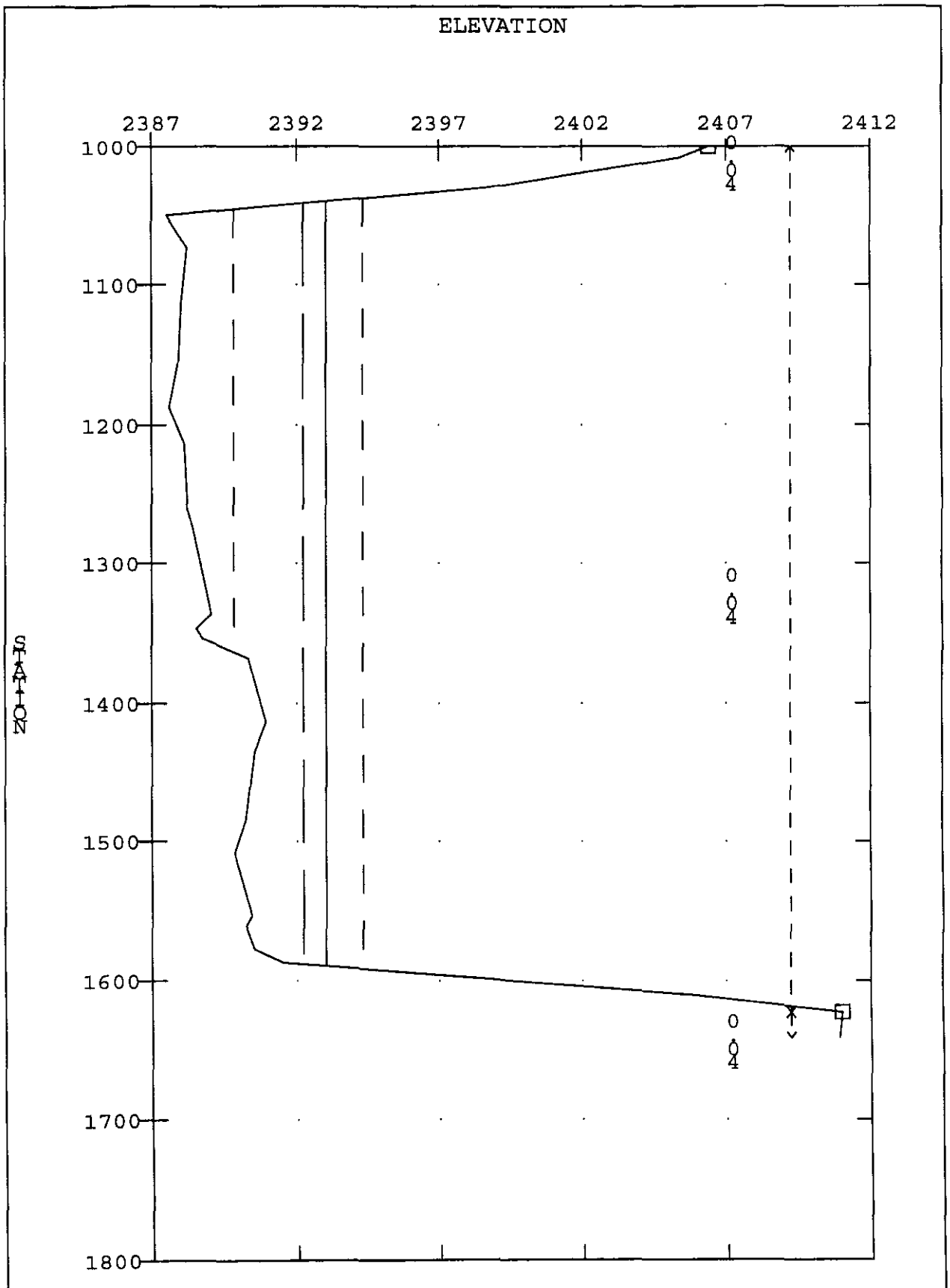
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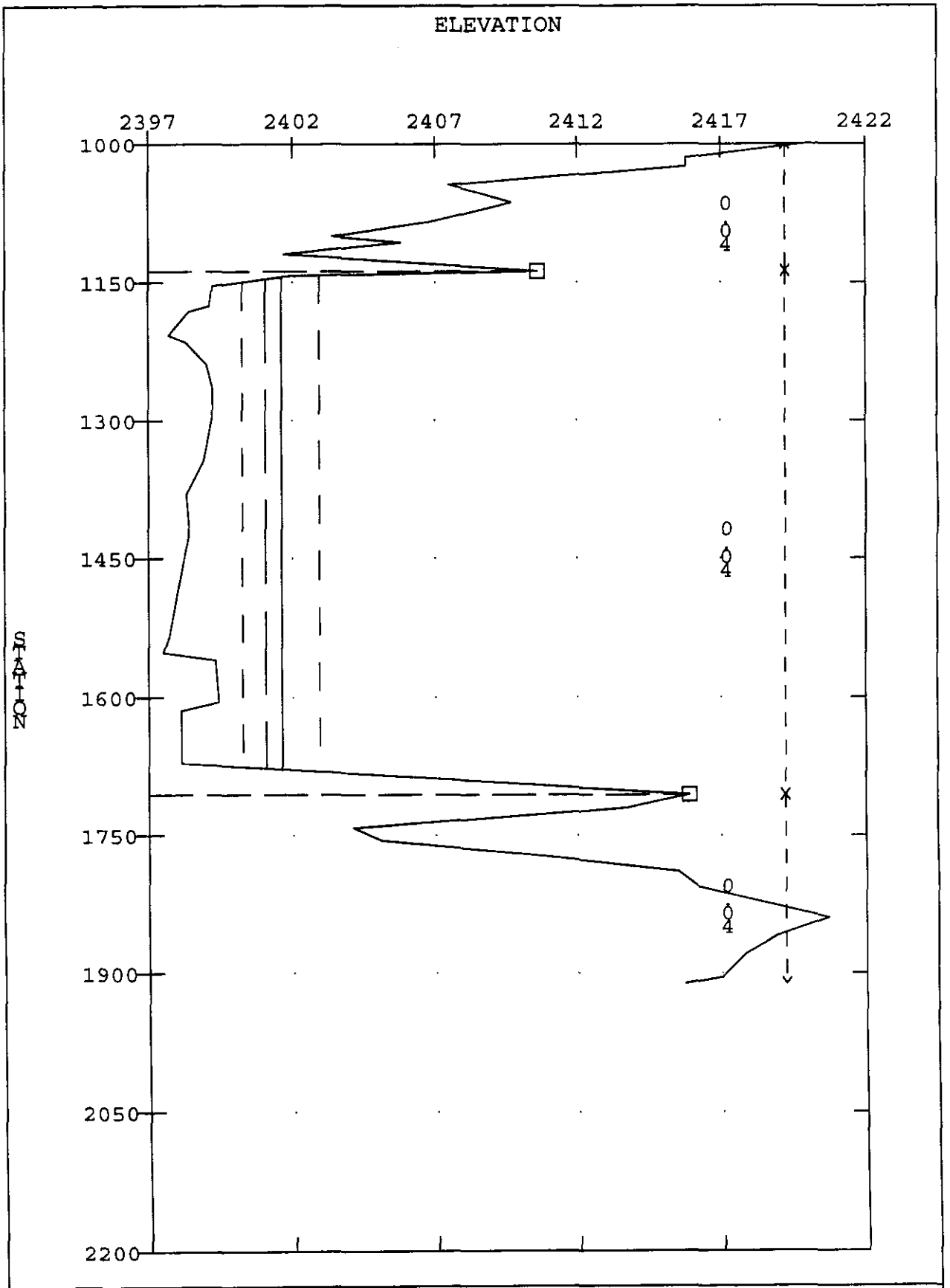
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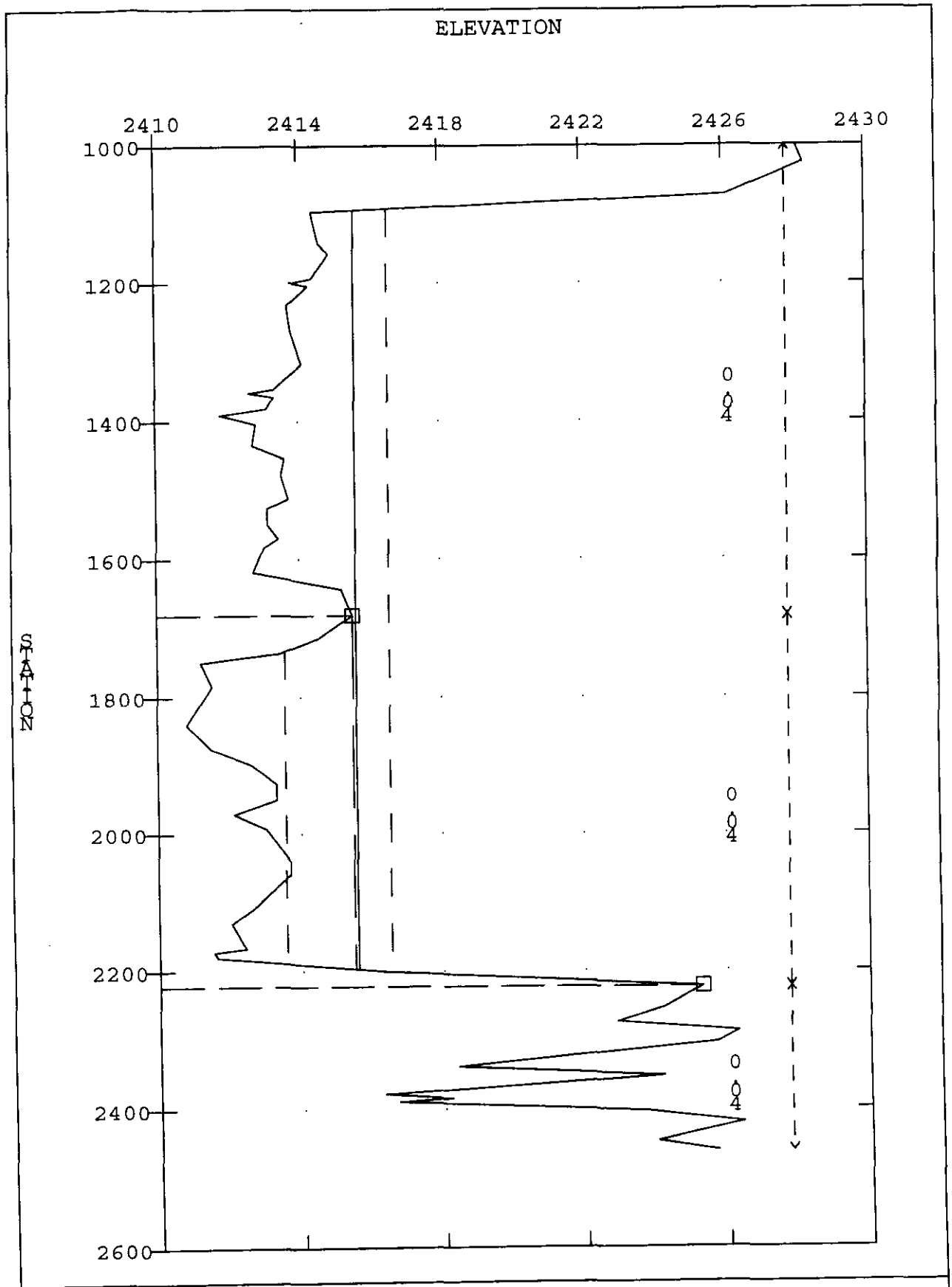
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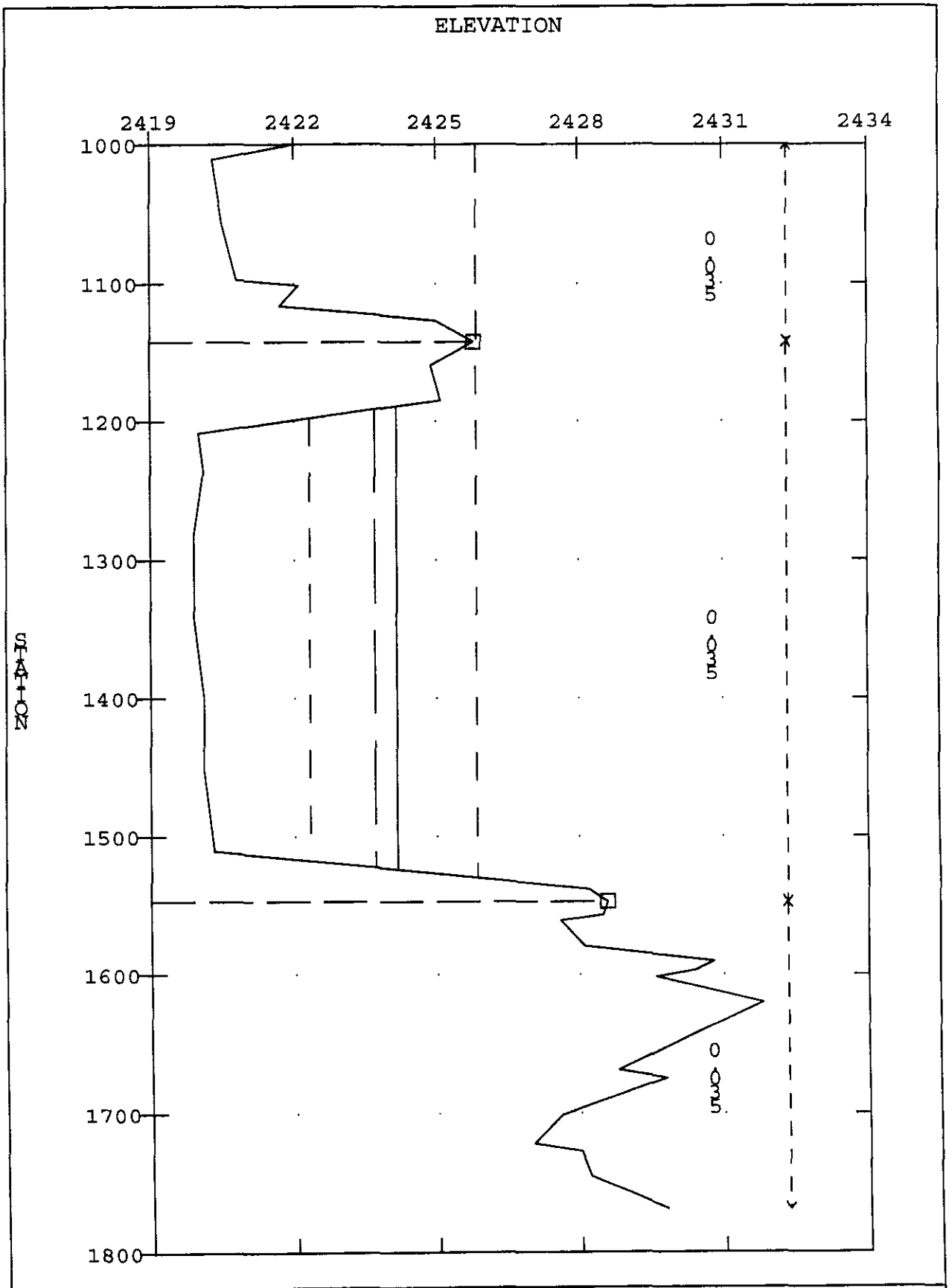
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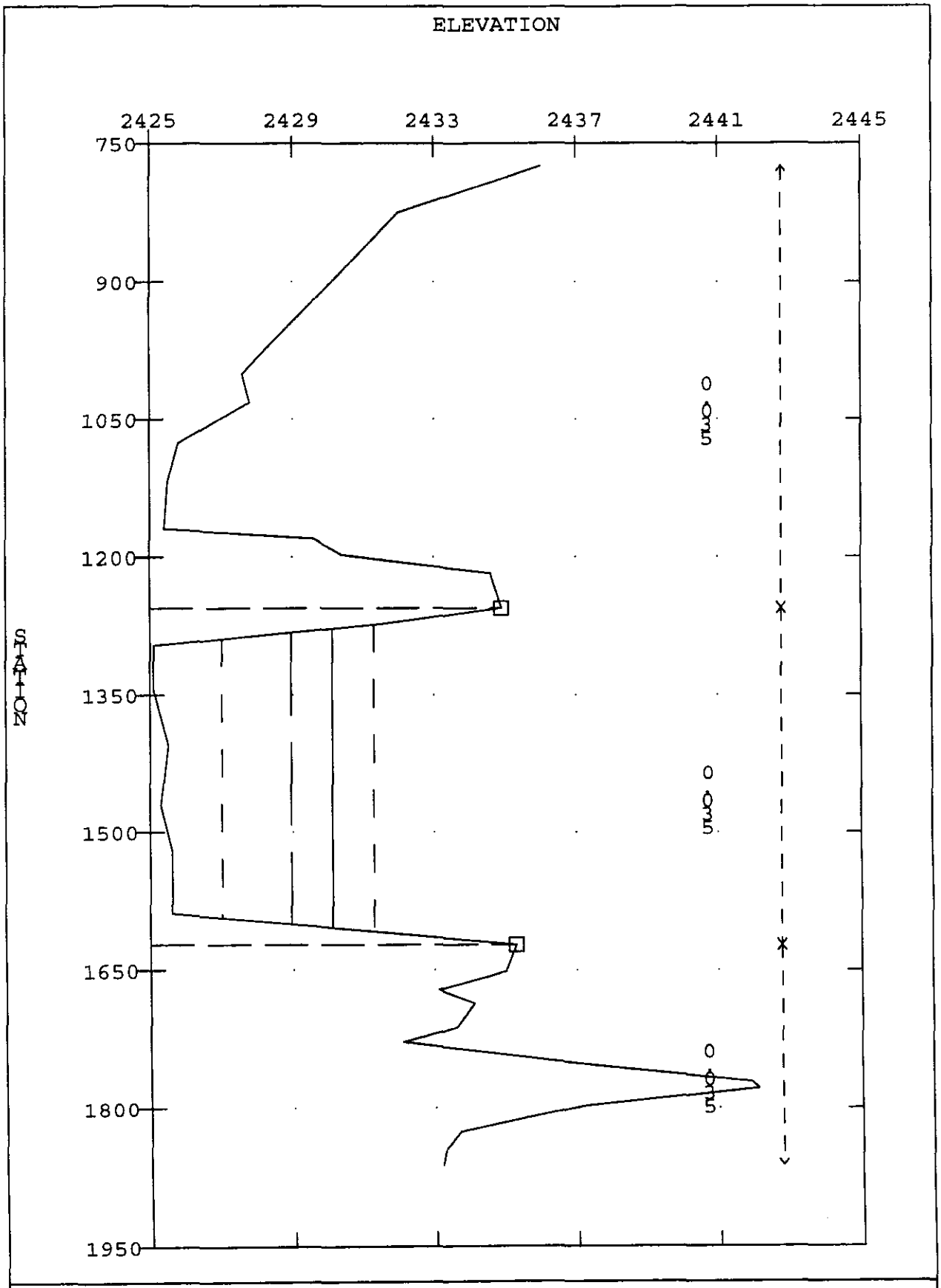
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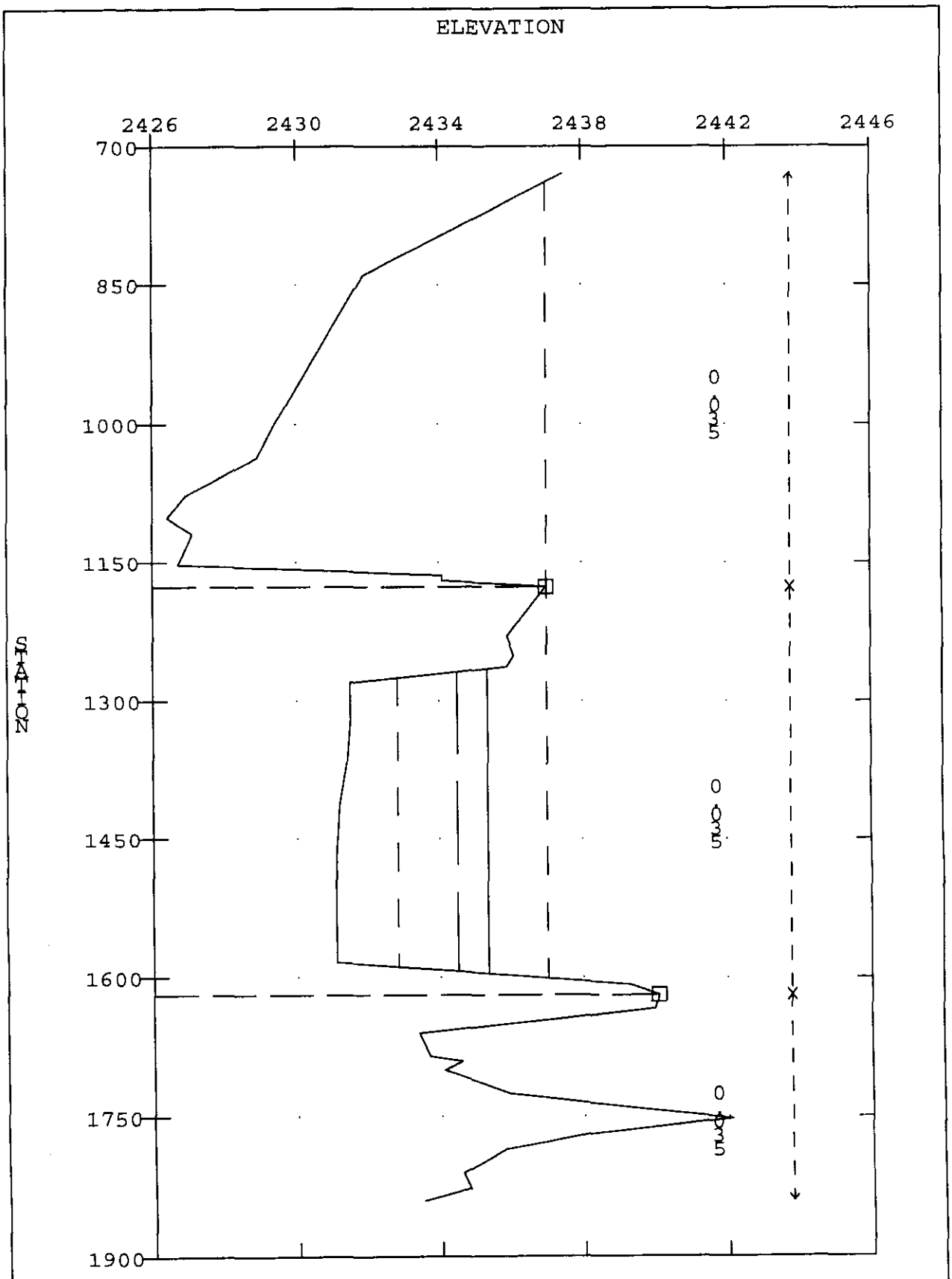
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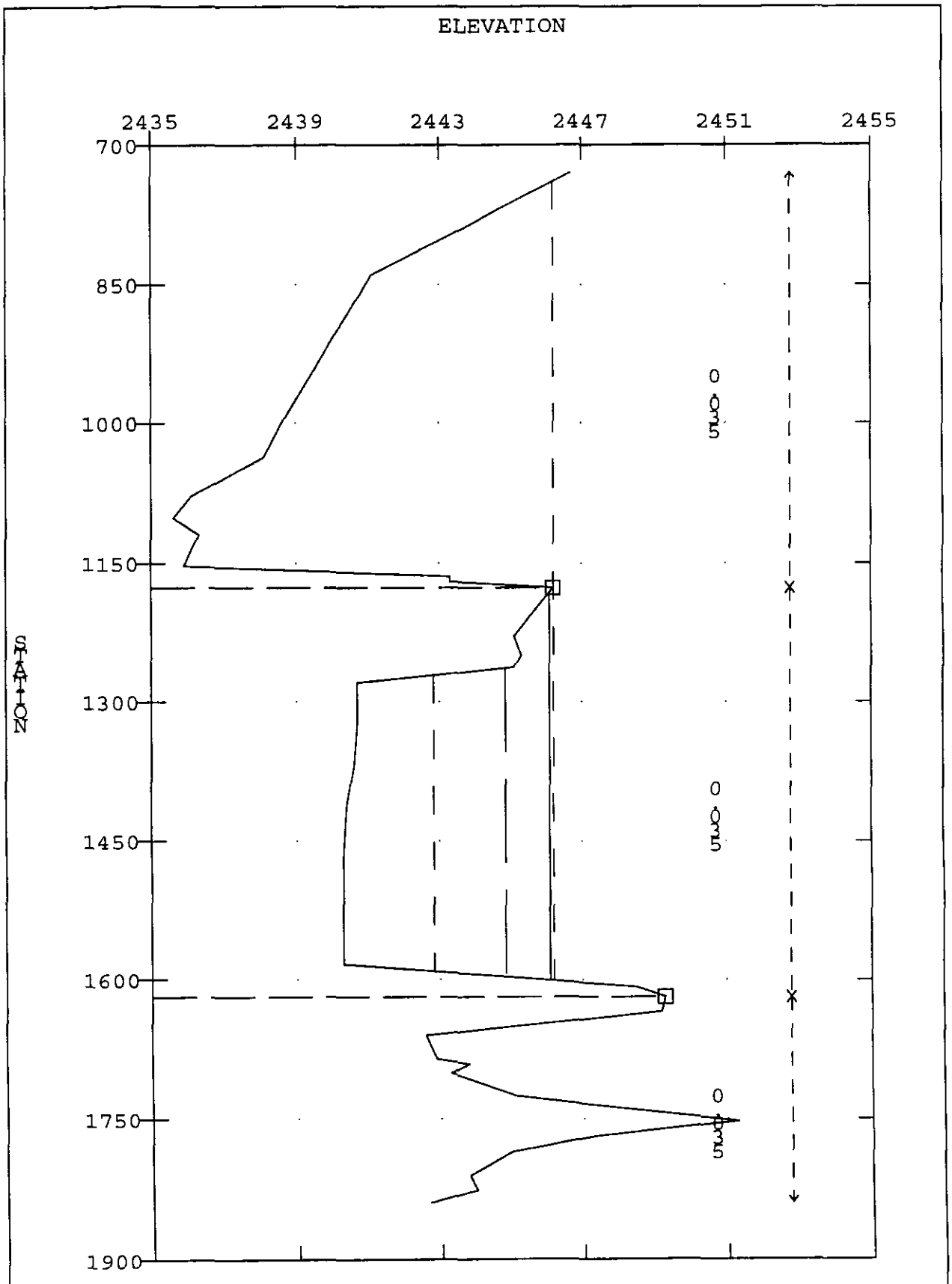
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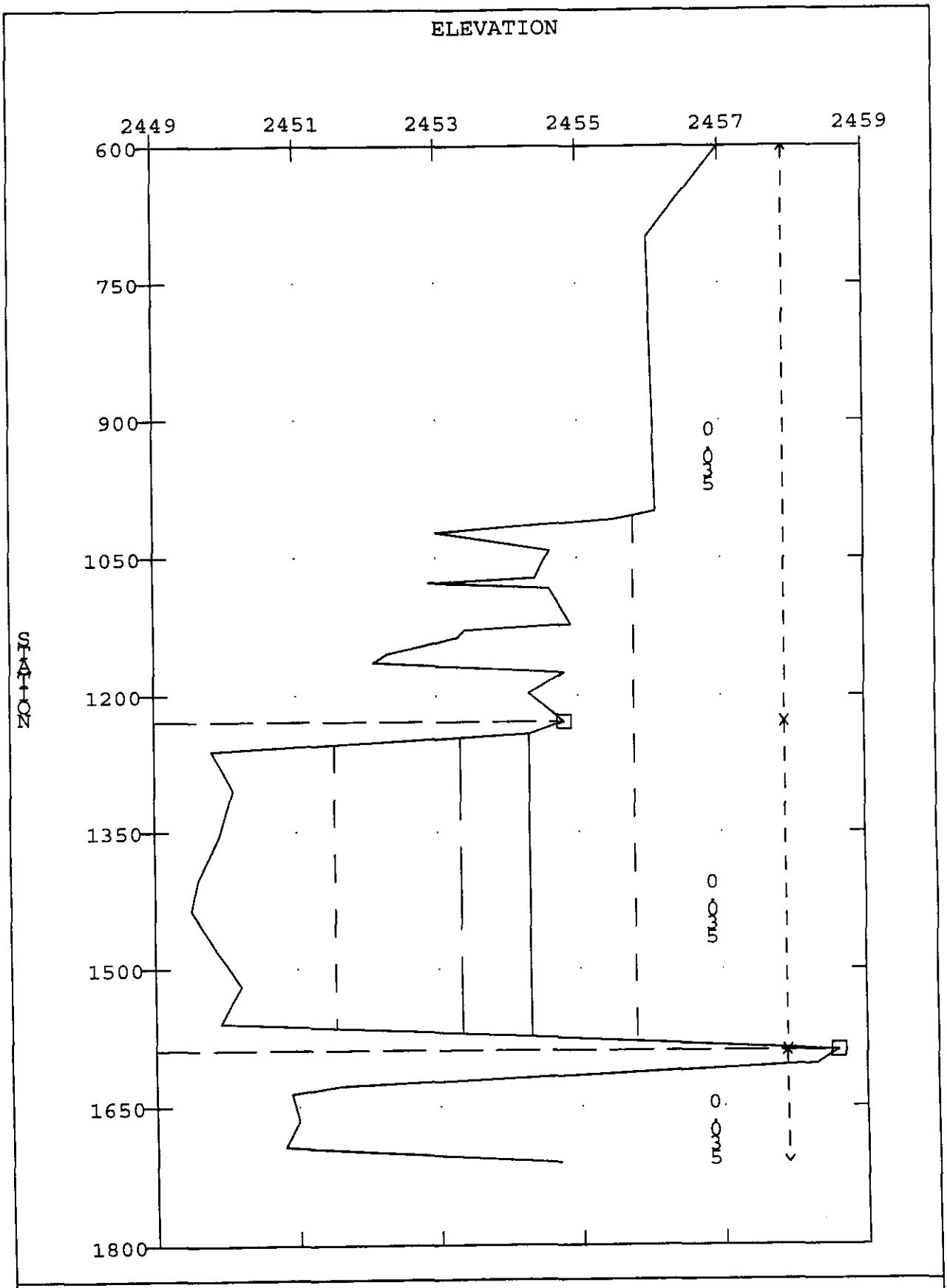
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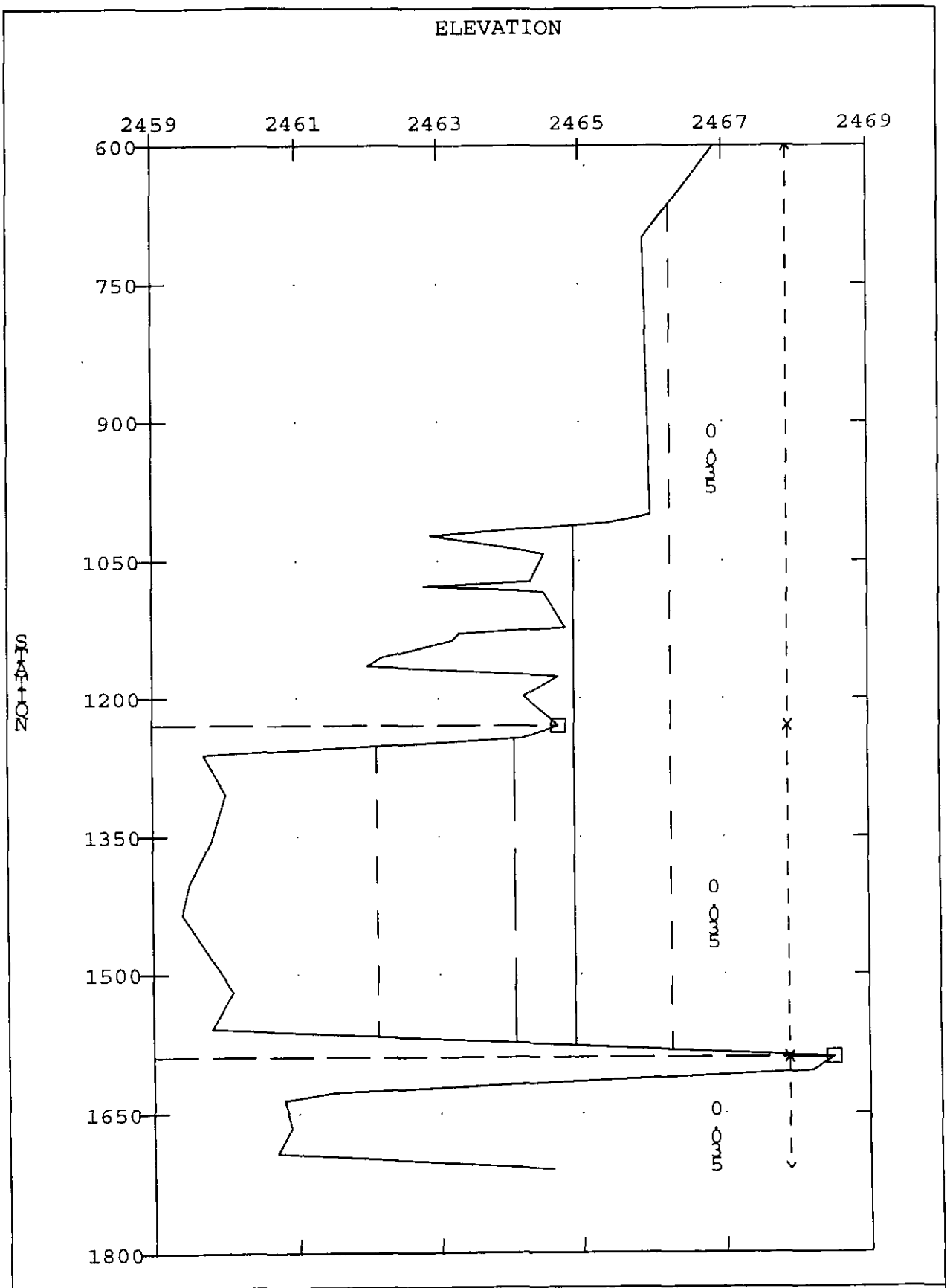
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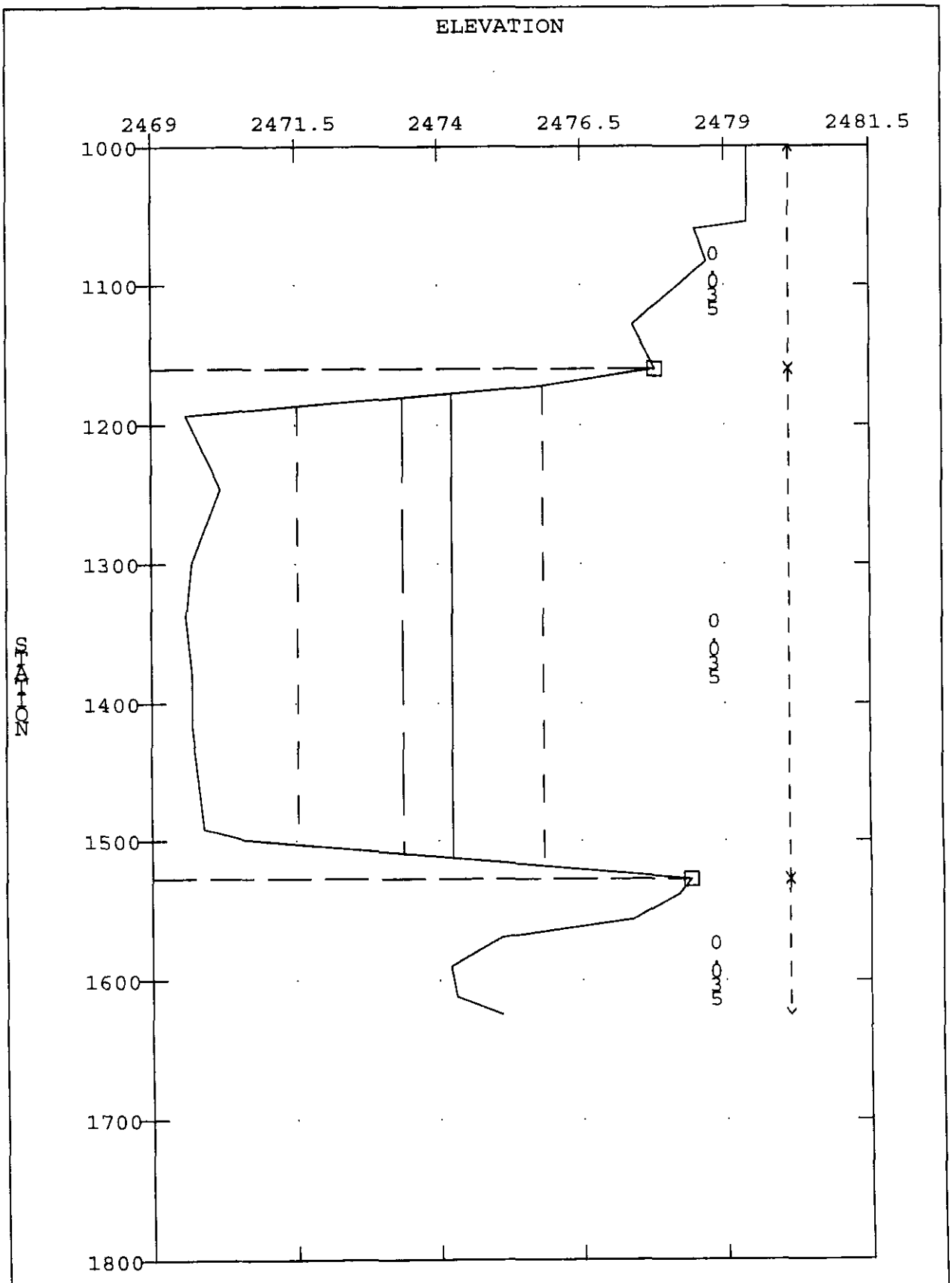
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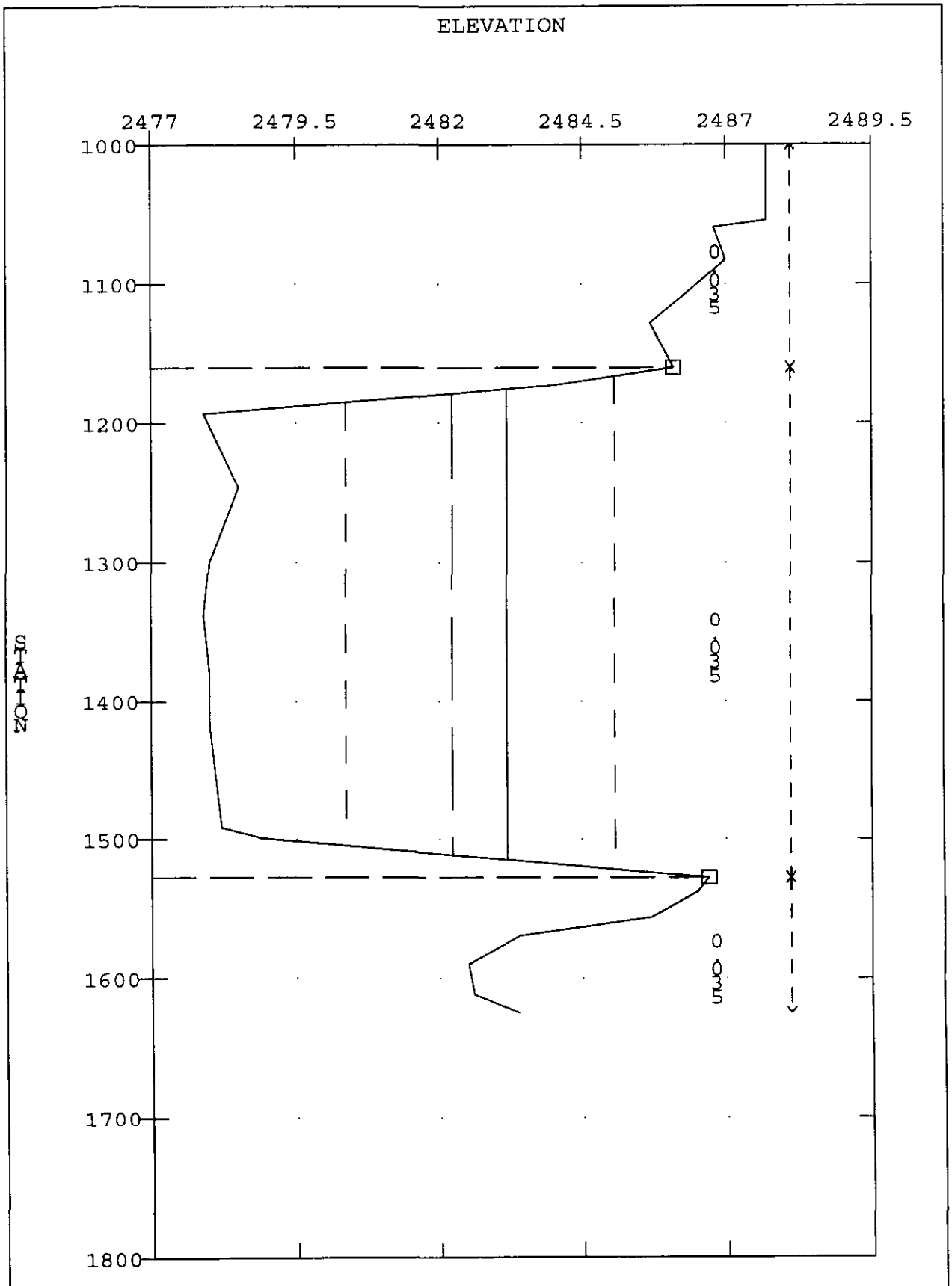
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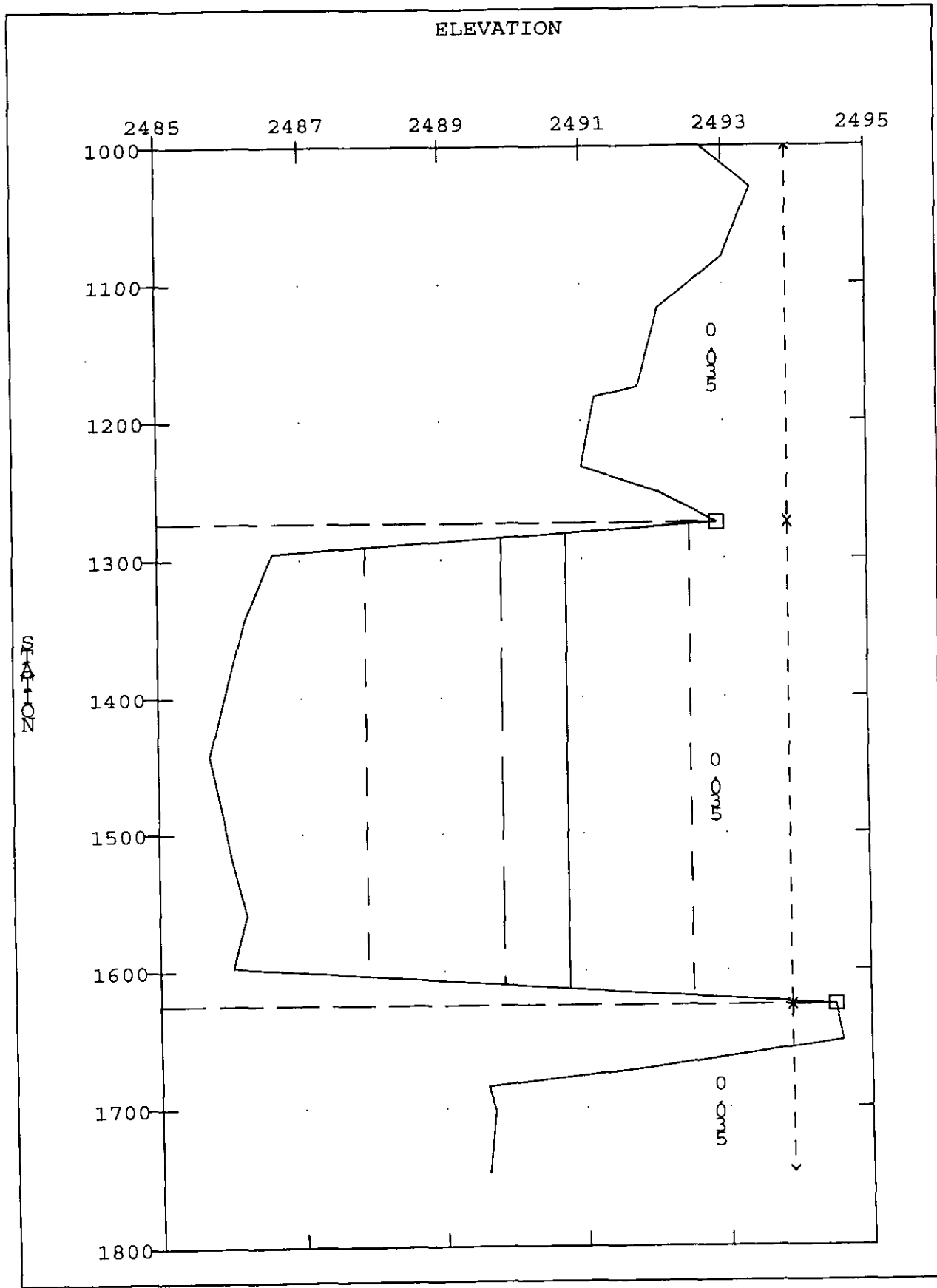
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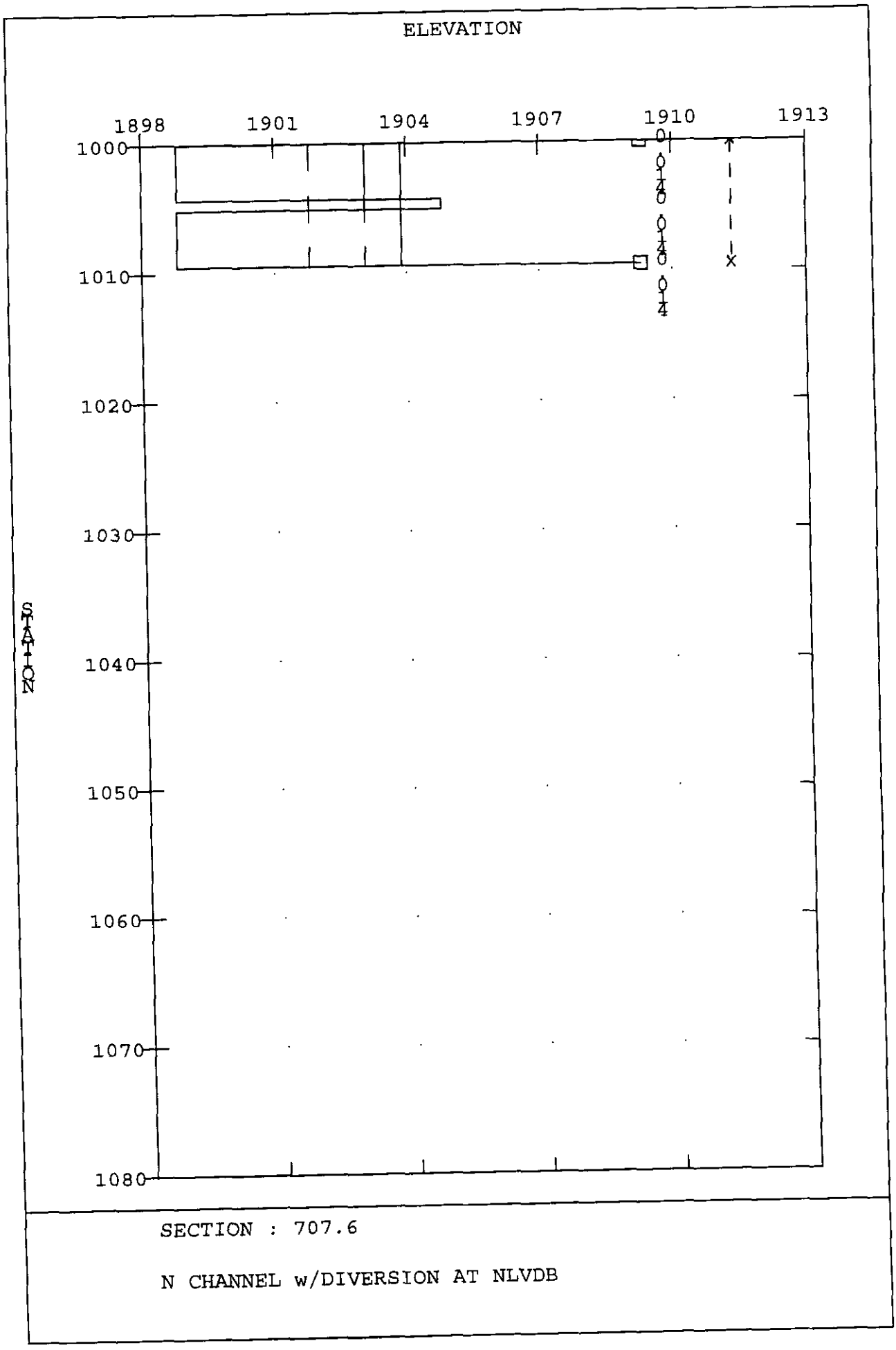
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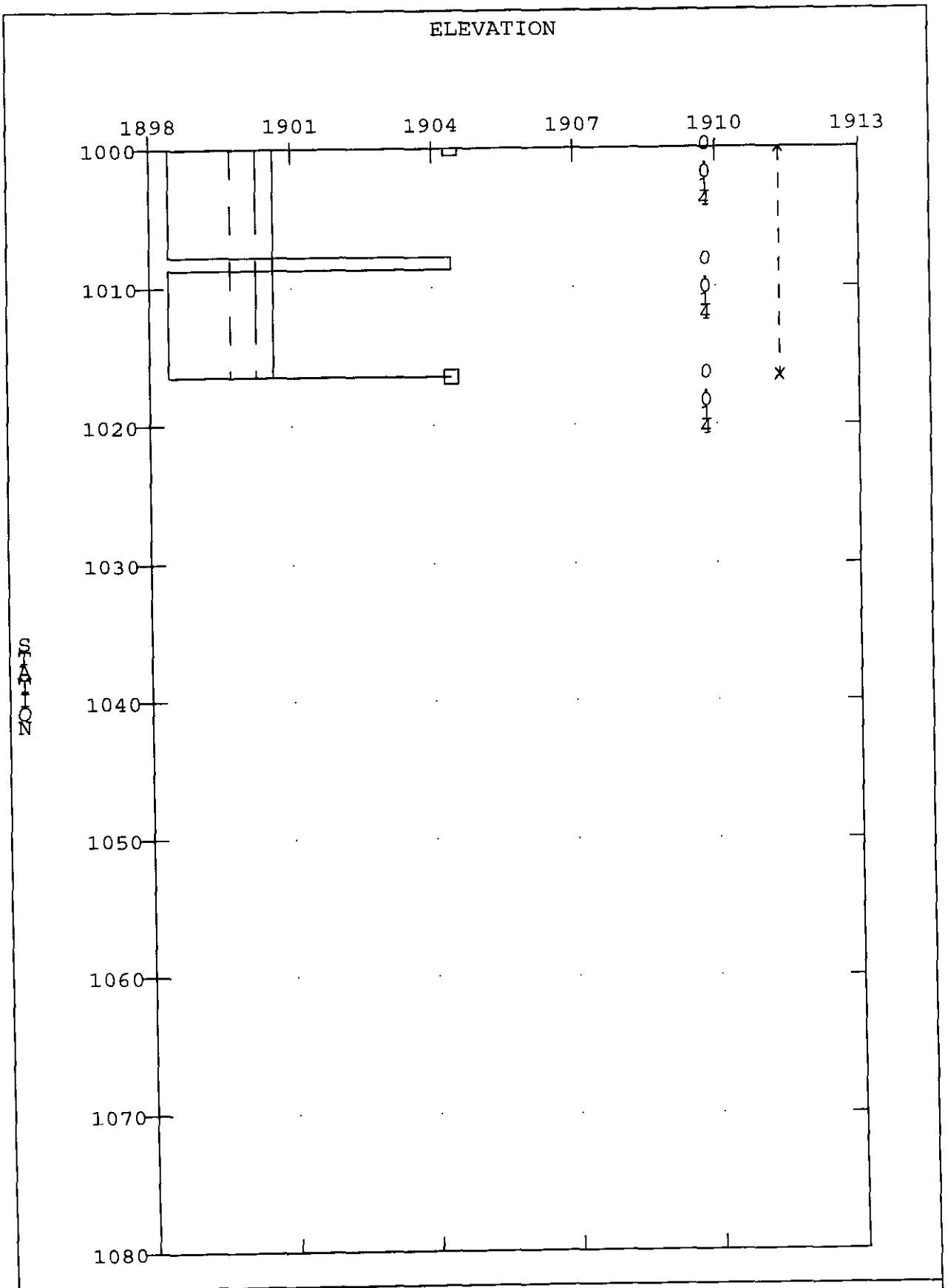
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Cross Section Plots
NCH-SPW



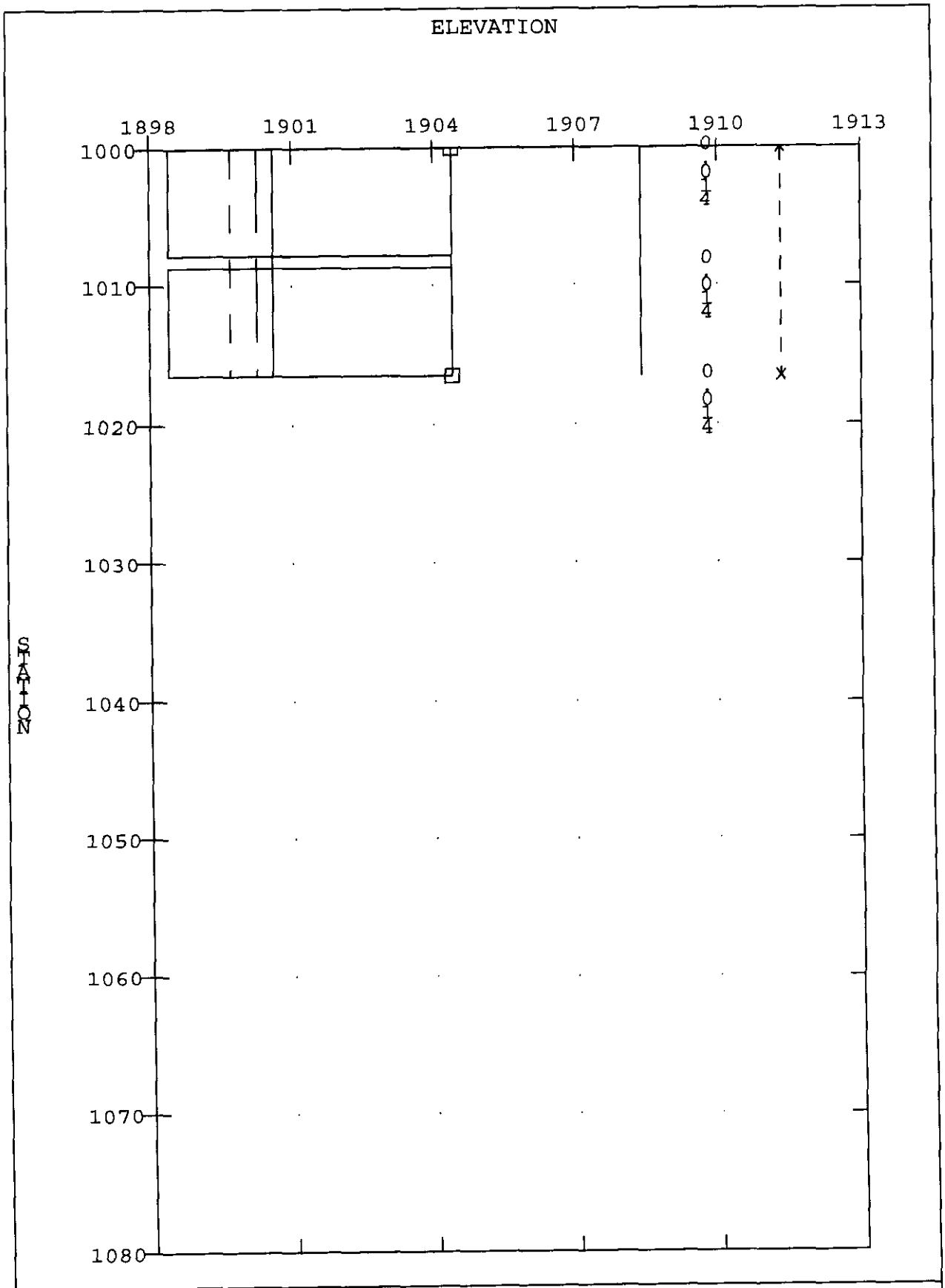
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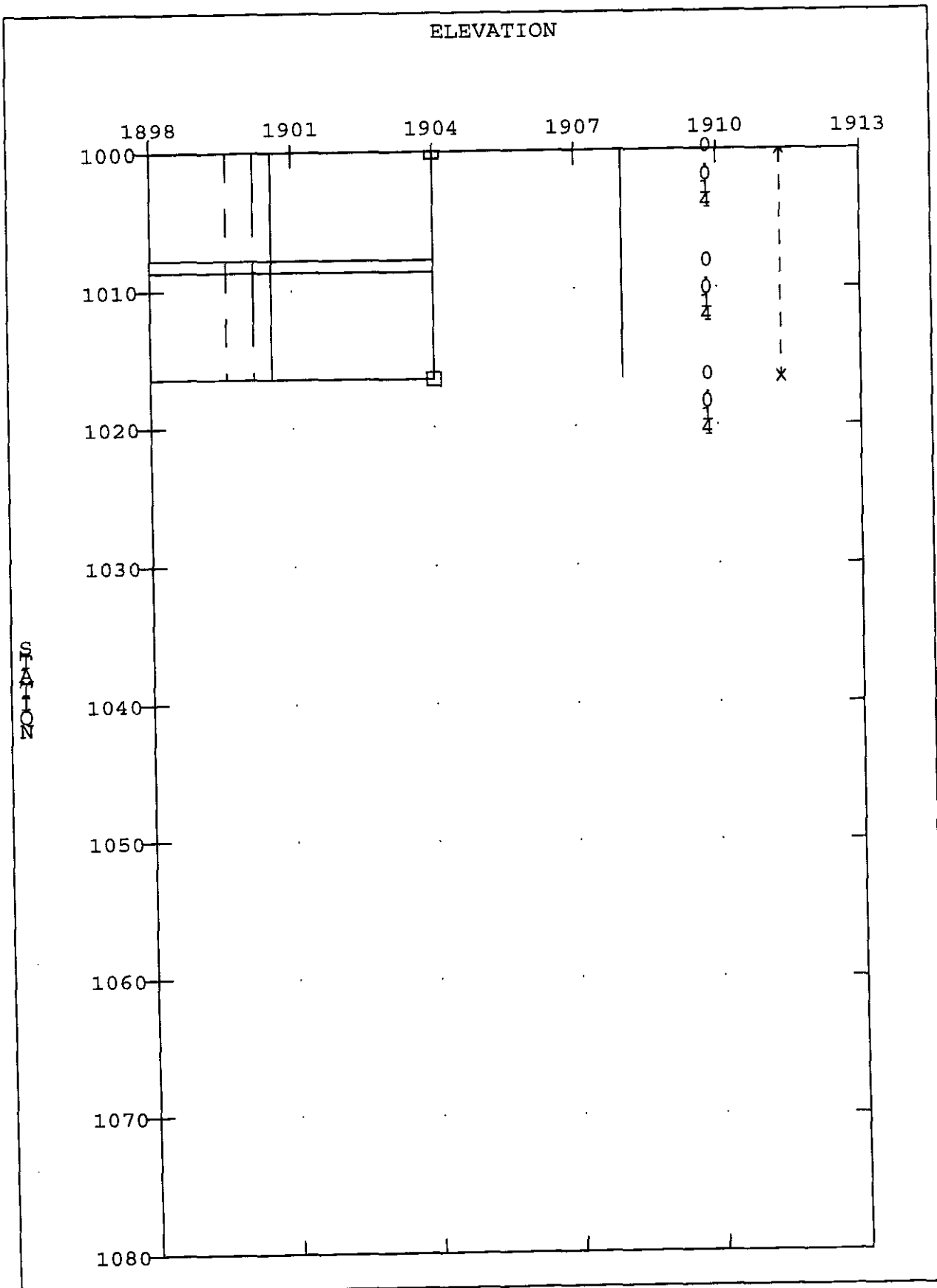
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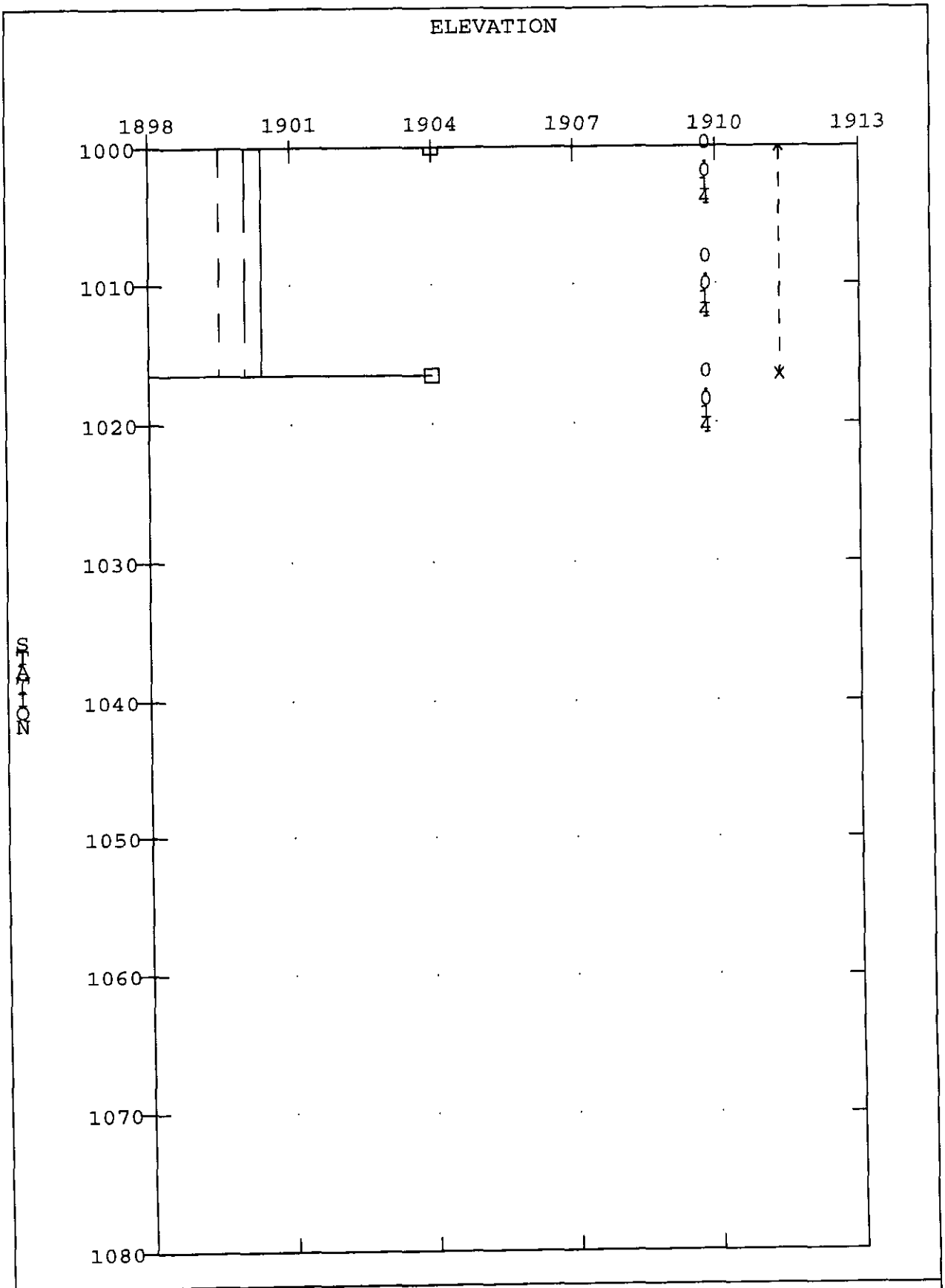
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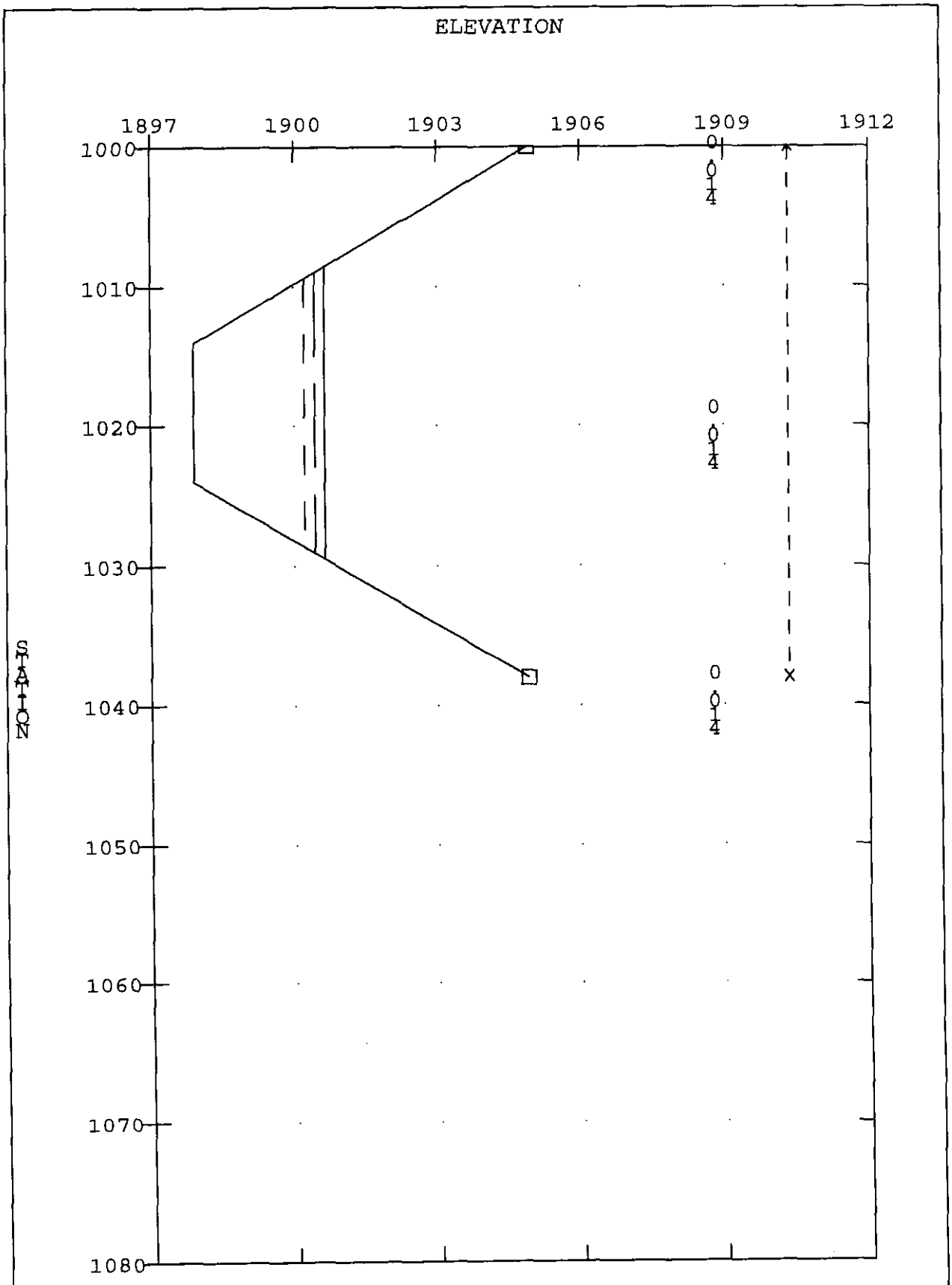
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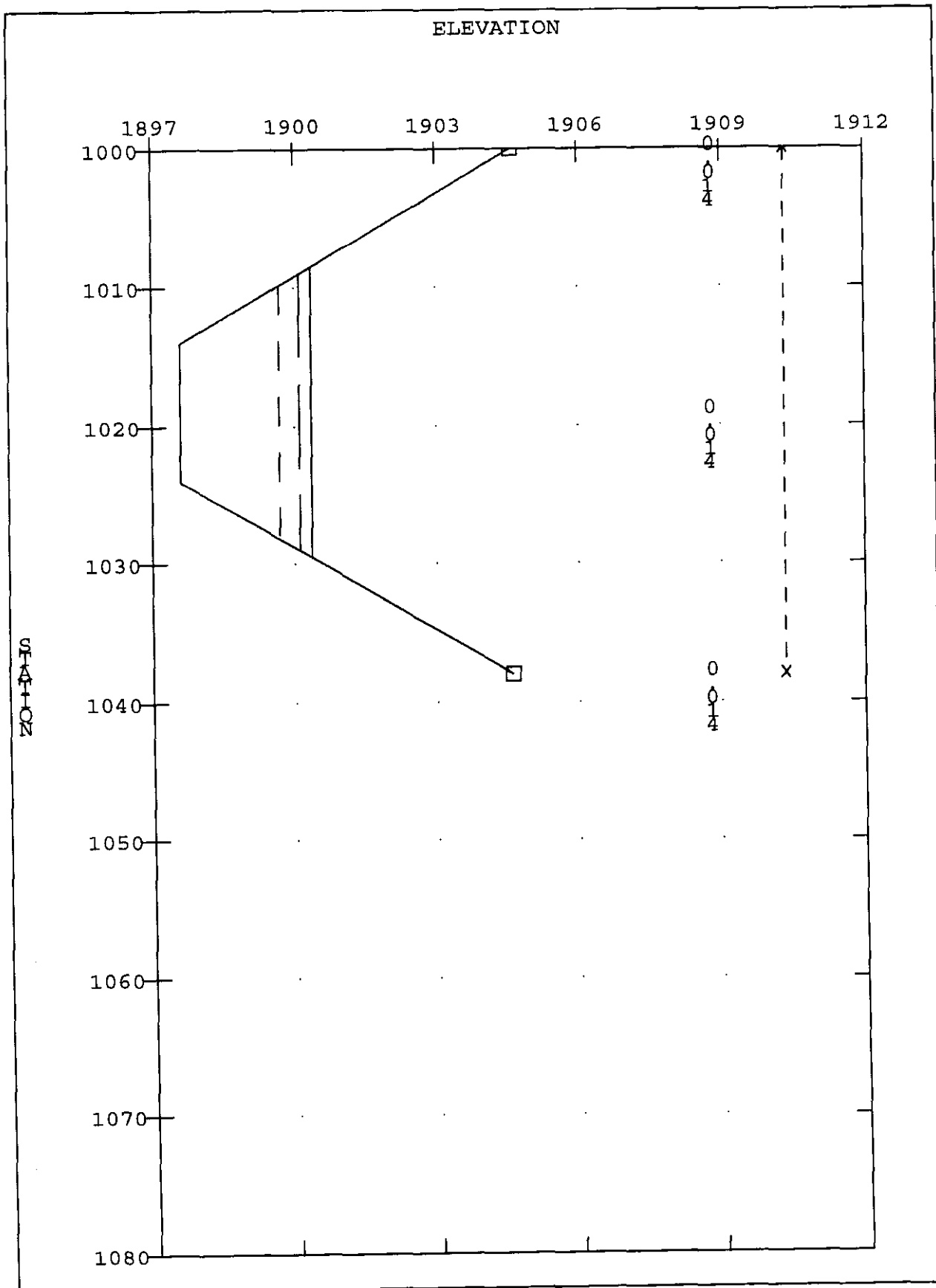
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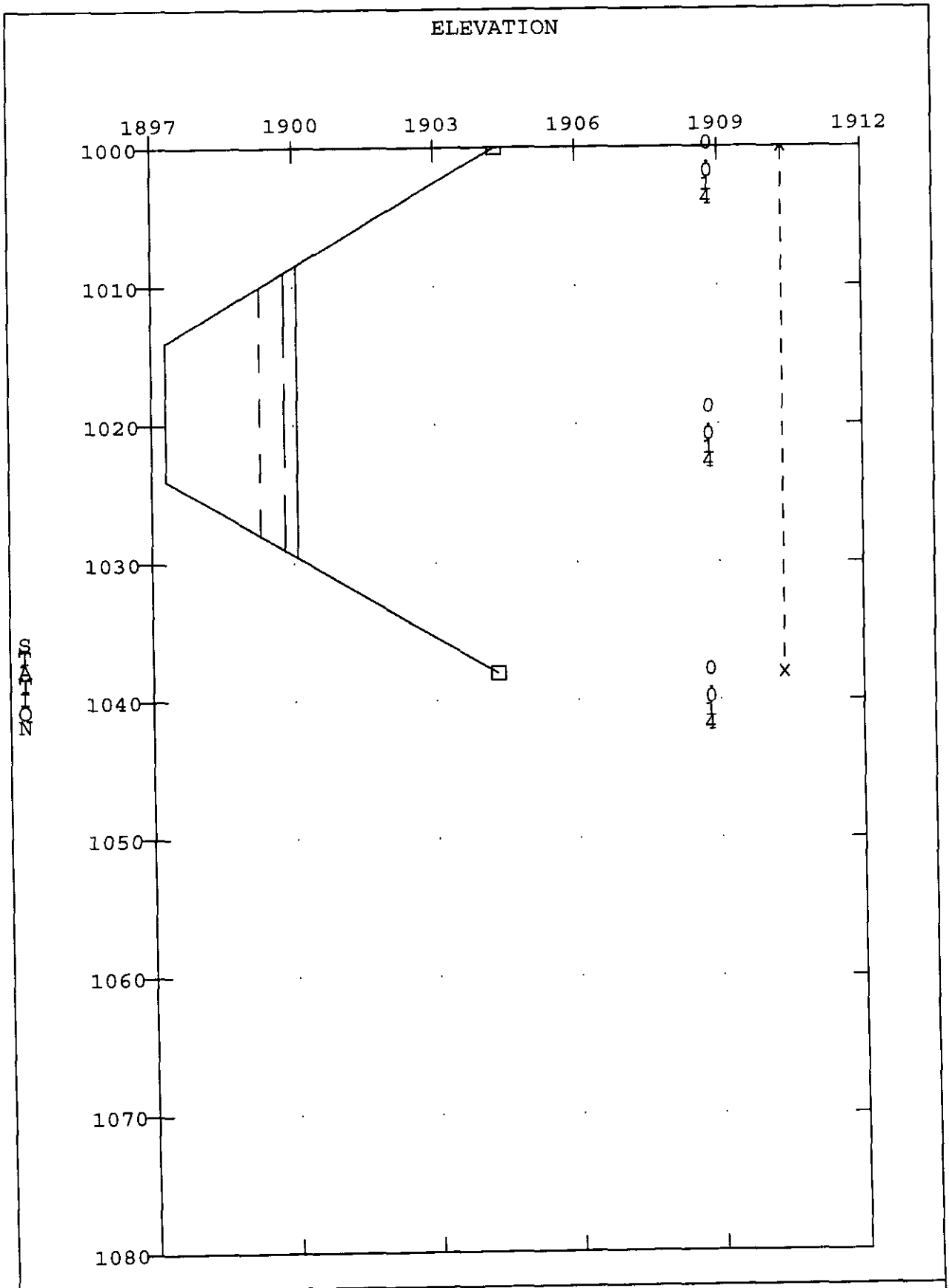
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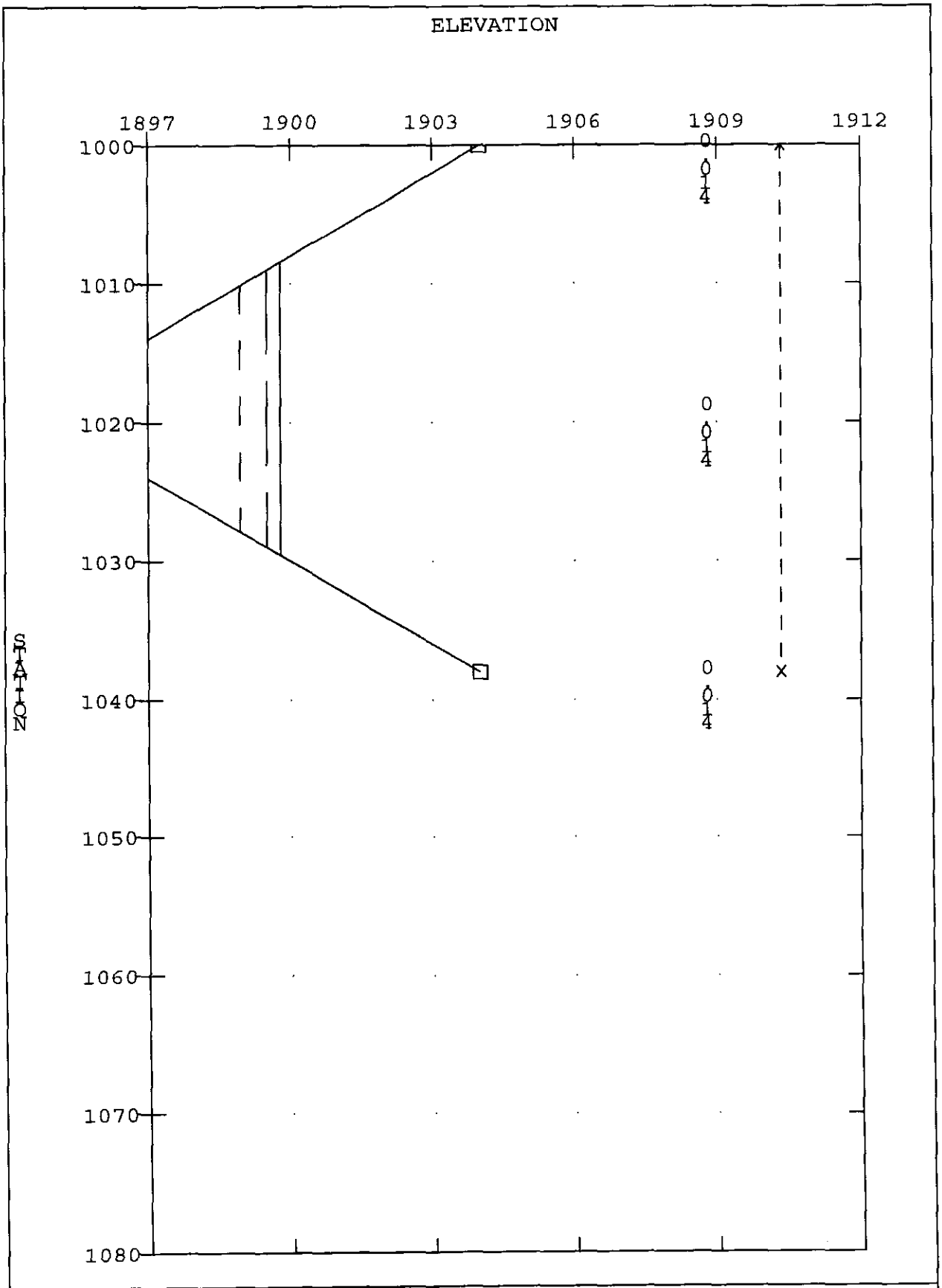
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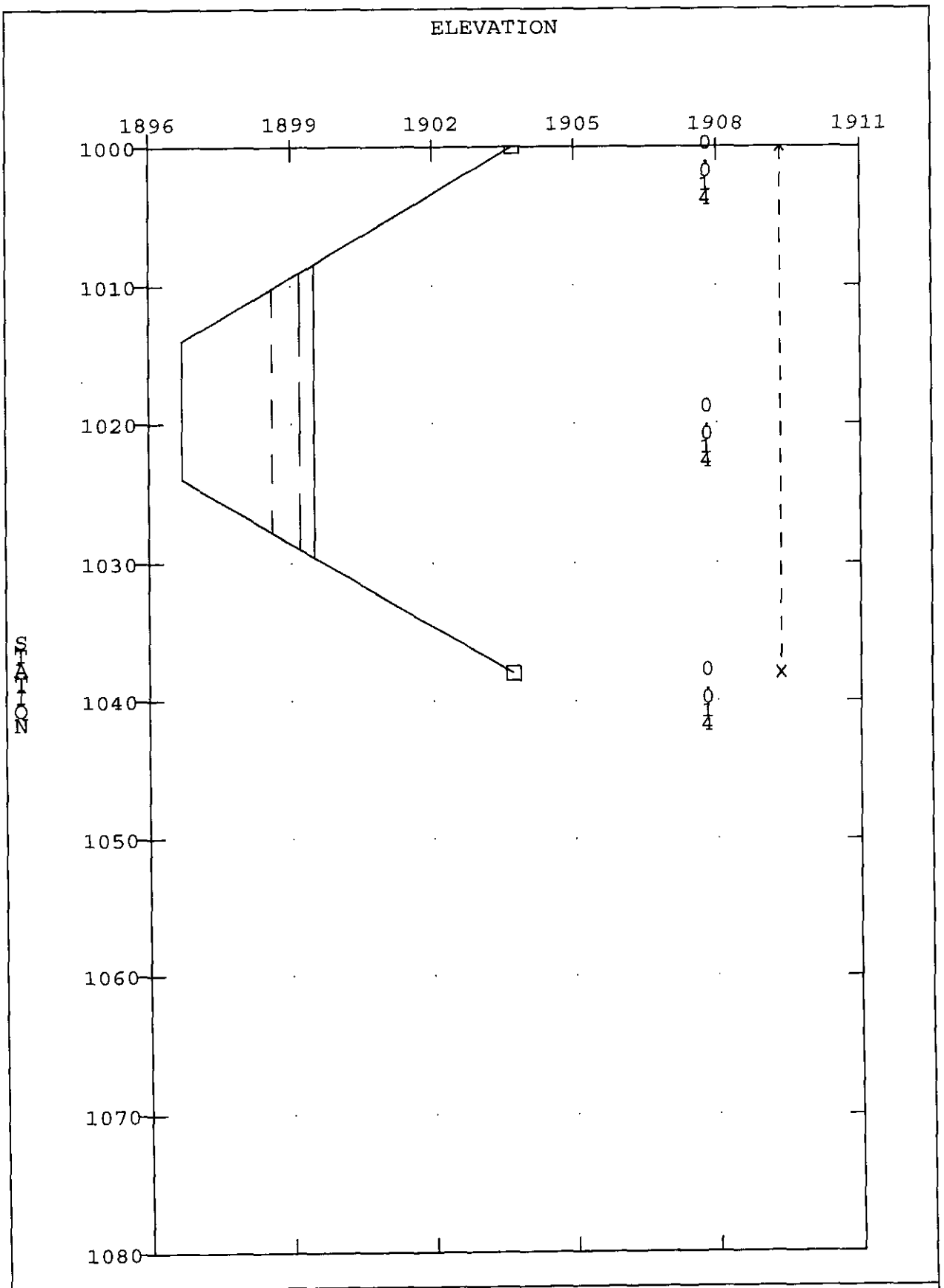
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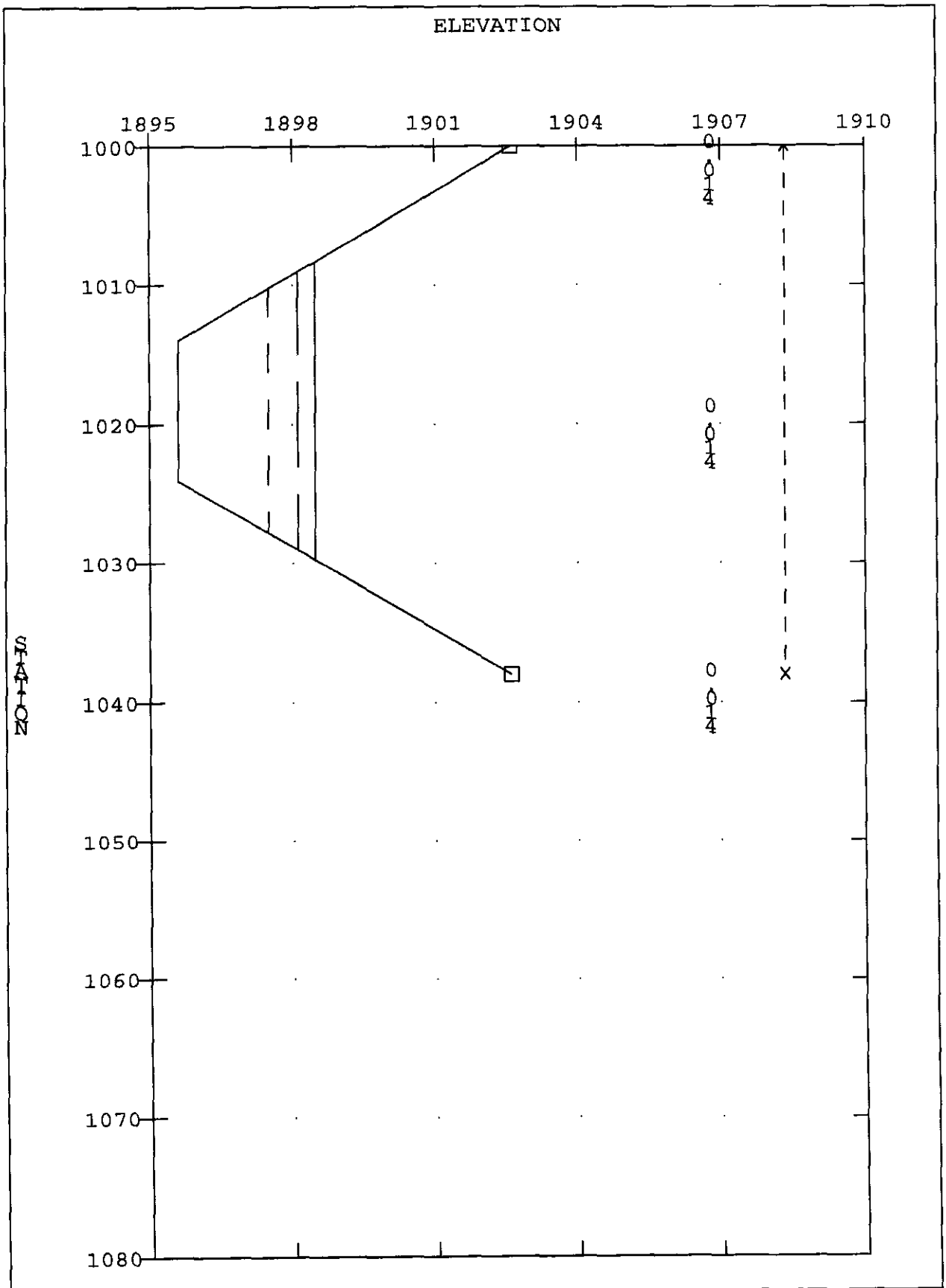
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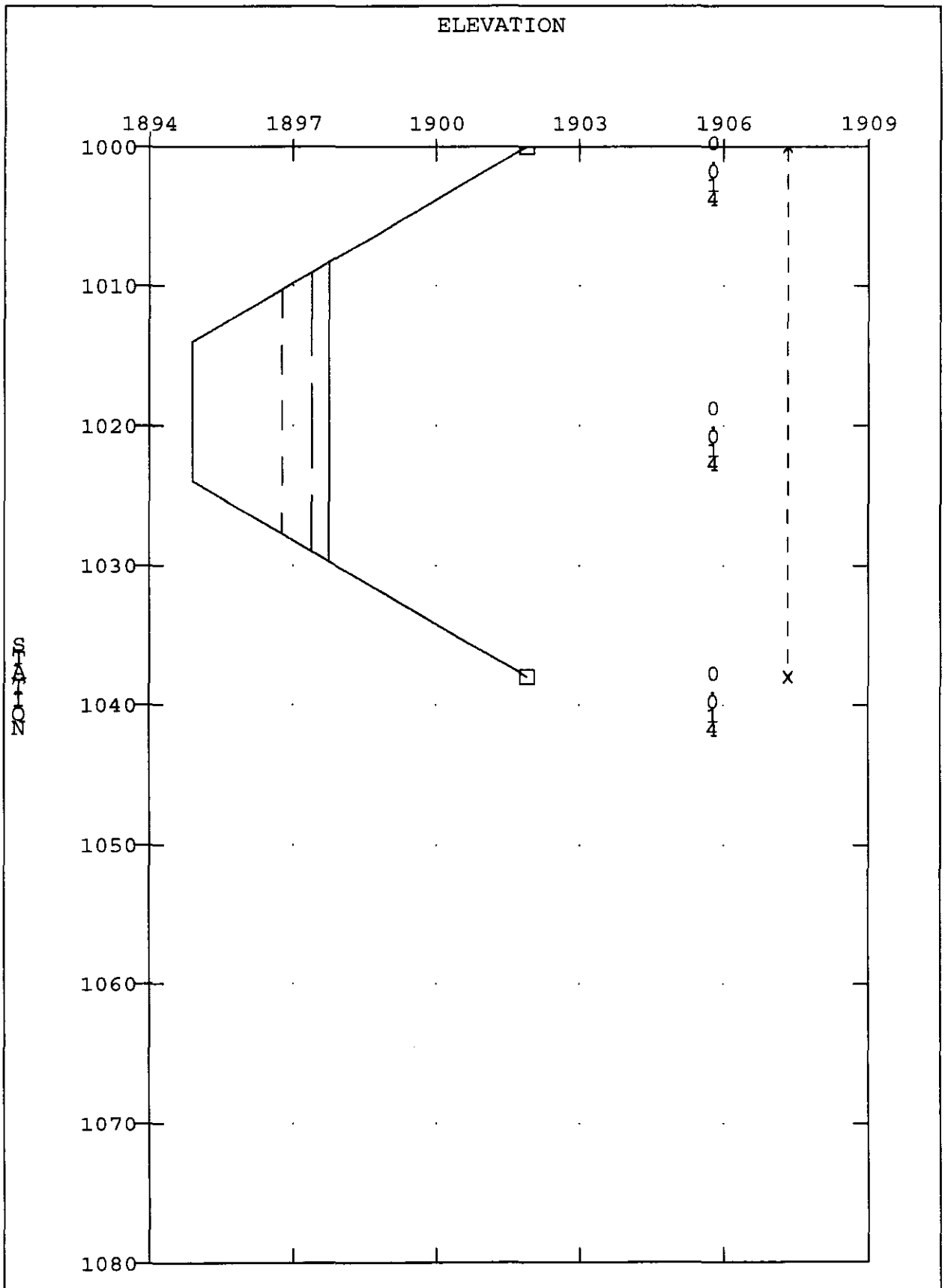
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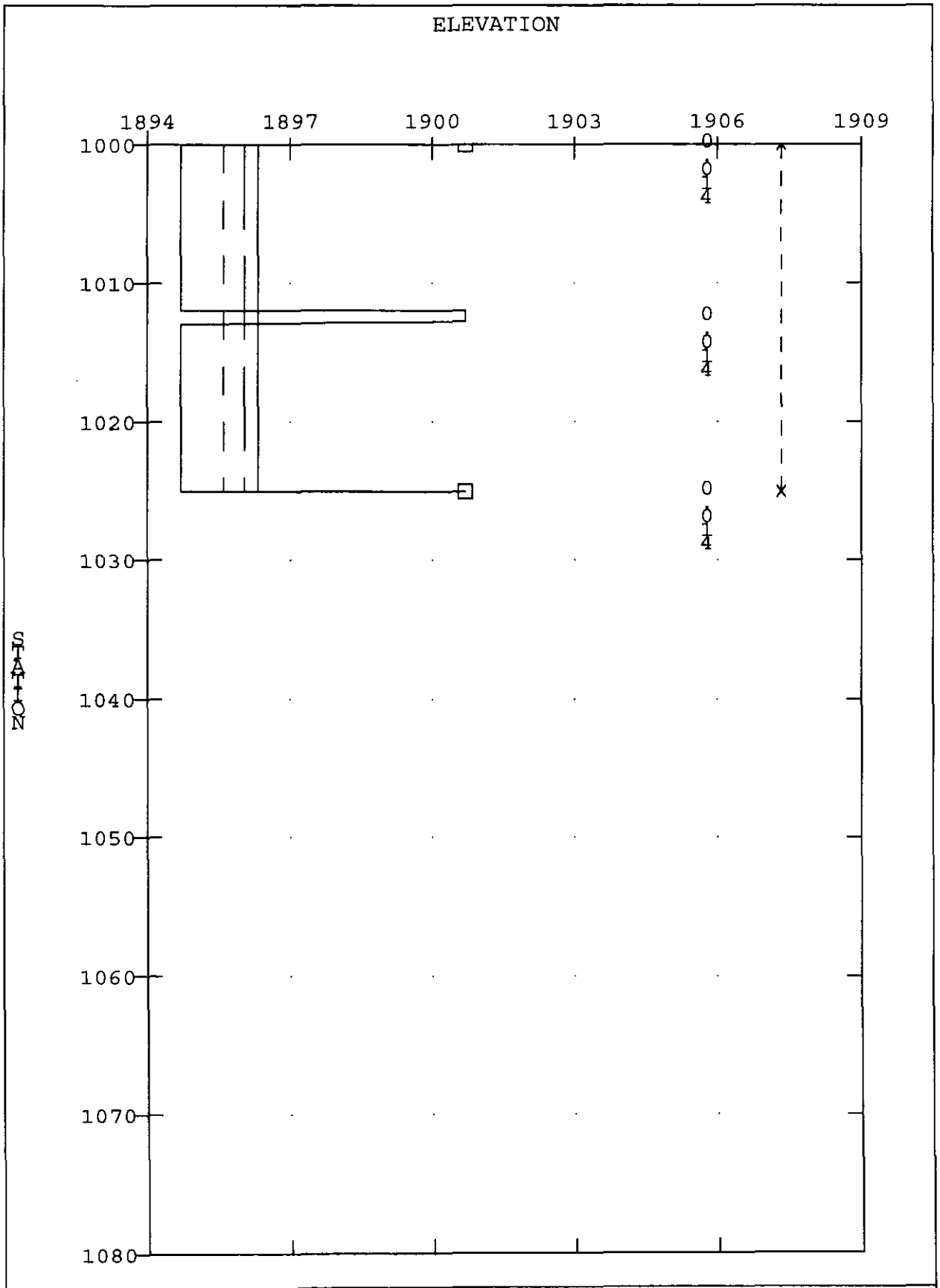
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SECTION : 25

N CHANNEL w/DIVERSION AT NLVDB



SECTION : 1

N CHANNEL w/DIVERSION AT NLVDB

UPPER LAS VEGAS WASH VOLUME 4

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 4
Engineering Analysis
without North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 4
Engineering Analyses; without North Las Vegas Detention Basin Diversion Dike

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4. Hydrologic Support Data

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TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 4

This volume of the TSDN contains engineering analyses performed during the FIS, including hydrologic and hydraulic analyses. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the analyses for the '**Without North Las Vegas Detention Basin Diversion Dike**' case. Volume 3 contains similar analyses for the "With North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

Addendum to Hydrology Memorandum
Upper Las Vegas Wash
for
'Without North Las Vegas Detention Basin Diversion Dike' Case

The attached hydrology memorandum was prepared for the Upper Las Vegas Wash assuming the diversion dike at the North Las Vegas Detention Basin would remain in place during major flood events. The analysis for the 'Without North Las Vegas Detention Basin Diversion Dike' Case differs from the "with" case in two respects:

- The Diversion Dike is assumed to fail when overtopped. Overtopping was computed to occur near the peak of the 100-year Interbasin Storm (see Volume 2 of the TSDN). Therefore, the 100-year peak downstream of the basin was taken to be equal to the 100-year peak from the Interbasin Storm. The 500-year peak flow from the Spring Mountain Storm is higher than the Interbasin Storm, and this flow was used in computing 500 - year water surfaces downstream of the dike.

- The 100-year flood boundary immediately upstream of the dike was based on the Interbasin Storm 100-year peak flow, and is thus the same as for the 'With' case. No 500-year flooding limits are shown in this area because the 500 - year flow is assumed to pass through the opening of the failed diversion dike. Without the dike in place, the computed water surface elevations for the 500-year flow in this area are below the computed 100-year water surface elevations with the dike in place prior to overtopping.

- The pool elevation for the North Las Vegas Detention Basin is computed for the 100-year case using the Spring Mountain Storm, which has a lower peak discharge than the Interbasin Storm, but higher volume. The 500 - year pool elevation is computed using a 500 - year storm on the Range Wash. The Range Wash 500 - year precipitation was extrapolated from the precipitation data in existing HEC-1 models developed by Post, Buckley, Schuh, & Jernigan (1996), and based on the HEC-1 models developed by James M. Montgomery (1991) for the Clark County Regional Flood Control District. The methods used for extrapolating the precipitation data for the Range Wash Storm were similar to those described in the Hydrology Memorandum for extrapolating data for the Interbasin and Spring Mountain Storms.

Peak discharges for the 10- and 50- year events remain unchanged in the 'Without' case, as the dike is assumed to remain in place for these events. The resulting peak discharges for use in the flood insurance study are listed in the table below.

Table 1 - Flood Insurance Study Peak Discharges
Upper Las Vegas Wash
Without North Las Vegas Detention Basin Diversion Dike

Location	Storm ID	Model Node	Storm Return Period			
			10-Year	50-Year	100-Year	500-Year
Inflow to ULVWDB	Spring Mountain	WTRIBUS	3,465	10,312	14,737	24,938
Outflow from ULVWDB	Spring Mountain	ULVWDB	2,426	3,888	5,019	19,217
Inflow to NLVDB	Interbasin	NLVIN	2,939	6,751	8,537	8,537
Discharge Below Dike	Spring Mountain	na	0	0	8,537	17,855
Discharge Below NLVDB	Spring Mtn Interbasin	na	**1,292** 1,220	**2,186** 2,074	4,796 **8,537**	**17,855** 13,077

Definitions:
ULVDB = Upper Las Vegas Wash Detention Basin
NLVDB = North Las Vegas Detention Basin

References

James M. Montgomery, "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report", September, 1991.

Post, Buckley, Shuh, and Jernigan, "TSDN for Range Wash Flood Insurance Restudy", February 27, 1996.

HYDROLOGY MEMORANDUM
UPPER LAS VEGAS WASH

1. Hydrology

1.1 Study Approach

The Upper Las Vegas Wash is an ephemeral desert stream draining a basin area of approximately 720 square miles originating in the Spring and Sheep Mountains upstream of the City of Las Vegas. Peak flows from the majority of the basin are controlled by two major detention basins: the North Las Vegas Detention Basin constructed in 1984 and the Upper Las Vegas Wash Detention Basin constructed in 1993. The tributary area to the North Las Vegas Detention Basin was increased by 48 square miles with construction of the Range Wash Diversion Dike in 1994. Figure 1-1 shows basin boundaries above the major flood control structures.

Previous hydrology studies for flood control facility design and for determining regulated flood discharges include work by the U.S. Army Corps of Engineers (1988), James M. Montgomery (1991), Boyle Engineering Corporation (1991) and by Black & Veatch (1993).

The approach and objectives for the current hydrologic analysis are to assess the adequacy of the previous analyses, and to update and re-run previously-developed Flood Insurance Study HEC-1 models as necessary to reflect existing flood control facilities.

1.2 Previous Hydrology Studies

The hydrology of the Upper Las Vegas Wash has been studied in numerous previous reports. Recent studies leading to the development of HEC-1 models adopted for use in the present work are listed below.

- U.S. Army Corps of Engineers (COE), South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988. That study provided a regional analysis of flood frequency data, including 20 years of peak flow data for USGS Gage 09419650, Las Vegas Wash at North Las Vegas. The Las Vegas Wash at this location reflects flows from the Upper Las Vegas Wash channel. The COE developed a computed probability 100-year regional flood frequency curve, reproduced here as Figure 1-2.

- Black & Veatch (B&V), "Flood Control Facilities Plan for the Northern Las Vegas Wash," August 1989. That study included the development of HEC-1 models with various storm centerings for the Upper Las Vegas Wash basin.

- Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood

Control Facility Plan," prepared for City of North Las Vegas, June 1991. That study included HEC-1 modeling and led to construction of the West Range Wash Diversion Dike which now diverts flow from 48 square miles of the Range Wash basin into the North Las Vegas Detention Basin.

- B&V, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991. That study included HEC-1 modeling of the upper portion of the Las Vegas Wash basin, and led to construction of the Upper Las Vegas Wash Detention Basin and an accompanying interception berm/channel extending to the west from that facility.

- James M. Montgomery (JMM), "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991). HEC-1 models for that study were based on the HEC-1 models developed by B&V (above). Model calibration was attained by matching previous COE and B&V discharges in an initial set of model runs which did not include proposed flood control facilities The proposed facilities were then introduced to the models to generate Flood Insurance Study (FIS) flows.

- B&V, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25 1993. That report included HEC-1 modeling of 6 storm centerings to examine impacts of the Upper Las Vegas Wash Detention Basin and West Range Wash Diversion Dike on outflows from the North Las Vegas Detention Basin. This work led to modification of the North Las Vegas Detention Basin outlet structure by closing two of the five original outlet pipes.

A review of peak flow data through 1993 for the USGS Las Vegas Wash gage (Gage 09419650, Las Vegas Wash at North Las Vegas) found that no significant flood events have occurred since the COE's 1988 analysis that would substantially change the results of that assessment. The lack of additional significant events in the Las Vegas Wash would tend to lower the COE-estimated 100-year discharge for that station, but the COE's adopted regional analysis curve (Figure 1-2) already results in a slightly lower 100-year discharge estimate for that station than frequency analysis of the individual station gage records. The COE's regional analysis for 100-year peak discharge versus drainage area therefore continues to be a reasonable method for estimating unregulated peak flows for the Upper Las Vegas Wash basin.

Existing HEC-1 models of the Upper Las Vegas Wash were "calibrated" to the COE regional analysis curve, and should provide a reasonable estimate of unregulated peak flows. However, it should be noted that there was no calibration to the shape or volume of runoff hydrographs, apparently due to a lack of data for such calibration. The accuracy of the shape and volume of simulated runoff hydrographs, which are important to the performance of detention facilities, is therefore unknown. Hydrographs simulated by the existing HEC-1 models assume a hydrograph shape defined by the SCS unitgraph approach.

The previous analyses considered numerous separate storm centerings over the basin to identify storm configurations which produced the highest peak flows at various locations in the basin. Multiple storm centerings were required because peak flows in the region result from cloudburst events having areas less than 200 square miles and that only cover a portion of the entire Upper Las Vegas Wash basin. For the present work, we have accepted the findings of the previous B&V (1993) and JMM (1991) studies as to which theoretical design storms are most critical for determining FIS discharges:

- The "Spring Mountain Storm" previously used by both JMM and B&V produces the highest uncontrolled peak inflows to the Upper Las Vegas Wash detention basin, as well as the highest peak outflows from both the Upper and North Las Vegas Wash detention basins. This storm was compared to the "Sheep Mountain Storm" by B&V (1993) and determined to be the critical storm for peak inflows and volumes to the North Las Vegas Detention Basin during design of outlet modifications. The Spring Mountain storm has been modeled as a 136.34 sq. mi. storm centered over the Spring Mountain Range. Spring Mountain storm HEC-1 models had previously been developed by JMM (1991) with 10-, 50-, and 100-year rainfall amounts. The Spring Mountain storm simulates a 100-year (uncontrolled) peak flow of 14,737 cfs into the Upper Las Vegas Wash detention basin. Considering the detention basin's total tributary area of approximately 516 sq. mi., the HEC-1 result, is consistent with the COE's regional analysis curve (Figure 1-2).

- The "Interbasin Storm" previously used by B&V produces the highest 100-year peak inflow to the North Las Vegas detention basin. The Interbasin storm has been modeled as a 54.37 sq. mi. storm covering the North Las Vegas Wash tributary area between the Upper and North Las Vegas Wash detention basins. A single Interbasin storm model had been developed by B&V (1993) to represent 100-year storm conditions only. The Interbasin storm simulates a 100-year (uncontrolled) peak flow of 8,537 cfs from the 54.37 sq. mi. basin and is consistent with the COE's regional analysis curve (Figure 1-2).

- An unnamed storm covering the entire 48.16 sq. mi. tributary area to the West Range Wash diversion dike produces the highest peak flows for the West Range Wash diversion dike. A HEC-1 model for this storm had previously been developed by Boyle (1991) for 100-year storm conditions only. This storm simulates a 100-year (uncontrolled) peak flow of 6,584 cfs from the 48.16 sq. mi. basin, which is about 13% lower than the 100-year peak flow indicated from the COE's regional analysis curve (Figure 1-2).

For purposes of the present work, the previously-developed Spring Mountain 10-, 50-, and 100-year HEC-1 models were updated to reflect the existing flood control facilities, and additional Interbasin storm models were developed to represent 10- and 50-year rainfall amounts. HEC-1 models representing 500-year rainfall amounts were developed for both the Spring Mountain and Interbasin storms.

No modifications were made to the HEC-1 model representing West Range Wash diversion dike flows, as FIS discharges for floodplain mapping were not required for this location. If required for other purposes, approximate 10- through 500-year values for West Range Wash diversion dike flows could be estimated by multiplying Interbasin storm values by 0.89, which is the ratio of Interbasin storm to West Range Wash diversion dike basin areas.

1.3 Modifications to Existing HEC-1 models.

HEC-1 models developed by JMM (1991) for the Spring Mountain storm and by B&V (1993) for the Interbasin storm were used as the basis for hydrologic modeling in the present study. No changes were made to any of the previously-defined runoff or channel routing parameters including basin areas, curve numbers, loss rates, channel geometry, and channel routing coefficients. Furthermore, no changes were made to subbasin rainfall amounts for 10- through 100-year return periods, precipitation multipliers, or depth-area correction factors, all of which appeared to be consistent with values recommended by the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (1990).

Spring Mountain Storm Files

Spring Mountain 10-, 50-, and 100-year storm HEC-1 files for the present study are based on HEC-1 files prepared by JMM (1991) for the previous FIS hydrology study. Modifications to the JMM files consisted of updating the detention basin characteristics for existing conditions as follows:

- Stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were updated to reflect as-built conditions. The 1991 JMM model had been based on a preliminary detention basin design which was revised prior to construction. The original (JMM, 1991) model SV, SE, and SQ data for the Upper Las Vegas Wash detention basin were replaced using the SV, SE, and SQ data from HEC-1 models prepared by B&V (1993). The B&V stage-storage and stage-discharge relationships for the Upper Las Vegas Wash detention basin were reviewed and found to adequately reflect as-built conditions.

- The stage-discharge relationship for the North Las Vegas Wash detention basin was updated to reflect the existing three-pipe outlet structure with a four-feet high, 53-feet wide upstream barrier wall. The 1991 JMM model had assumed a four-pipe outlet structure based on preliminary design data; however, two of the structure's original five outlet pipes were subsequently blocked following construction of the Upper Las Vegas Wash detention basin. The original (JMM, 1991) model SQ data for the North Las Vegas Wash detention basin, for stages above seven feet, were replaced using the discharge data presented by B&V (1993) for a three-pipe outlet structure. Discharges below about seven feet stage were found to be controlled by the upstream barrier wall which was not represented in any of the previously

outlet rating curves. The rating curve for the barrier wall was computed for the current study by assuming orifice flow through the weep holes, plus weir flow at stages above four feet.

A Spring Mountain 500-year storm HEC-1 model was developed for the present study by modifying the 100-year model to include 500-year rather than 100-year rainfall amounts. This differs from the approach taken in the previous JMM (1991) FIS study in which 500-year flows were estimated by extrapolation of the flows simulated for 10-, 50-, and 100-year return periods. The previous method is likely to underestimate 500-year flows in the Upper Las Vegas Wash system because the detention basins are sized to be filled during a 100-year event. A substantial loss of flow control should therefore be expected at more extreme events due to spillway flow.

Spring Mountain storm 500-year rainfall amounts for each model subbasin were determined by extrapolation of the rainfall amounts from the JMM (1991) 10-, 50-, and 100-year Spring Mountain storm HEC-1 models.

Interbasin Storm Files

Interbasin storm 10- through 500-year rainfall HEC-1 files for the present study are based on the 100-year Interbasin storm HEC-1 file prepared by B&V (1993). This storm covers the Las Vegas Wash basin area beginning immediately downstream from the Upper Las Vegas Wash detention basin and extending to the outlet of the North Las Vegas detention basin. Hydraulic characteristics for the North Las Vegas detention basin were revised to be the same as for the updated Spring Mountain storm models discussed above.

Subbasin rainfall amounts for the 100-year Interbasin storm are as presented in the original B&V model. Rainfall amounts for 10- and 50- year storms are based on the 10- and 50-year subbasin rainfall amounts presented by JMM (1991) for the Lower Central Valley storm, which covers all but two of the subbasins included in the Interbasin storm. Rainfall amounts from the JMM (1991) 10- and 50-year models were divided by a factor of 0.62 to remove the depth-area correction factor which had been applied to subbasin rainfall amounts in the original development of the Lower Central Valley models. 10- and 50- year, 6-hour rainfall amounts for the two subbasins (104 and 105) not covered by the Lower Central Valley models were determined from NOAA Atlas 2 for Nevada. The 10- and 50-year atlas amounts were increased by factors of 1.24 and 1.39 respectively, as recommended by the CCRFCD (1990). A depth-area correction factor of 0.66 was applied for all Interbasin storms.

Subbasin rainfall amounts for the 500-year Interbasin storm were determined by extrapolation of rainfall amounts from the 10-, 50-, and 100-year Interbasin storm models.

Input files for all HEC-1 models modified or created for the purposes of this study are provided in digital form on a diskette which accompanies this report.

1.4 Revised FIS Discharges

Table 1 summarizes the results of the HEC-1 modeling at various points along the Upper Las Vegas Wash system. Computation nodes are shown in Figure 1-3. Table 2 compares the current model results with the previously adopted FIS flows.

The current model results for 10- through 100-year return periods are slightly lower than the previously-adopted FIS discharges. We do not consider the differences to be sufficiently large to warrant changing the previously-published 10- through 100-year flows which are currently being used by others for concurrent (downstream) floodplain mapping analyses.

The revised hydrologic analysis indicates a 500-year discharge downstream from the North Las Vegas detention basin which is about 80% larger than previously assumed. This increase in the 500-year discharge is due to a loss of detention basin flow control that was not specifically addressed in the previous FIS analysis.

REFERENCES

Black & Veatch, "Hydrologic Analysis of Proposed Transbasin Diversion from the Range Wash Watershed into the North Las Vegas Detention Basin," prepared for City of North Las Vegas, June 1990 draft.

Black & Veatch, "Predesign Report for the Upper Las Vegas Wash Detention Basin," prepared for City of North Las Vegas, March 1991.

Black & Veatch, "North Las Vegas Detention Basin Outlet Modification Report," prepared for City of North Las Vegas, August 25, 1993.

Boyle Engineering Corporation, "Western and Eastern Tributaries of Range Wash Flood Control Facility Plan," prepared for City of North Las Vegas, June 1991.

Clark County Regional Flood Control District, "Hydrologic Criteria and Drainage Design Manual," Section 500 (Rainfall) and Section 600 (Storm Runoff), October 1990.

Montgomery, James M., "Clark County Regional Flood Control District Las Vegas Valley Flood Insurance Study Hydrology Report," September 1991 (Adopted November 14, 1991).

Montgomery, James M., "Clark County Regional Flood Control District, The Master Plan Update of the Las Vegas Valley (Volume II)," August 1991.

U.S. Army Corps of Engineers, South Pacific Division, "Hydrological Documentation for Feasibility Study, Las Vegas Wash and Tributaries, Clark County, Nevada," draft dated April 1988.

U.S. Army Corps of Engineers, Los Angeles District, "Special Flood Hazard Study, Las Vegas Wash and Tributaries, Clark County, Nevada," July 1988.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, NOAA Atlas 2: Precipitation-Frequency Atlas of the Western United States, Volume VII-Nevada, 1973.

Table 1-1
HEC-1 Results

Location	Storm ID	Model Node	Storm Return Period 10-yr	50-yr	100-yr	500-yr
Inflow to ULVWDB	Spring Mtn	WTRIBUS	3,465	10,312	14,737	24,938
Outflow from ULVWDB (Max basin stage, feet)	Spring Mtn	ULWDB	2,426 (2351.26)	3,888 (2366.98)	5,019 (2372.40)	19,217 (2375.68)
Inflow to NLVDB	Spring Mtn	NLVIN	2,400	3,878	4,796	**17,855**
	Interbasin		**2,939**	**6,751**	**8,537**	13,077
Diversion Dike Overflow at NLVDB	Spring Mtn	DIVDIKE	0	0	0	**6,838**
	Interbasin		0	0	**194**	3,226
NLVDB Pipe and Spillway Outflow (Max stage, feet above 2108 feet)	Spring Mtn	NLVDET	1,292 (9.90)	2,186 (22.5)	2,839 (27.42)	6,322 (31.44)
Total Discharge below NLVDB	Spring Mtn	2 combined	**1,292**	**2,186**	**2,839**	**8,988**
	Interbasin		1,220	2,074	2,345	5,438
Diversion along Railway	Spring Mtn	RRCHANNL	0	0	0	2,236
ULVW at Railway Bridge	Spring Mtn	RRBRIDGE	1,281	2,183	2,833	6,083
Diversion at King Charles Channel	Spring Mtn	KCHAR	1,024	1,746	2,266	4,866
ULVW at Hwy 15	Spring Mtn	I15 below KCHAR	256	437	567	1,217

Definitions:

ULVWDB = Upper Las Vegas Wash Detention Basin
NLVDB = North Las Vegas Detention Basin
ULVW = North Las Vegas Wash

Assumptions for Railway and King Charles Diversions:

HEC-1 model output for diversions from the main ULVW into the Railway and King Charles Channels are based on the following approximate relationships:

ULVW Flow cfs	Diversion to Railway Channel	NLVW Flow cfs	Diversion to King Charles
0	0	0	0
6,000	0	1,000	800
20,000	13,500	10,000	8,000

Storms:

Spring Mountain: a 136 square mile storm over the Spring Mountains upstream from the ULVWDB.
Interbasin: a 54 square mile storm between the ULVWDB and NLVDB

West Range Wash Diversion flows to NLVDB

West Range Wash Diversion flows were not modeled as part of the present study. Three estimates of the 100-year peak inflow from this 48.2 square mile basin are readily available as follows:

From HEC-1 model by Boyle (1991): 6,584 cfs
From COE Regional Curve: 48.2 times 155 cfs/sq mi: 7,471 cfs
Adjust Interbasin storm flows above DIVDIKE for basin area, 8,537 times (48/54):7,588 cfs

Table 1-2
Comparison of HEC-1 model results with previous (1991) FIS Discharges

Node (JMM, 1991)	10-year Peak Flow, cfs			50-year Peak Flow, cfs			100-year Peak Flow, cfs			500-year Peak Flow, cfs		
	Adopted (1991)	Model (rev, 1998)	Change	Adopted (1991)	Model (rev, 1998)	Change	Adopted (1991)	Model (rev, 1998)	Change	Adopted (1991)	Model (rev, 1998)	Change
RRBRIDGE	1,440	1,281	(159)	2,600	2,183	(417)	3,050	2,833	(217)	4,630	8,319	3,689
NC5	288	256	(32)	520	437	(83)	618	567	(51)	940	1,217	277

Node	Description Given by JMM, 1991
RRBRIDGE	Total flow at RR bridge (before diversion along RR to A Channel)
NC5	Outflow from NLV det. basin below King Charles Diversion

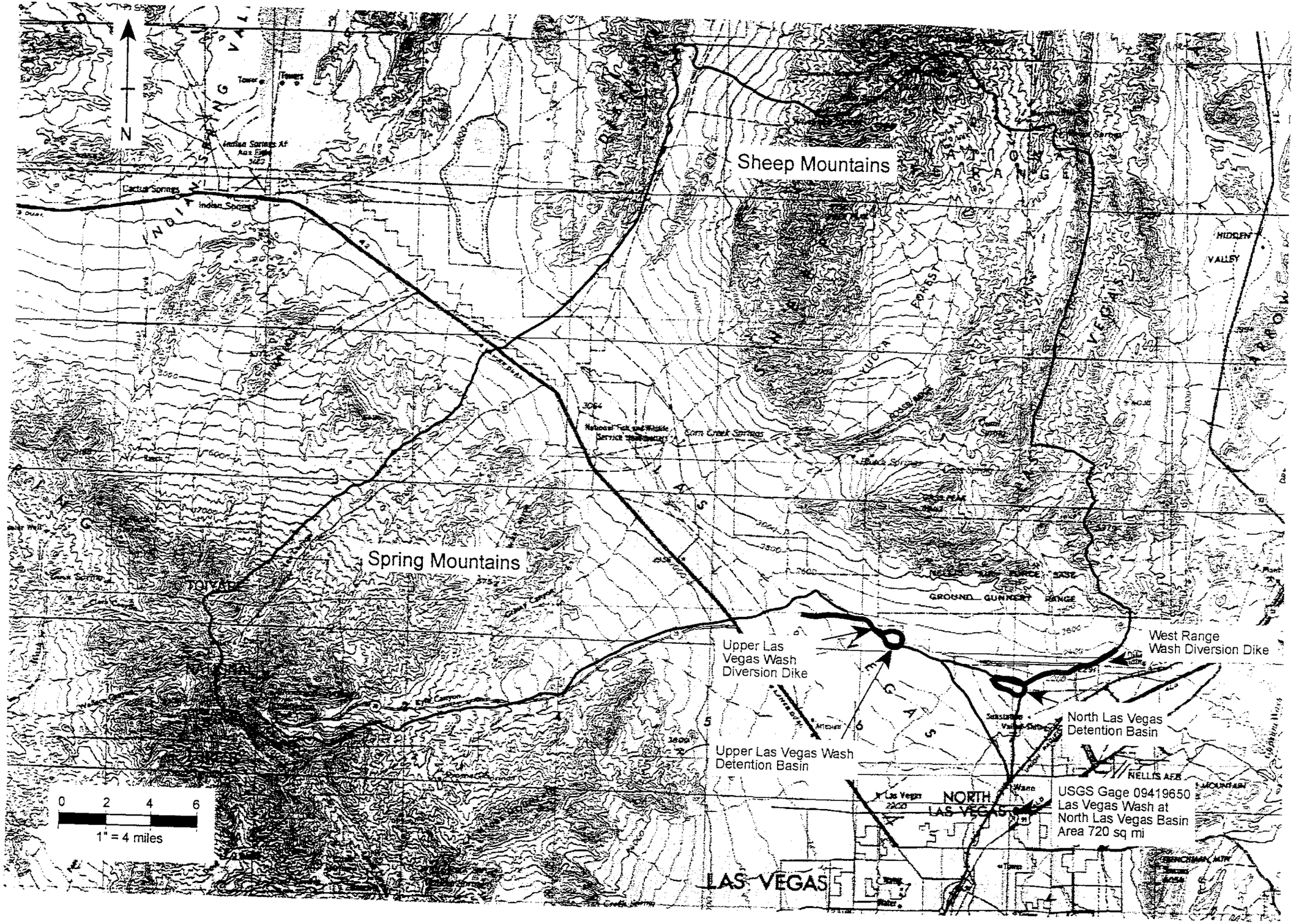
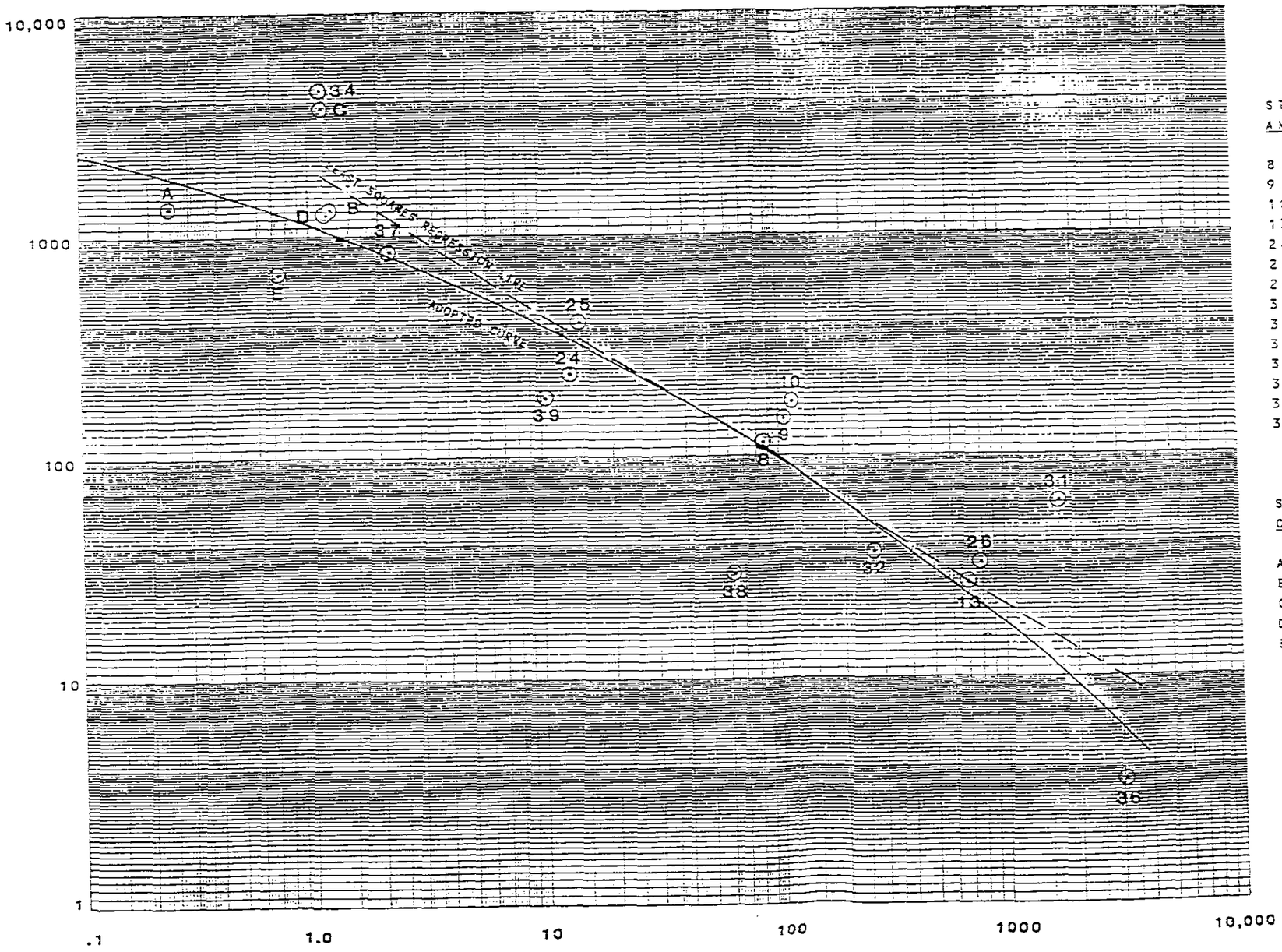


Figure 1-1 Tributary Area Map



STREAMGAUGES USED IN REGIONAL ANALYSIS (ANALYTICAL ANALYSIS)

8. FLAMINGO WASH @ LAS VEGAS
9. FLAMINGO WASH @ MARYLAND PKWY
10. FLAMINGO WASH NEAR MOUTH
13. LAS VEGAS WASH @ N. LAS VEGAS
24. TYSON WASH TR. NEAR QUARZITE
25. SACTO WASH TR. NEAR TOPOC
26. SACTO WASH NR. YUCCA, ARIZONA
31. SAN FELIPE CRK NR. WSTMRELND
32. SALT CREEK NEAR MECCA, CALIF.
34. CARUTHERS CRK NR. IVANPAH, CA
36. AMARGOSA RIVER @ TECOPA
37. AMARGOSA R TR. #1 NR. JOHNNIE
38. SALT WELLS CRK NR. WESTEND, CA
39. NINEMILE CREEK NEAR BROWN, CA

STREAMGAUGES USED TO HELP SHAPE CURVE (GRAPHICAL ANALYSIS)

A. BOOM CREEK NEAR BARSTOW, CA
B. DETRITAL WASH NR. CHLORIDE, AZ
C. LAS VEGAS WASH TR. NR. HENDERSON
D. LAS VEGAS WASH TR. S. OF NELLIS
E. BEACON CREEK AT HELENDALE, CA

LAS VEGAS FEASIBILITY STUDY

COMPUTED 100-YEAR PEAK DISCHARGE VERSUS DRAINAGE AREA

US ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

Source: Corps of Engineers, 1988

Figure 1-2. Corps of Engineers Adapted Regional 100-Year Peak Discharge Curve

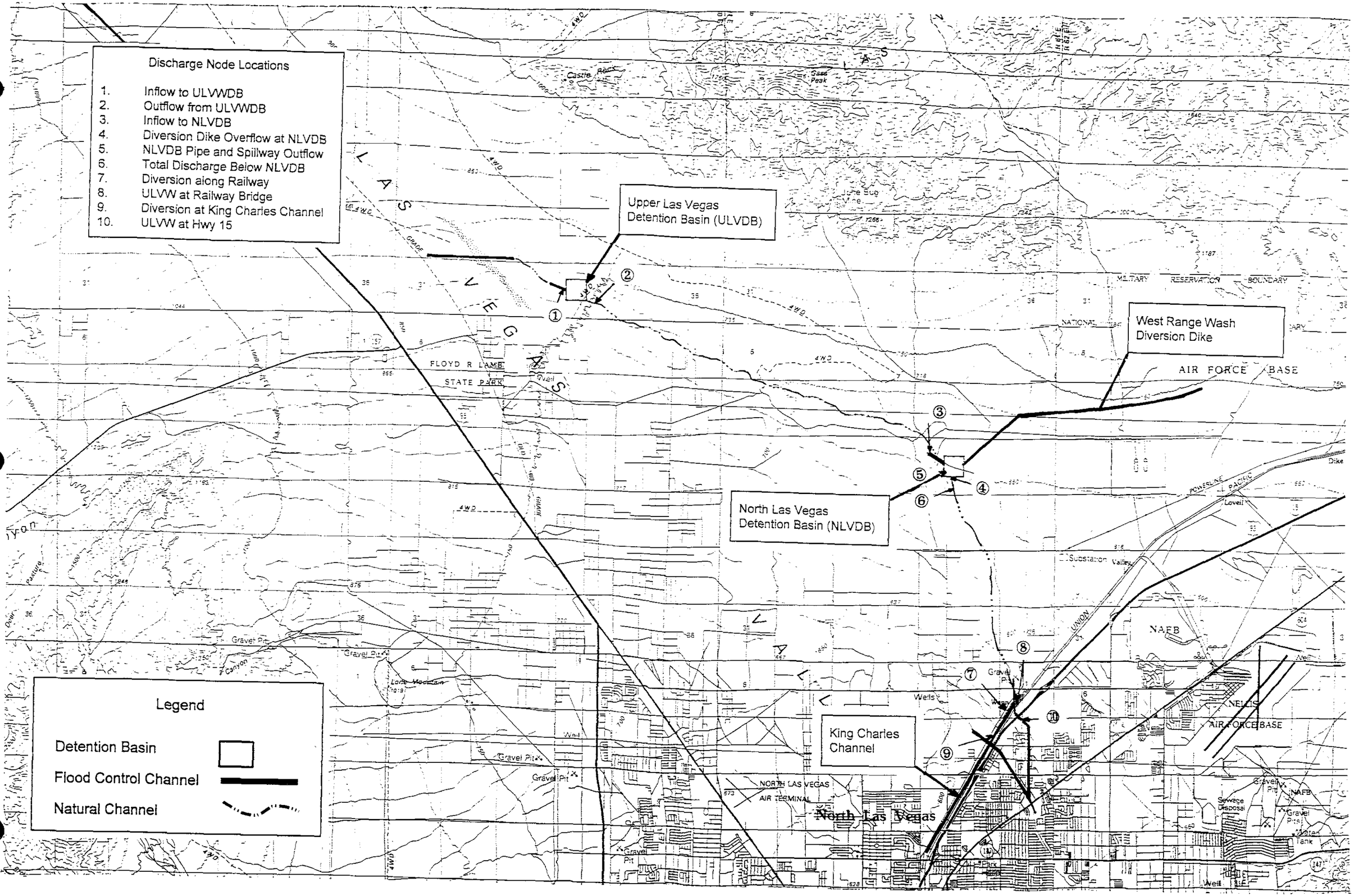


Figure 1-3. Computational Discharge Nodes

Study Contractor: Northwest Hydraulic Consultants

HYDROLOGIC ANALYSES INDEX

City of North Las Vegas, City of Las Vegas, and Clark County, Nevada
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

HYDROLOGIC ANALYSES INDEX

FLOODING SOURCE/ STREAM NAME	HYDROLOGIC METHOD/ MODEL USED	METHOD/MODEL ANALYSIS DATE	EXHIBIT NO. PAPER COPY	EXHIBIT NO. FLOPPY DISKETTES
Spring Mountain Storm/ULVW	HEC-1	5/96	A	CD
Lower Central Valley storm/ULVW	HEC-1	5/96	B	
Interbasin Storm /ULVW	HEC-1	5/96	C	
Range Wash storm /ULVW	HEC-1	12/96	D	

HEC-1 Models

File name: MD_HECWO.ME

METADATA FILE
Upper Las Vegas Wash Without North Las Vegas Detention Basin Diversion Dike

Data Set Identity:	HEC-1 and HEC-2 Data & Output Files
County and State:	Clark County, Nevada
Theme Keywords:	Hydrology and Hydraulics
Representation Model:	N/A
Spatial Object Types:	N/A
Data Set Size:	N/A
Transfer Format:	ASCII
Data Set Description:	HEC-1 and HEC-2 Data & Output Files
Intended Use:	Support for Hydrologic and Hydraulic Computations
Data set extent:	
List of file names included:	
Intended Scale of Use:	N/A
Resolution of Data:	N/A
Projection Name:	N/A
Horizontal Datum:	N/A
Vertical Datum:	National Geodetic Vertical Datum of 1929
Projection Units:	Feet

Zone Number:	N/A
Coordinate Precision:	N/A
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain
Policy Status:	N/A
Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors

Source Name:	HEC-1 and HEC-2 files
Source Scale:	N/A
Source Medium:	Paper, Compact Disk
Creator of Source:	Northwest Hydraulic Consultants
Date of Source Material:	22, April, 1998
Source Projection:	N/A
Processing Procedures:	N/A
Procedure Tolerances:	N/A
Positional Accuracy:	N/A
Positional Accuracy Method:	N/A
Attribute Accuracy:	N/A
Data Model Integrity:	N/A
Completeness:	N/A
Metadata Date:	22, April, 1998
Metadata Contact:	Edward E. Wallace

HEC-1 files listed below were prepared by Northwest Hydraulic Consultants Inc (NHC) for analysis of the North Las Vegas Wash and have not yet been approved. by FEMA. All files were based on files previously prepared by James M Montgomery (JMM) for the Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Flood Insurance Study Hydrology Report, dated September 1991. Source files for the Spring Mountain, Interbasin, and Lower Central Valley Storms were obtained in digital form from the CCRFCD and were all dated January 1991. The model for the Range Wash Storm was copied from the Boyle Engineering Corporation Technical Support Data Notebook for Clark County, Nevada and Incorporated areas, Range Wash Flood Insurance Restudy, Volume 2 Part 1.

Three modifications were made to the JMM HEC-1 files.

1. The files were updated to reflect the as-built stage-storage-outflow characteristics for the Upper Las Vegas Wash Detention Basin, which had not been constructed at the time of the JMM studies. The relationships used in the revised models correspond to data from HEC-1 models prepared in August 1993 by Black & Veatch for the report titled "North Las Vegas Detention Basin Outlet Modification Report."

2. The stage-outflow relationship for the North Las Vegas Detention was revised to reflect the three-pipe outflow configuration which presently exists (two pipes were blocked following completion of the Upper Las Vegas Wash Detention Basin). Also, the stage-outflow relation at low water levels was corrected to reflect the hydraulic control presented by a four-foot high wall (with 13 1-foot square weep holes) which is located immediatly upstream from the pipe inlets. This control appear to have been overlooked in the previous analyses.

3. 500-year storm HEC-1 models were created from the 100-year models by replacing all rainfall (PB Cards) data with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency extrapolation of rainfall amounts found in the JMM 10-. 50-, and 100-year models for each storm centering.

Modifications to the East and West Range Washes 100-Year, 6-Hour Storm, Future Conditions with Alternative IV Facilities, dated 6/5/92, included inserting the stage-outflow relationship for the North Las Vegas Detention described above in item 2. In addition the 100-Year rainfall (PB Cards) data were replaced with extrapolated 500-year amounts as described in item 3.

The HEC-1 models summarized below were used in the draft 1996 NHC Flood Insurance Study review submittal to FEMA.

SP_010.H1I - 10-year Spring Mountain Storm, modified from JMM

HEC-1 file SPR10.DAT as described above.

SP_050.H1I - 50-year Spring Mountain Storm, modified from JMM HEC-1 file SPR50.DAT as described above.

SP_100.H1I - 100-year Spring Mountain Storm, modified from JMM HEC-1 file SPR100.DAT as described above.

SP_500.H1I - 500-year Spring Mountain Storm, modified from JMM HEC-1 file SPR100.DAT as described above.

LC_010.H1I - 10-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW10.DAT as described above.

LC_050.H1I - 50-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW50.DAT as described above.

LC_100.H1I - 100-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW100.DAT as described above.

LC_500.H1I - 500-year Lower Central Valley Storm, modified from JMM HEC-1 file ULVW100.DAT as described above.

RW_500.H1I - 500-year Range Wash Storm, modified from Boyle HEC-1 file described in items 2 and 3.

Paper Copy A
SP Spring Mountain Storm

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*           VERSION 4.0.1 (LOCAL)       *
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                *DIAGRAM
            1   ID          FEMA FLOOD INSURANCE STUDY, 1996
            2   ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
            3   ID          SPRING MOUNTAIN 10-YEAR STORM
            4   ID
            5   ID          Current (05/96) model based on a HEC-1 model prepared by James M
            6   ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
            7   ID          Study Hydrology Report dated 9/91.  Two modifications were made
            8   ID          to the source model.  First, Upper Las Vegas Detention Basin storage
            9   ID          and outflow characteristics were revised to reflect the as-built
           10   ID          configuration described by construction drawings dated 5/91 and HEC-1
           11   ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
           12   ID          relationship for the North Las Vegas Detention Basin was revised
           13   ID          to reflect the current three-pipe outlet condition (two of the five
           14   ID          pipes were blocked following construction of the upper basin) and the
           15   ID          hydraulic control created by the 4-foot high barrier wall located
           16   ID          upstream from the pipe inlets.
           17   ID
           18   ID          Remaining comments are from the original model dated 1/91.
           19   ID
           20   ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
           21   ID          NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
           22   ID          SPRING MOUNTAIN 10-YEAR STORM EXISTING CONDITIONS
           23   ID
           24   ID          Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
           25   ID          CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
           26   ID          The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
           27   ID          portion within the Gowan Area (which is not tributary to the Upper
           28   ID          Las Vegas Wash Detention Basin diversion)
           29   ID          Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
           30   ID          All routing steps immediately d/s of a diversion converted to
           31   ID          Muskingum routing to avoid zero flow, 8/90
           32   ID
           33   ID          This run models the diversion from the West Tributary to the proposed
           34   ID          Upper Las Vegas Wash Detention Basin, 1/91
           35   ID
*** PREE ***
           36   IT      6       0       0     200
           37   IO      5       0       0
           38   IN      5       0       0
           39   JR    PREC   0.903
                * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                * LAS VEGAS WASH DETENTION BASIN

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           41   KM   RUNOFF FROM SUBBASIN 201
           42   BA   5.543
           43   PB    1.44
           44   PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
           45   PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
           46   PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
           47   PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
           48   PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
           49   PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
           50   PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
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1 HEC-1 INPUT PAGE 2

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          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           51   PC    .997    .999   1.00
           52   LS      0      80
```

```
 53          UD    .208

 54          KK     208
 55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
 56          RM       5    0.53    0.15

 57          KK     207
 58          KM   RUNOFF FROM SUBBASIN 207
 59          BA   1.223
 60          PB    1.36
 61          LS       0      72
 62          UD    .358

 63          KK     208
 64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
 65          RM       2    0.20    0.15

 66          KK     208
 67          KM   RUNOFF FROM SUBBASIN 208
 68          BA   8.778
 69          PB    1.44
 70          LS       0      70
 71          UD    .833

 72          KK       .
 73          KM   COMBINE SUBBASINS 201, 207, & 208
 74          HC       3

 75          KK     218
 76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
 77          RM       3    0.35    0.15

 78          KK     205
 79          KM   RUNOFF FROM SUBBASIN 205
 80          BA   9.587
 81          PB    1.44
 82          LS       0      78
 83          UD    .794

 84          KK     206
 85          KM   RUNOFF FROM SUBBASIN 206
 86          BA   6.635
 87          PB    1.36
 88          LS       0      64
 89          UD    .754

 90          KK     211
 91          KM   RUNOFF FROM SUBBASIN 211
 92          BA   3.691
 93          PB    1.36
 94          LS       0      80
 95          UD    .527
1                                        HEC-1 INPUT                                        PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 96          KK       .
 97          KM   COMBINE SUBBASINS 205, 206, & 211
 98          HC       3

 99          KK     217
100          KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101          RM       4    0.40    0.15

102          KK       .
103          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104          HC       2

105          KK     221
106          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107          RM       5    0.50    0.15

108          KK     222
109          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110          RM       5    0.51    0.15

111          KK     212
112          KM   RUNOFF FROM SUBBASIN 212
113          BA   5.641
114          PB    1.36
115          LS       0      82
116          UD    .403

117          KK     224
118          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119          RM       2    0.17    0.15

120          KK     222
121          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122          RM       6    0.63    0.15

123          KK       .
124          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125          HC       2

126          KK     223
127          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128          RM      18    1.84    0.15
```

```
          129          KK     202
          130          KM   RUNOFF FROM SUBBASIN 202
          131          BA   5.523
          132          PB    1.51
          133          LS       0       80
          134          UD    .134
1                                        HEC-1 INPUT                                        PAGE  4

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          135          KK     203
          136          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
          137          RM       3    0.27    0.15

          138          KK     203
          139          KM   RUNOFF FROM SUBBASIN 203
          140          BA   6.249
          141          PB    1.51
          142          LS       0       80
          143          UD    .248

          144          KK     204
          145          KM   RUNOFF FROM SUBBASIN 204
          146          BA   2.458
          147          PB    1.59
          148          LS       0       80
          149          UD    .205

          150          KK       .
          151          KM   COMBINE SUBBASINS 202, 203, & 204
          152          HC       3

          153          KK     209
          154          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
          155          RM       4    0.40    0.15

          156          KK     209
          157          KM   RUNOFF FROM SUBBASIN 209
          158          BA   2.824
          159          PB    1.51
          160          LS       0       69
          161          UD    .500

          162          KK     210
          163          KM   RUNOFF FROM SUBBASIN 210
          164          BA  9.4182
          165          PB    1.51
          166          LS       0       77
          167          UD    .585

          168          KK       .
          169          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
          170          HC       3

          171          KK     213
          172          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
          173          RM       5    0.54    0.15

          174          KK     214
          175          KM   RUNOFF FROM SUBBASIN 214
          176          BA   7.167
          177          PB    1.29
          178          LS       0       80
          179          UD    .869
1                                        HEC-1 INPUT                                        PAGE  5

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          180          KK     215
          181          KM   RUNOFF FROM SUBBASIN 215
          182          BA   9.983
          183          PB    1.29
          184          LS       0       78
          185          UD    .717

          186          KK     213
          187          KM   RUNOFF FROM SUBBASIN 213
          188          BA  16.253
          189          PB    1.29
          190          LS       0       77
          191          UD   1.196

          192          KK       .
          193          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
          194          HC       4

          195          KK     223
          196          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
          197          KM    214, & 215 THRU SUBBASIN 223
          198          RM       3    0.29    0.15

          199          KK       V
          200          RM       6    0.58    0.15

          201          KK       V
          202          RM      18    1.83    0.15
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203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB    1.06
207          LS       0      77
208          UD    3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SR 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP     300       3

215          KK       .
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP     500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1    STOR      -1
222          SV       0      12      80     170     320     560    1000    1610    1800    1980
223          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
224          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
225          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
226          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
227          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

228          KK     116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK     109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK       .
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
242          DI   17775   20135   23000
243          DQ       0       0       0       0       0     410    1225    2435    3565    5135
244          DQ    6775    8635   11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1    STOR      -1
249          SV       0      25     100     190     430     665    1095    1285    1435    1540
250          SV    1650    1825    1920    2000    2110    2200    2310    2430
251          SE       0       2       4       6      10      14      21      24      26      27
252          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
254          SQ    3050    4630    5710    7090    8610   10140   11670   13200
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

255          KK       .
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK       .
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
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264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI       0    6000   20000
268          DQ       0       0   13500

269          KK     I15
270          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT    KCHAR
272          DI       0    1000   10000
273          DQ       0     800    8000

274          KK     NC1
275          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK     700  0.0058   0.016       0    TRAP      10       2

277          KK       V
278          RK    2000  0.0100   0.035       0    TRAP      30       2

279          KK     NC2
280          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM   TO GOWAN AVE.
282          RK    1300   .0056    .030       0    TRAP      12       2

283          KK     NC3
284          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM   TO CHEYENNE AVE.
286          RK    2600   .0021    .030       0    TRAP      20     2.5

287          KK     NC4
288          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK    1300    .003    .016       0    TRAP      18       2

291          KK     NC5
292          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM   (LINED CHANNEL)
294          RK     500    .001    .016       0    TRAP      18       2
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA   0.001
300          PB    2.00
301          LS       0      80
302          UD    1.00

303          KKDUMMY_COMBINE
304          KM   Combine dummy subarea with recalled RRCHANNEL diversion
305          HC       2

306          KKRRCHANNL
307          RK    4900   .0041     .03       0    TRAP      40       2

308          KK    I-15
309          DR   KCHAR

310          KKDUMMY_AREA
311          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA   0.001
313          PB    2.00
314          LS       0      80
315          UD    1.00

316          KKDUMMY_COMBINE
317          KM   Combine dummy subarea with recalled KCHAR diversion
318          HC       2

319          KK ACHANNL
320          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC       2

322          KK     AC1
323          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK     750   .0092    .035       0    TRAP      12     1.5

325          KK     AC2
326          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK    1600   .0065    .035       0    TRAP      37     2.5

328          KK     AC3
329          RK    1600   .0065    .030       0    TRAP      52     1.5

330          KK     AC4
331          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK    1650   .0053    .030       0    TRAP      70     1.5
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


333          KK NCHANNL
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          334          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          335          HC       2

          336          KK     AC5
          337          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
          338          RK     450    .0053     .030        0    TRAP       70     1.5

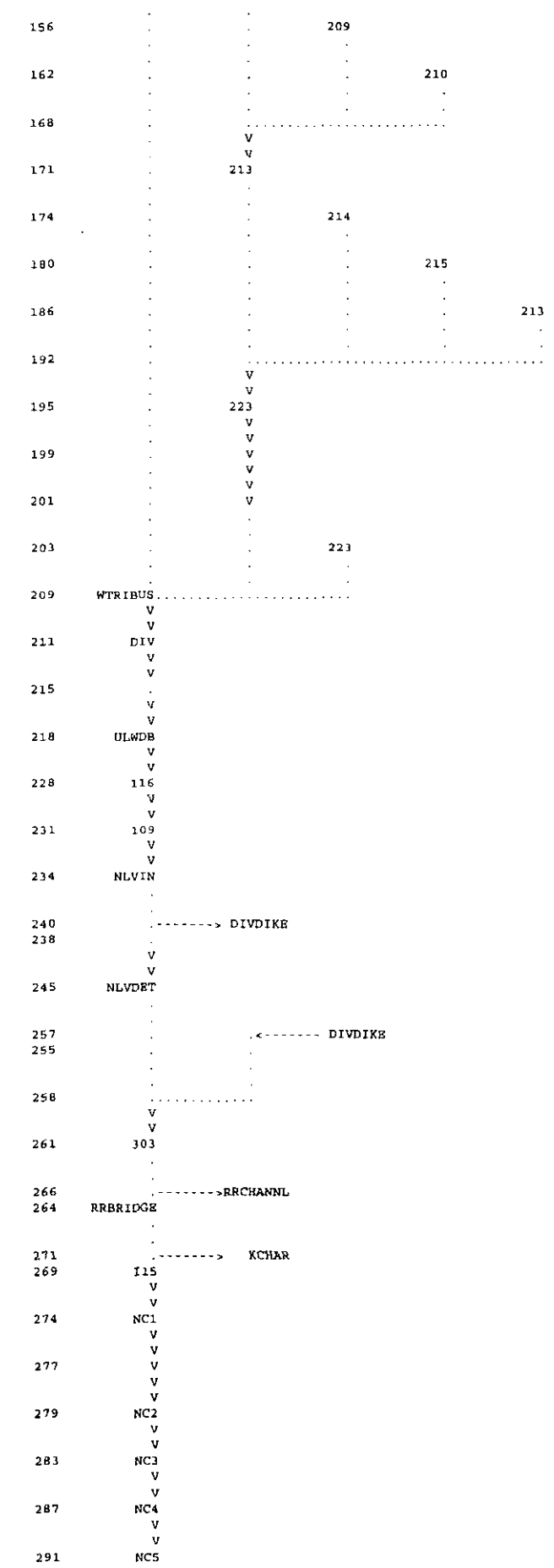
          339          KK     AC6
          340          RK    1300    .0047     .030        0    TRAP       78     1.5

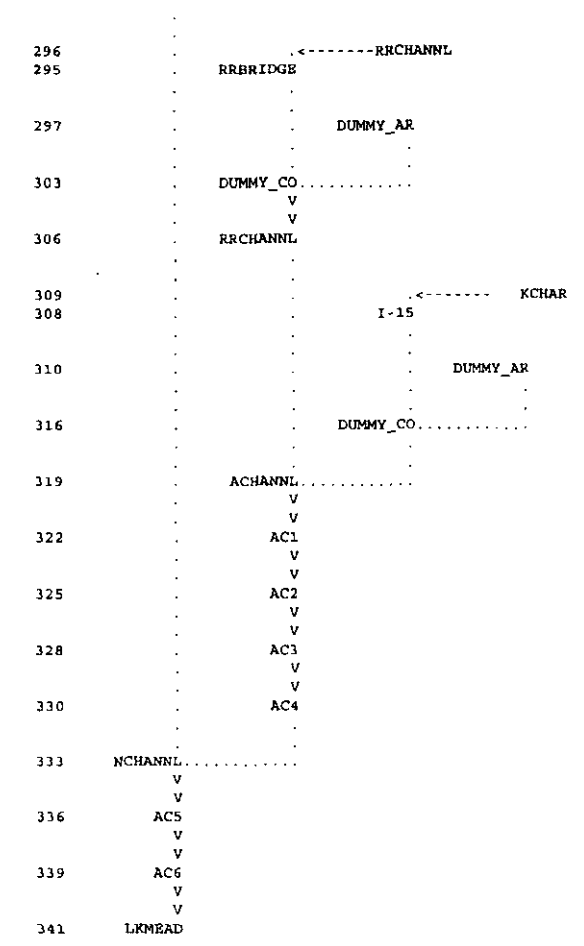
          341          KK  LKMEAD
          342          KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
          343          KM   THRU "A" CHANNEL
          344          RK    4500     .004     .030        0    TRAP       96     1.5
          345          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

    40          201
                  V
                  V
    54          208
                  .
                  .
    57            .          207
                  .            V
                  .            V
    63            .          208
                  .            .
                  .            .
    66            .            .          208
                  .            .            .
                  .            .            .
    72            ..........................
                  V
                  V
    75          218
                  .
                  .
    78            .          205
                  .            .
                  .            .
    84            .            .          206
                  .            .            .
                  .            .            .
    90            .            .            .          211
                  .            .            .            .
                  .            .            .            .
    96            .            ...........................
                  .            V
                  .            V
    99            .          217
                  .            .
                  .            .
   102            ..............
                  V
                  V
   105          221
                  V
                  V
   108          222
                  .
                  .
   111            .          212
                  .            V
                  .            V
   117            .          224
                  .            V
                  .            V
   120            .          222
                  .            .
                  .            .
   123            ..............
                  V
                  V
   126          223
                  .
                  .
   129            .          202
                  .            V
                  .            V
   135            .          203
                  .            .
                  .            .
   138            .            .          203
                  .            .            .
                  .            .            .
   144            .            .            .          204
                  .            .            .            .
                  .            .            .            .
   150            .            ...........................
                  .            V
                  .            V
   153            .          209
                  .            .
```


156
209
162
210
168
171
213
174
214
180
215
186
213
192
195
223
199
201
203
223
209
WTRIBUS
211
DIV
215
218
ULWDB
228
116
231
109
234
NLVIN
240
DIVDIKE
238
245
NLVDET
257
DIVDIKE
255
258
261
303
266
RRCHANNL
264
RRBRIDGE
271
KCHAR
269
I15
274
NC1
277
279
NC2
283
NC3
287
NC4
291
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:01   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 10-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 10-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
  37 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN          6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1954  ENDING TIME
                      ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL    0.10 HOURS
                      TOTAL TIME BASE   19.90 HOURS

           ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    0.90
1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                          FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                        TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA     PLAN                 RATIO 1
                                                             0.90

 HYDROGRAPH AT
+                  201       5.54      1    FLOW            525.
                                              TIME           3.60

 ROUTED TO
+                  208       5.54      1    FLOW            392.
                                              TIME           4.20

 HYDROGRAPH AT
+                  207       1.22      1    FLOW             33.
                                              TIME           5.00

 ROUTED TO
+                  208       1.22      1    FLOW             30.
                                              TIME           5.20

 HYDROGRAPH AT
+                  208       8.78      1    FLOW            140.
                                              TIME           5.50

   3 COMBINED AT
+                    .      15.54      1    FLOW            545.
                                              TIME           5.40

 ROUTED TO
+                  218       15.54     1    FLOW            503.
                                              TIME           5.70

 HYDROGRAPH AT
+                  205       9.59      1    FLOW            439.
                                              TIME           5.30

 HYDROGRAPH AT
+                  206       6.64      1    FLOW              5.
                                              TIME           5.80

 HYDROGRAPH AT
+                  211       3.69      1    FLOW            205.
                                              TIME           5.10

   3 COMBINED AT
+                    .       19.91     1    FLOW            634.
                                              TIME           5.30

 ROUTED TO
+                  217       19.91     1    FLOW            609.
                                              TIME           5.60

   2 COMBINED AT
+                    .       35.46     1    FLOW           1110.
                                              TIME           5.70

   ROUTED TO
```

+	221	35.46	1	FLOW	1051.
				TIME	6.20
ROUTED TO					
+	222	35.46	1	FLOW	1011.
				TIME	6.60
HYDROGRAPH AT					
+	212	5.64	1	FLOW	431.
				TIME	3.90
ROUTED TO					
+	224	5.64	1	FLOW	414.
				TIME	4.10
ROUTED TO					
+	222	5.64	1	FLOW	362.
				TIME	4.70
2 COMBINED AT					
+	.	41.10	1	FLOW	1167.
				TIME	5.90
ROUTED TO					
+	223	41.10	1	FLOW	1123.
				TIME	8.00
HYDROGRAPH AT					
+	202	5.52	1	FLOW	715.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	557.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	632.
				TIME	3.70
HYDROGRAPH AT					
+	204	2.46	1	FLOW	324.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	1386.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	1203.
				TIME	4.20
HYDROGRAPH AT					
+	209	2.82	1	FLOW	63.
				TIME	5.20
HYDROGRAPH AT					
+	210	9.42	1	FLOW	504.
				TIME	5.20
3 COMBINED AT					
+	.	26.47	1	FLOW	1643.
				TIME	5.30
ROUTED TO					
+	213	26.47	1	FLOW	1482.
				TIME	5.80
HYDROGRAPH AT					
+	214	7.17	1	FLOW	290.
				TIME	5.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	352.
				TIME	5.30
HYDROGRAPH AT					
+	213	16.25	1	FLOW	398.
				TIME	5.70
4 COMBINED AT					
+	.	59.88	1	FLOW	2381.
				TIME	5.70
ROUTED TO					
+	223	59.88	1	FLOW	2332.
				TIME	6.00
ROUTED TO					
+	V	59.88	1	FLOW	2271.
				TIME	6.50
ROUTED TO					
+	V	59.88	1	FLOW	2164.
				TIME	8.10
HYDROGRAPH AT					
+	223	35.36	1	FLOW	181.
				TIME	8.00

3 COMBINED AT					
+	WTRIBUS	136.34	1	FLOW	3465.
				TIME	8.10
ROUTED TO					
+	DIV	136.34	1	FLOW	3460.
				TIME	8.20
ROUTED TO					
+	.	136.34	1	FLOW	3457.
				TIME	8.40
ROUTED TO					
+	ULWDB	136.34	1	FLOW	2426.
				TIME	9.30
			** PEAK STAGES IN FEET **		
			1	STAGE	2351.26
				TIME	9.30
ROUTED TO					
+	116	136.34	1	FLOW	2418.
				TIME	9.80
ROUTED TO					
+	109	136.34	1	FLOW	2410.
				TIME	10.20
ROUTED TO					
+	NLVIN	136.34	1	FLOW	2400.
				TIME	10.80
DIVERSION TO					
+	DIVDIKE	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT					
+	.	136.34	1	FLOW	2400.
				TIME	10.80
ROUTED TO					
+	NLVDET	136.34	1	FLOW	1292.
				TIME	12.70
			** PEAK STAGES IN FEET **		
			1	STAGE	9.90
				TIME	12.70
HYDROGRAPH AT					
+	.	0.00	1	FLOW	0.
				TIME	0.10
2 COMBINED AT					
+	.	136.34	1	FLOW	1292.
				TIME	12.70
ROUTED TO					
+	303	136.34	1	FLOW	1281.
				TIME	14.00
DIVERSION TO					
+	RRCHANNL	136.34	1	FLOW	0.
				TIME	0.10
HYDROGRAPH AT					
+	RRBRIDGE	136.34	1	FLOW	1281.
				TIME	14.00
DIVERSION TO					
+	KCHAR	136.34	1	FLOW	1024.
				TIME	14.00
HYDROGRAPH AT					
+	I15	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	NC1	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	V	136.34	1	FLOW	256.
				TIME	14.00
ROUTED TO					
+	NC2	136.34	1	FLOW	256.
				TIME	14.10
ROUTED TO					
+	NC3	136.34	1	FLOW	256.
				TIME	14.20
ROUTED TO					
+	NC4	136.34	1	FLOW	256.
				TIME	14.20
ROUTED TO					
+	NC5	136.34	1	FLOW	256.
				TIME	14.20

```
 HYDROGRAPH AT
+               RRBRIDGE       0.00      1   FLOW            0.
                                             TIME          0.10

 HYDROGRAPH AT
+               DUMMY_AR       0.00      1   FLOW            0.
                                             TIME          4.50

  2 COMBINED AT
+               DUMMY_CO       0.00      1   FLOW            0.
                                             TIME          4.50

 ROUTED TO
+               RRCHANNL       0.00      1   FLOW            0.
                                             TIME          8.20

 HYDROGRAPH AT
+                    I-15      0.00      1   FLOW         1024.
                                             TIME         14.00

 HYDROGRAPH AT
+               DUMMY_AR       0.00      1   FLOW            0.
                                             TIME          4.50

  2 COMBINED AT
+               DUMMY_CO       0.00      1   FLOW         1024.
                                             TIME         14.00

  2 COMBINED AT
+                ACHANNL       0.00      1   FLOW         1024.
                                             TIME         14.00

 ROUTED TO
+                     AC1      0.00      1   FLOW         1024.
                                             TIME         14.00

 ROUTED TO
+                     AC2      0.00      1   FLOW         1024.
                                             TIME         14.00

 ROUTED TO
+                     AC3      0.00      1   FLOW         1024.
                                             TIME         14.10

 ROUTED TO
+                     AC4      0.00      1   FLOW         1024.
                                             TIME         14.10

  2 COMBINED AT
+                NCHANNL    136.34      1   FLOW         1279.
                                             TIME         14.10

 ROUTED TO
+                     AC5    136.34      1   FLOW         1279.
                                             TIME         14.10

 ROUTED TO
+                     AC6    136.34      1   FLOW         1279.
                                             TIME         14.10

 ROUTED TO
+                  LKMEAD    136.34      1   FLOW         1279.
                                             TIME         14.20
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
          ISTAQ     ELEMENT      DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                      PEAK                                        PEAK

                                (MIN)      (CFS)     (MIN)       (IN)     (MIN)      (CFS)     (MIN)        (IN)

        FOR PLAN = 1  RATIO= 0.90
             DIV  MANE          5.21   3463.51    495.48       0.11      6.00   3459.62    492.00        0.11

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7722E+03 EXCESS=0.0000E+00 OUTFLOW=0.7720E+03 BASIN STORAGE=0.1069E+01 PERCENT ERROR=  -0.1

        FOR PLAN = 1  RATIO= 0.90
               MANE          3.77   3458.58    502.91       0.11      6.00   3456.94    504.00        0.11

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7720E+03 EXCESS=0.0000E+00 OUTFLOW=0.7711E+03 BASIN STORAGE=0.1033E+01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
             NC1  MANE          0.45    256.10    840.38       0.02      6.00    256.09    840.00        0.02

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1275E+03 EXCESS=0.0000E+00 OUTFLOW=0.1274E+03 BASIN STORAGE=0.9933E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.90
               V  MANE          1.58    256.07    843.08       0.02      6.00    255.97    840.00        0.02

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1274E+03 EXCESS=0.0000E+00 OUTFLOW=0.1268E+03 BASIN STORAGE=0.5542E+00 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          1.06    255.97    843.09      0.02      6.00    255.96    846.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1268E+03 EXCESS=0.0000E+00 OUTFLOW=0.1265E+03 BASIN STORAGE=0.3098E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          2.92    255.92    850.26      0.02      6.00    255.89    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1265E+03 EXCESS=0.0000E+00 OUTFLOW=0.1254E+03 BASIN STORAGE=0.1022E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.89    255.87    853.29      0.02      6.00    255.86    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1253E+03 EXCESS=0.0000E+00 OUTFLOW=0.1250E+03 BASIN STORAGE=0.2923E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.47    255.85    853.04      0.02      6.00    255.83    852.00        0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1250E+03 EXCESS=0.0000E+00 OUTFLOW=0.1248E+03 BASIN STORAGE=0.1636E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
           RRCHANNL  MANE          6.00      0.11    493.12      0.64      6.00      0.11    492.00        0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.33   1024.42    840.53   4779.70      6.00   1024.37    840.00     4778.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5101E+03 EXCESS=0.0000E+00 OUTFLOW=0.5098E+03 BASIN STORAGE=0.4075E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.92   1024.33    841.67   4769.08      6.00   1024.08    840.00     4764.70

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5097E+03 EXCESS=0.0000E+00 OUTFLOW=0.5087E+03 BASIN STORAGE=0.1332E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.85   1024.07    841.79   4753.96      6.00   1023.77    846.00     4751.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5082E+03 EXCESS=0.0000E+00 OUTFLOW=0.5071E+03 BASIN STORAGE=0.1339E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          1.04   1023.74    846.47   4739.14      6.00   1023.74    846.00     4734.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5068E+03 EXCESS=0.0000E+00 OUTFLOW=0.5055E+03 BASIN STORAGE=0.1653E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.37   1279.22    846.44      0.09      6.00   1279.14    846.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6298E+03 EXCESS=0.0000E+00 OUTFLOW=0.6293E+03 BASIN STORAGE=0.5286E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.82   1279.11    847.76      0.09      6.00   1278.71    846.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6293E+03 EXCESS=0.0000E+00 OUTFLOW=0.6277E+03 BASIN STORAGE=0.1660E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
             LKMEAD  MANE          2.97   1278.70    852.17      0.09      6.00   1278.64    852.00        0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6275E+03 EXCESS=0.0000E+00 OUTFLOW=0.6216E+03 BASIN STORAGE=0.6680E+01 PERCENT ERROR=  -0.1


*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:20   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
            1           ID          FEMA FLOOD INSURANCE STUDY, 1996
            2           ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
            3           ID          SPRING MOUNTAIN 50-YEAR STORM
            4           ID
            5           ID          Current (05/96) model based on a HEC-1 model prepared by James M
            6           ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
            7           ID          Study Hydrology Report dated 9/91.  Two modifications were made
            8           ID          to the source model.  First, Upper Las Vegas Detention Basin storage
            9           ID          and outflow characteristics were revised to reflect the as-built
           10           ID          configuration described by construction drawings dated 5/91 and HEC-1
           11           ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
           12           ID          relationship for the North Las Vegas Detention Basin was revised
           13           ID          to reflect the current three-pipe outlet condition (two of the five
           14           ID          pipes were blocked following construction of the upper basin) and the
           15           ID          hydraulic control created by the 4-foot high barrier wall located
           16           ID          upstream from the pipe inlets.
           17           ID
           18           ID          Remaining comments are from the original model dated 1/91.
           19           ID
           20           ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
           21           ID          NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
           22           ID          SPRING MOUNTAIN 50-YEAR STORM EXISTING CONDITIONS
           23           ID
           24           ID          Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
           25           ID          CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
           26           ID          The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
           27           ID          portion within the Gowan Area (which is not tributary to the Upper
           28           ID          Las Vegas Wash Detention Basin diversion)
           29           ID          Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
           30           ID          All routing steps immediately d/s of a diversion converted to
           31           ID          Muskingum routing to avoid zero flow, 8/90
           32           ID
           33           ID          This run models the diversion from the West Tributary to the proposed
           34           ID          Upper Las Vegas Wash Detention Basin, 1/91
           35           ID
*** FREE ***
           36           IT       6        0        0      200
           37           IQ       5        0        0
           38           IN       5        0        0
           39           JR    PREC    0.903
                        * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                        * LAS VEGAS WASH DETENTION BASIN

           40           KK     201
           41           KM   RUNOFF FROM SUBBASIN 201
           42           BA   5.543
           43           PB    2.20
           44           PC    .000     .020     .059     .080     .110     .144     .150     .160     .168     .171
           45           PC    .180     .182     .187     .190     .197     .202     .210     .220     .230     .241
           46           PC    .250     .259     .265     .280     .290     .300     .305     .309     .310     .317
           47           PC    .321     .327     .333     .346     .361     .381     .408     .430     .477     .514
           48           PC    .561     .630     .710     .720     .731     .752     .779     .790     .795     .804
           49           PC    .810     .820     .826     .840     .859     .889     .910     .938     .966     .970
           50           PC    .974     .979     .981     .983     .985     .989     .990     .992     .993     .996
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1 HEC-1 INPUT PAGE 2

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          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           51           PC    .997     .999    1.00
           52           LS       0       80
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```
53          UD    .208

54          KK     208
55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
56          RM       5    0.53    0.15

57          KK     207
58          KM   RUNOFF FROM SUBBASIN 207
59          BA   1.223
60          PB    2.03
61          LS       0       72
62          UD    .358

63          KK     208
64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
65          RM       2    0.20    0.15

66          KK     208
67          KM   RUNOFF FROM SUBBASIN 208
68          BA   8.778
69          PB    2.03
70          LS       0       70
71          UD    .833

72          KK       .
73          KM   COMBINE SUBBASINS 201, 207, & 208
74          HC       3

75          KK     218
76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
77          RM       3    0.35    0.15

78          KK     205
79          KM   RUNOFF FROM SUBBASIN 205
80          BA   9.587
81          PB    2.20
82          LS       0       78
83          UD    .794

84          KK     206
85          KM   RUNOFF FROM SUBBASIN 206
86          BA   6.635
87          PB    2.03
88          LS       0       64
89          UD    .754

90          KK     211
91          KM   RUNOFF FROM SUBBASIN 211
92          BA   3.691
93          PB    2.03
94          LS       0       80
95          UD    .527
1                                    HEC-1 INPUT                                    PAGE  3

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

96          KK       .
97          KM   COMBINE SUBBASINS 205, 206, & 211
98          HC       3

99          KK     217
100         KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101         RM       4    0.40    0.15

102         KK       .
103         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104         HC       2

105         KK     221
106         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107         RM       5    0.50    0.15

108         KK     222
109         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110         RM       5    0.51    0.15

111         KK     212
112         KM   RUNOFF FROM SUBBASIN 212
113         BA   5.641
114         PB    2.03
115         LS       0       82
116         UD    .403

117         KK     224
118         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119         RM       2    0.17    0.15

120         KK     222
121         KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122         RM       6    0.63    0.15

123         KK       .
124         KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125         HC       2

126         KK     223
127         KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128         RM      18    1.84    0.15
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 129          KK     202
 130          KM   RUNOFF FROM SUBBASIN 202
 131          BA   5.523
 132          PB    2.28
 133          LS       0       80
 134          UD    .134
1                                        HEC-1 INPUT                                        PAGE  4

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 135          KK     203
 136          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
 137          RM       3    0.27    0.15

 138          KK     203
 139          KM   RUNOFF FROM SUBBASIN 203
 140          BA   6.249
 141          PB    2.28
 142          LS       0       80
 143          UD    .248

 144          KK     204
 145          KM   RUNOFF FROM SUBBASIN 204
 146          BA   2.458
 147          PB    2.28
 148          LS       0       80
 149          UD    .205

 150          KK       .
 151          KM   COMBINE SUBBASINS 202, 203, & 204
 152          HC       3

 153          KK     209
 154          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
 155          RM       4    0.40    0.15

 156          KK     209
 157          KM   RUNOFF FROM SUBBASIN 209
 158          BA   2.824
 159          PB    2.28
 160          LS       0       69
 161          UD    .500

 162          KK     210
 163          KM   RUNOFF FROM SUBBASIN 210
 164          BA  9.4182
 165          PB    2.20
 166          LS       0       77
 167          UD    .585

 168          KK       .
 169          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
 170          HC       3

 171          KK     213
 172          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
 173          RM       5    0.54    0.15

 174          KK     214
 175          KM   RUNOFF FROM SUBBASIN 214
 176          BA   7.167
 177          PB    1.86
 178          LS       0       80
 179          UD    .869
1                                        HEC-1 INPUT                                        PAGE  5

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 180          KK     215
 181          KM   RUNOFF FROM SUBBASIN 215
 182          BA   9.983
 183          PB    1.86
 184          LS       0       78
 185          UD    .717

 186          KK     213
 187          KM   RUNOFF FROM SUBBASIN 213
 188          BA  16.253
 189          PB    2.03
 190          LS       0       77
 191          UD   1.196

 192          KK       .
 193          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
 194          HC       4

 195          KK     223
 196          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
 197          KM    214, & 215 THRU SUBBASIN 223
 198          RM       3    0.29    0.15

 199          KK       V
 200          RM       6    0.58    0.15

 201          KK       V
 202          RM      18    1.83    0.15
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203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB    1.52
207          LS       0      77
208          UD    3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM     UPPER LAS VEGAS WASH DETENTION BASIN
             * KM     DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
1                                        HEC-1 INPUT                                        PAGE  6

        LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP     300       3

215          KK       .
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP     500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1     STOR      -1
222          SV       0       12       80      170      320      560     1000     1610     1800     1980
223          SV    2150     2330     2500     2690     2900     3100     3600     4950     6680
224          SE    2335     2340     2345     2350     2355     2360     2365     2370     2371     2372
225          SE    2373     2374     2375     2376     2377     2378     2380     2385     2390
226          SQ       0      600     1700     2300     2800     3300     3750     4100     4170     4240
227          SQ    6200     9960    15150    21140    28320    36220    54120   110170   180730

228          KK     116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK     109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK       .
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0     2000     6000     8000     8200     8910    10225    11935    13565    15635
242          DI   17775    20135    23000
243          DQ       0        0        0        0        0      410     1225     2435     3565     5135
244          DQ    6775     8635    11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1     STOR      -1
249          SV       0       25      100      190      430      665     1095     1285     1435     1540
250          SV    1650     1825     1920     2000     2110     2200     2310     2430
251          SE       0        2        4        6       10       14       21       24       26       27
252          SE      28       30       31       32       33       34       35       36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0       77      117      597     1310     1660     2110     2260     2360     2690
254          SQ    3050     4630     5710     7090     8610    10140    11670    13200
1                                        HEC-1 INPUT                                        PAGE  7

        LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

255          KK       .
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK       .
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
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264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI        0    6000   20000
268          DQ        0       0   13500

269          KK     I15
270          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT   KCHAR
272          DI        0    1000   10000
273          DQ        0     800    8000

274          KK     NC1
275          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK     700  0.0058   0.016       0    TRAP      10       2

277          KK       V
278          RK    2000  0.0100   0.035       0    TRAP      30       2

279          KK     NC2
280          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM   TO GOWAN AVE.
282          RK    1300   .0056    .030       0    TRAP      12       2

283          KK     NC3
284          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM   TO CHEYENNE AVE.
286          RK    2600   .0021    .030       0    TRAP      20     2.5

287          KK     NC4
288          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK    1300    .003    .016       0    TRAP      18       2

291          KK     NC5
292          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM   (LINED CHANNEL)
294          RK     500    .001    .016       0    TRAP      18       2
1                                        HEC-1 INPUT                                        PAGE  8

          LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA   0.001
300          PB    2.00
301          LS       0      80
302          UD    1.00

303          KKDUMMY_COMBINE
304          KM   Combine dummy subarea with recalled RRCHANNEL diversion
305          HC       2

306          KKRRCHANNL
307          RK    4900   .0041     .03       0    TRAP      40       2

308          KK    I-15
309          DR   KCHAR

310          KKDUMMY_AREA
311          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA   0.001
313          PB    2.00
314          LS       0      80
315          UD    1.00

316          KKDUMMY_COMBINE
317          KM   Combine dummy subarea with recalled KCHAR diversion
318          HC       2

319          KK ACHANNL
320          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC       2

322          KK     AC1
323          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK     750   .0092    .035       0    TRAP      12     1.5

325          KK     AC2
326          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK    1600   .0065    .035       0    TRAP      37     2.5

328          KK     AC3
329          RK    1600   .0065    .030       0    TRAP      52     1.5

330          KK     AC4
331          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK    1650   .0053    .030       0    TRAP      70     1.5
1                                        HEC-1 INPUT                                        PAGE  9

          LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


333          KK NCHANNL
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          334           KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          335           HC       2

          336           KK     AC5
          337           KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
          338           RK     450   .0053    .030        0    TRAP       70     1.5

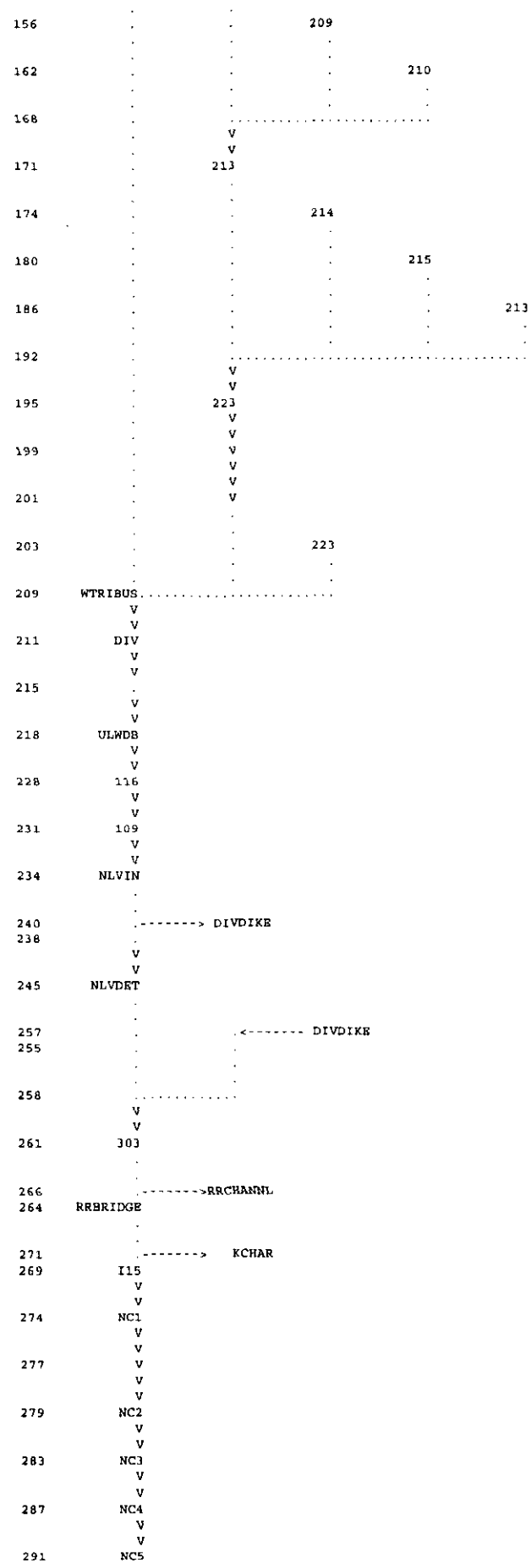
          339           KK     AC6
          340           RK    1300   .0047    .030        0    TRAP       78     1.5

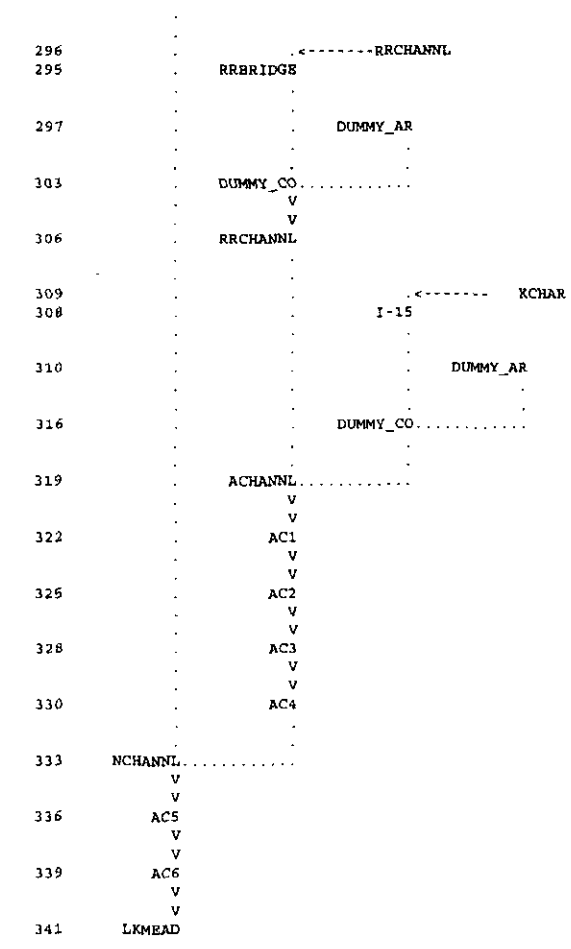
          341           KK  LKMEAD
          342           KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
          343           KM   THRU "A" CHANNEL
          344           RK    4500    .004    .030        0    TRAP       96     1.5
          345           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

    40          201
                  V
                  V
    54          208
                  .
                  .
    57            .           207
                  .             V
                  .             V
    63            .           208
                  .             .
                  .             .
    66            .             .           208
                  .             .             .
                  .             .             .
    72            .........................
                  V
                  V
    75          218
                  .
                  .
    78            .           205
                  .             .
                  .             .
    84            .             .           206
                  .             .             .
                  .             .             .
    90            .             .             .           211
                  .             .             .             .
                  .             .             .             .
    96            .             ...........................
                  .             V
                  .             V
    99            .           217
                  .             .
                  .             .
   102            ..............
                  V
                  V
   105          221
                  V
                  V
   108          222
                  .
                  .
   111            .           212
                  .             V
                  .             V
   117            .           224
                  .             V
                  .             V
   120            .           222
                  .             .
                  .             .
   123            ..............
                  V
                  V
   126          223
                  .
                  .
   129            .           202
                  .             V
                  .             V
   135            .           203
                  .             .
                  .             .
   138            .             .           203
                  .             .             .
                  .             .             .
   144            .             .             .           204
                  .             .             .             .
                  .             .             .             .
   150            .             ...........................
                  .             V
                  .             V
   153            .           209
                  .             .
```


156
209
162
210
168
171
213
174
214
180
215
186
213
192
195
223
199
201
203
223
209
WTRIBUS
211
DIV
215
218
ULWDB
228
116
231
109
234
NLVIN
240
DIVDIKE
238
245
NLVDET
257
DIVDIKE
255
258
261
303
266
RRCHANNL
264
RRBRIDGE
271
KCHAR
269
I15
274
NC1
277
279
NC2
283
NC3
287
NC4
291
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:20   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 50-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 50-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
  37 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                        NMIN          6  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1   0  ENDING DATE
                      NDTIME       1954  ENDING TIME
                       ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL    0.10 HOURS
                        TOTAL TIME BASE   19.90 HOURS

           ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT

      JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    0.90
1

             PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                          FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                        TIME TO PEAK IN HOURS


                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA     PLAN                 RATIO 1
                                                                0.90

 HYDROGRAPH AT
+                    201       5.54     1   FLOW            1666.
                                               TIME             3.60

 ROUTED TO
+                    208       5.54     1   FLOW            1227.
                                               TIME             4.20

 HYDROGRAPH AT
+                    207       1.22     1   FLOW             111.
                                               TIME             5.00

 ROUTED TO
+                    208       1.22     1   FLOW             104.
                                               TIME             5.20

 HYDROGRAPH AT
+                    208       8.78     1   FLOW             488.
                                               TIME             5.40

   3 COMBINED AT
+                      .      15.54     1   FLOW            1608.
                                               TIME             4.20

 ROUTED TO
+                    218      15.54     1   FLOW            1474.
                                               TIME             4.60

 HYDROGRAPH AT
+                    205       9.59     1   FLOW            1258.
                                               TIME             4.30

 HYDROGRAPH AT
+                    206       6.64     1   FLOW             202.
                                               TIME             5.40

 HYDROGRAPH AT
+                    211       3.69     1   FLOW             589.
                                               TIME             4.00

   3 COMBINED AT
+                      .      19.91     1   FLOW            1823.
                                               TIME             4.20

 ROUTED TO
+                    217      19.91     1   FLOW            1749.
                                               TIME             5.60

   2 COMBINED AT
+                      .      35.46     1   FLOW            3220.
                                               TIME             4.60

 ROUTED TO
```

+	221	35.46	1	FLOW	3043.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	2929.
				TIME	5.70
HYDROGRAPH AT					
+	212	5.64	1	FLOW	1218.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	1167.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	1011.
				TIME	4.70
2 COMBINED AT					
+	.	41.10	1	FLOW	3670.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	3418.
				TIME	7.70
HYDROGRAPH AT					
+	202	5.52	1	FLOW	1968.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	1634.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	1826.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	806.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	3975.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	3424.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	243.
				TIME	5.10
HYDROGRAPH AT					
+	210	9.42	1	FLOW	1337.
				TIME	4.10
3 COMBINED AT					
+	.	26.47	1	FLOW	4961.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	4394.
				TIME	4.70
HYDROGRAPH AT					
+	214	7.17	1	FLOW	702.
				TIME	4.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	882.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	1402.
				TIME	5.50
4 COMBINED AT					
+	.	59.88	1	FLOW	7015.
				TIME	4.70
ROUTED TO					
+	223	59.88	1	FLOW	6845.
				TIME	5.00
ROUTED TO					
+	V	59.88	1	FLOW	6583.
				TIME	5.60
ROUTED TO					
+	V	59.88	1	FLOW	6162.
				TIME	7.70
HYDROGRAPH AT					
+	223	35.36	1	FLOW	732.
				TIME	7.70

```
  3 COMBINED AT
+                 WTRIBUS    136.34     1   FLOW       10312.
                                             TIME        7.70

 ROUTED TO
+                     DIV    136.34     1   FLOW       10304.
                                             TIME        7.80

 ROUTED TO
+                       .    136.34     1   FLOW       10299.
                                             TIME        7.90

 ROUTED TO
+                   ULWDB    136.34     1   FLOW        3888.
                                             TIME        9.70

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE     2366.98
                                             TIME        9.70

 ROUTED TO
+                     116    136.34     1   FLOW        3885.
                                             TIME       10.20

 ROUTED TO
+                     109    136.34     1   FLOW        3882.
                                             TIME       10.70

 ROUTED TO
+                   NLVIN    136.34     1   FLOW        3878.
                                             TIME       11.20

 DIVERSION TO
+                 DIVDIKE    136.34     1   FLOW           0.
                                             TIME        0.10

 HYDROGRAPH AT
+                       .    136.34     1   FLOW        3878.
                                             TIME       11.20

 ROUTED TO
+                  NLVDET    136.34     1   FLOW        2186.
                                             TIME       16.20

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE       22.51
                                             TIME       16.20

 HYDROGRAPH AT
+                       .      0.00     1   FLOW           0.
                                             TIME        0.10

  2 COMBINED AT
+                       .    136.34     1   FLOW        2186.
                                             TIME       16.20

 ROUTED TO
+                     303    136.34     1   FLOW        2183.
                                             TIME       17.40

 DIVERSION TO
+                RRCHANNL    136.34     1   FLOW           0.
                                             TIME        0.10

 HYDROGRAPH AT
+                RRBRIDGE    136.34     1   FLOW        2183.
                                             TIME       17.40

 DIVERSION TO
+                    KCHAR    136.34     1   FLOW        1746.
                                             TIME       17.40

 HYDROGRAPH AT
+                     I15    136.34     1   FLOW         437.
                                             TIME       17.40

 ROUTED TO
+                     NC1    136.34     1   FLOW         437.
                                             TIME       17.40

 ROUTED TO
+                       V    136.34     1   FLOW         437.
                                             TIME       17.50

 ROUTED TO
+                     NC2    136.34     1   FLOW         437.
                                             TIME       17.50

 ROUTED TO
+                     NC3    136.34     1   FLOW         437.
                                             TIME       17.60

 ROUTED TO
+                     NC4    136.34     1   FLOW         437.
                                             TIME       17.60

 ROUTED TO
+                     NC5    136.34     1   FLOW         437.
                                             TIME       17.60
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 HYDROGRAPH AT
+                RRBRIDGE       0.00      1   FLOW            0.
                                                TIME          0.10

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW            0.
                                                TIME          4.50

  2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW            0.
                                                TIME          4.50

 ROUTED TO
+                RRCHANNL       0.00      1   FLOW            0.
                                                TIME          8.20

 HYDROGRAPH AT
+                    I-15       0.00      1   FLOW         1746.
                                                TIME         17.40

 HYDROGRAPH AT
+                DUMMY_AR       0.00      1   FLOW            0.
                                                TIME          4.50

  2 COMBINED AT
+                DUMMY_CO       0.00      1   FLOW         1746.
                                                TIME         17.40

  2 COMBINED AT
+                 ACHANNL       0.00      1   FLOW         1746.
                                                TIME         17.40

 ROUTED TO
+                     AC1       0.00      1   FLOW         1746.
                                                TIME         17.40

 ROUTED TO
+                     AC2       0.00      1   FLOW         1746.
                                                TIME         17.50

 ROUTED TO
+                     AC3       0.00      1   FLOW         1746.
                                                TIME         17.50

 ROUTED TO
+                     AC4       0.00      1   FLOW         1746.
                                                TIME         17.50

  2 COMBINED AT
+                 NCHANNL     136.34      1   FLOW         2183.
                                                TIME         17.50

 ROUTED TO
+                     AC5     136.34      1   FLOW         2183.
                                                TIME         17.50

 ROUTED TO
+                     AC6     136.34      1   FLOW         2183.
                                                TIME         17.60

 ROUTED TO
+                  LKMEAD     136.34      1   FLOW         2183.
                                                TIME         17.60
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                                 COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                      PEAK                                        PEAK

                                (MIN)      (CFS)      (MIN)       (IN)    (MIN)      (CFS)      (MIN)        (IN)

          FOR PLAN = 1  RATIO= 0.90
               DIV  MANE          3.45  10304.62    467.32       0.33     6.00   10303.82    468.00         0.33

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2428E+04 EXCESS=0.0000E+00 OUTFLOW=0.2428E+04 BASIN STORAGE=0.1848E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
                 .  MANE          2.42  10301.51    473.34       0.33     6.00   10299.06    474.00         0.33

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2428E+04 EXCESS=0.0000E+00 OUTFLOW=0.2426E+04 BASIN STORAGE=0.1893E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC1  MANE          0.32    436.58   1044.80       0.04     6.00     436.57   1044.00         0.04

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2956E+03 EXCESS=0.0000E+00 OUTFLOW=0.2953E+03 BASIN STORAGE=0.3640E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
                 V  MANE          1.36    436.57   1047.44       0.04     6.00     436.57   1050.00         0.04

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2952E+03 EXCESS=0.0000E+00 OUTFLOW=0.2933E+03 BASIN STORAGE=0.1955E+01 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          0.87    436.56   1051.70       0.04       6.00    436.56   1050.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2931E+03 EXCESS=0.0000E+00 OUTFLOW=0.2921E+03 BASIN STORAGE=0.1155E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          2.45    436.55   1055.69       0.04       6.00    436.55   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2919E+03 EXCESS=0.0000E+00 OUTFLOW=0.2887E+03 BASIN STORAGE=0.3752E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.65    436.54   1057.52       0.04       6.00    436.53   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2880E+03 EXCESS=0.0000E+00 OUTFLOW=0.2872E+03 BASIN STORAGE=0.9907E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.42    436.53   1056.82       0.04       6.00    436.53   1056.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2869E+03 EXCESS=0.0000E+00 OUTFLOW=0.2864E+03 BASIN STORAGE=0.5417E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
            RRCHANNL  MANE          6.00      0.11    493.12       0.64       6.00      0.11    492.00         0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.32   1746.32   1044.58  11071.28       6.00   1746.28   1044.00     11071.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1183E+04 EXCESS=0.0000E+00 OUTFLOW=0.1181E+04 BASIN STORAGE=0.1442E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.87   1746.28   1046.23  11036.84       6.00   1746.27   1050.00     11024.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1181E+04 EXCESS=0.0000E+00 OUTFLOW=0.1177E+04 BASIN STORAGE=0.4612E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.81   1746.26   1051.05  10984.78       6.00   1746.25   1050.00     10980.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1176E+04 EXCESS=0.0000E+00 OUTFLOW=0.1172E+04 BASIN STORAGE=0.4367E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          0.91   1746.23   1051.53  10931.93       6.00   1746.19   1050.00     10927.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1171E+04 EXCESS=0.0000E+00 OUTFLOW=0.1166E+04 BASIN STORAGE=0.5445E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.36   2182.63   1050.58       0.20       6.00   2182.60   1050.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1452E+04 EXCESS=0.0000E+00 OUTFLOW=0.1450E+04 BASIN STORAGE=0.1292E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.64   2182.59   1051.26       0.20       6.00   2182.57   1056.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1450E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.5505E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
              LKMEAD  MANE          2.51   2182.54   1060.33       0.20       6.00   2182.50   1056.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+04 EXCESS=0.0000E+00 OUTFLOW=0.1427E+04 BASIN STORAGE=0.2144E+02 PERCENT ERROR=  -0.3


*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:40   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
            1           ID          FEMA FLOOD INSURANCE STUDY, 1996
            2           ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
            3           ID          SPRING MOUNTAIN 100-YEAR STORM
            4           ID
            5           ID          Current (05/96) model based on a HEC-1 model prepared by James M
            6           ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
            7           ID          Study Hydrology Report dated 9/91.  Two modifications were made
            8           ID          to the source model.  First, Upper Las Vegas Detention Basin storage
            9           ID          and outflow characteristics were revised to reflect the as-built
           10           ID          configuration described by construction drawings dated 5/91 and HEC-1
           11           ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
           12           ID          relationship for the North Las Vegas Detention Basin was revised
           13           ID          to reflect the current three-pipe outlet condition (two of the five
           14           ID          pipes were blocked following construction of the upper basin) and the
           15           ID          hydraulic control created by the 4-foot high barrier wall located
           16           ID          upstream from the pipe inlets.
           17           ID
           18           ID          Remaining comments are from the original model dated 1/91.
           19           ID
           20           ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
           21           ID          NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
           22           ID          SPRING MOUNTAIN 100-YEAR STORM EXISTING CONDITIONS
           23           ID
           24           ID          Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
           25           ID          CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
           26           ID          The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
           27           ID          portion within the Gowan Area (which is not tributary to the Upper
           28           ID          Las Vegas Wash Detention Basin diversion)
           29           ID          Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
           30           ID          All routing steps immediately d/s of a diversion converted to
           31           ID          Muskingum routing to avoid zero flow, 8/90
           32           ID
           33           ID          This run models the diversion from the West Tributary to the proposed
           34           ID          Upper Las Vegas Wash Detention Basin, 1/91
           35           ID
*** FREE ***
           36           IT       6       0       0     200
           37           IO       5       0       0
           38           IN       5       0       0
           39           JR    PREC   0.903
                        * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                        * LAS VEGAS WASH DETENTION BASIN

           40           KK     201
           41           KM   RUNOFF FROM SUBBASIN 201
           42           BA   5.543
           43           PB    2.44
           44           PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
           45           PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
           46           PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
           47           PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
           48           PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
           49           PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
           50           PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
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1 HEC-1 INPUT PAGE 2

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          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           51           PC    .997    .999   1.00
           52           LS      0      80
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 53          UD    .208

 54          KK     208
 55          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
 56          RM       5    0.53    0.15

 57          KK     207
 58          KM   RUNOFF FROM SUBBASIN 207
 59          BA   1.223
 60          PB    2.44
 61          LS       0      72
 62          UD    .358

 63          KK     208
 64          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
 65          RM       2    0.20    0.15

 66          KK     208
 67          KM   RUNOFF FROM SUBBASIN 208
 68          BA   8.778
 69          PB    2.53
 70          LS       0      70
 71          UD    .833

 72          KK       .
 73          KM   COMBINE SUBBASINS 201, 207, & 208
 74          HC       3

 75          KK     218
 76          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
 77          RM       3    0.35    0.15

 78          KK     205
 79          KM   RUNOFF FROM SUBBASIN 205
 80          BA   9.587
 81          PB    2.53
 82          LS       0      78
 83          UD    .794

 84          KK     206
 85          KM   RUNOFF FROM SUBBASIN 206
 86          BA   6.635
 87          PB    2.36
 88          LS       0      64
 89          UD    .754

 90          KK     211
 91          KM   RUNOFF FROM SUBBASIN 211
 92          BA   3.691
 93          PB    2.44
 94          LS       0      80
 95          UD    .527
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 96          KK       .
 97          KM   COMBINE SUBBASINS 205, 206, & 211
 98          HC       3

 99          KK     217
100          KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
101          RM       4    0.40    0.15

102          KK       .
103          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
104          HC       2

105          KK     221
106          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
107          RM       5    0.50    0.15

108          KK     222
109          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
110          RM       5    0.51    0.15

111          KK     212
112          KM   RUNOFF FROM SUBBASIN 212
113          BA   5.641
114          PB    2.44
115          LS       0      82
116          UD    .403

117          KK     224
118          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
119          RM       2    0.17    0.15

120          KK     222
121          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
122          RM       6    0.63    0.15

123          KK       .
124          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
125          HC       2

126          KK     223
127          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
128          RM      18    1.84    0.15
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          129          KK     202
          130          KM   RUNOFF FROM SUBBASIN 202
          131          BA   5.523
          132          PB    2.44
          133          LS       0       80
          134          UD    .134
1                                        HEC-1 INPUT                                        PAGE  4

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          135          KK     203
          136          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
          137          RM       3    0.27    0.15

          138          KK     203
          139          KM   RUNOFF FROM SUBBASIN 203
          140          BA   6.249
          141          PB    2.62
          142          LS       0       80
          143          UD    .248

          144          KK     204
          145          KM   RUNOFF FROM SUBBASIN 204
          146          BA   2.458
          147          PB    2.62
          148          LS       0       80
          149          UD    .205

          150          KK       .
          151          KM   COMBINE SUBBASINS 202, 203, & 204
          152          HC       3

          153          KK     209
          154          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
          155          RM       4    0.40    0.15

          156          KK     209
          157          KM   RUNOFF FROM SUBBASIN 209
          158          BA   2.824
          159          PB    2.62
          160          LS       0       69
          161          UD    .500

          162          KK     210
          163          KM   RUNOFF FROM SUBBASIN 210
          164          BA  9.4182
          165          PB    2.53
          166          LS       0       77
          167          UD    .585

          168          KK       .
          169          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
          170          HC       3

          171          KK     213
          172          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
          173          RM       5    0.54    0.15

          174          KK     214
          175          KM   RUNOFF FROM SUBBASIN 214
          176          BA   7.167
          177          PB    2.44
          178          LS       0       80
          179          UD    .869
1                                        HEC-1 INPUT                                        PAGE  5

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          180          KK     215
          181          KM   RUNOFF FROM SUBBASIN 215
          182          BA   9.983
          183          PB    2.36
          184          LS       0       78
          185          UD    .717

          186          KK     213
          187          KM   RUNOFF FROM SUBBASIN 213
          188          BA  16.253
          189          PB    2.27
          190          LS       0       77
          191          UD   1.196

          192          KK       .
          193          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
          194          HC       4

          195          KK     223
          196          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
          197          KM    214, & 215 THRU SUBBASIN 223
          198          RM       3    0.29    0.15

          199          KK       V
          200          RM       6    0.58    0.15

          201          KK       V
          202          RM      18    1.83    0.15
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203          KK     223
204          KM   RUNOFF FROM SUBBASIN 223
205          BA  35.362
206          PB    1.74
207          LS       0      77
208          UD    3.44

209          KK WTRIBUS
210          HC       3

211          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

212          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
213          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
214          RK    9200  0.0067   0.030       0    TRAP     300       3

215          KK       .
216          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
217          RK    5800  0.0083   0.030       0    TRAP     500       1

218          KK   ULWDB
219          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
220          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
221          RS       1    STOR      -1
222          SV       0      12      80     170     320     560    1000    1610    1800    1980
223          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
224          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
225          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
226          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
227          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

228          KK    116
229          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
230          RM       5    0.50    0.15

231          KK    109
232          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
233          RM       4    0.42    0.15

234          KK   NLVIN
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
236          KM   NORTH LAS VEGAS DETENTION BASIN
237          RM       5    0.54    0.15

238          KK       .
239          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
240          DT DIVDIKE
241          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
242          DI   17775   20135   23000
243          DQ       0       0       0       0       0     410    1225    2435    3565    5135
244          DQ    6775    8635   11000

245          KK  NLVDET
246          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
247          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
248          RS       1    STOR      -1
249          SV       0      25     100     190     430     665    1095    1285    1435    1540
250          SV    1650    1825    1920    2000    2110    2200    2310    2430
251          SE       0       2       4       6      10      14      21      24      26      27
252          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
253          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
254          SQ    3050    4630    5710    7090    8610   10140   11670   13200
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

255          KK       .
256          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
257          DR DIVDIKE

258          KK       .
259          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
260          HC       2

261          KK     303
262          KM   ROUTE OUTFLOW THRU SUBBASIN 303
263          RM      13    1.28    0.15
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264          KKRRBRIDGE
265          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
266          DTRRCHANNL
267          DI       0    6000   20000
268          DQ       0       0   13500

269          KK     I1S
270          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
271          DT   KCHAR
272          DI       0    1000   10000
273          DQ       0     800    8000

274          KK     NC1
275          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
276          RK     700  0.0058   0.016        0    TRAP      10       2

277          KK       V
278          RK    2000  0.0100   0.035        0    TRAP      30       2

279          KK     NC2
280          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
281          KM   TO GOWAN AVE.
282          RK    1300   .0056    .030        0    TRAP      12       2

283          KK     NC3
284          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
285          KM   TO CHEYENNE AVE.
286          RK    2600   .0021    .030        0    TRAP      20     2.5

287          KK     NC4
288          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
289          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
290          RK    1300    .003    .016        0    TRAP      18       2

291          KK     NC5
292          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
293          KM   (LINED CHANNEL)
294          RK     500    .001    .016        0    TRAP      18       2
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


295          KKRRBRIDGE
296          DRRRCHANNL

297          KKDUMMY_AREA
298          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
299          BA   0.001
300          PB    2.00
301          LS       0      80
302          UD    1.00

303          KKDUMMY_COMBINE
304          KM   Combine dummy subarea with recalled RRCHANNEL diversion
305          HC       2

306          KKRRCHANNL
307          RK    4900   .0041     .03        0    TRAP      40       2

308          KK     I-15
309          DR   KCHAR

310          KKDUMMY_AREA
311          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
312          BA   0.001
313          PB    2.00
314          LS       0      80
315          UD    1.00

316          KKDUMMY_COMBINE
317          KM   Combine dummy subarea with recalled KCHAR diversion
318          HC       2

319          KK ACHANNL
320          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
321          HC       2

322          KK     AC1
323          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
324          RK     750   .0092    .035        0    TRAP      12     1.5

325          KK     AC2
326          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
327          RK    1600   .0065    .035        0    TRAP      37     2.5

328          KK     AC3
329          RK    1600   .0065    .030        0    TRAP      52     1.5

330          KK     AC4
331          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
332          RK    1650   .0053    .030        0    TRAP      70     1.5
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


333          KK NCHANNL
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          334          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          335          HC       2

          336          KK     AC5
          337          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
          338          RK     450    .0053     .030        0    TRAP       70     1.5

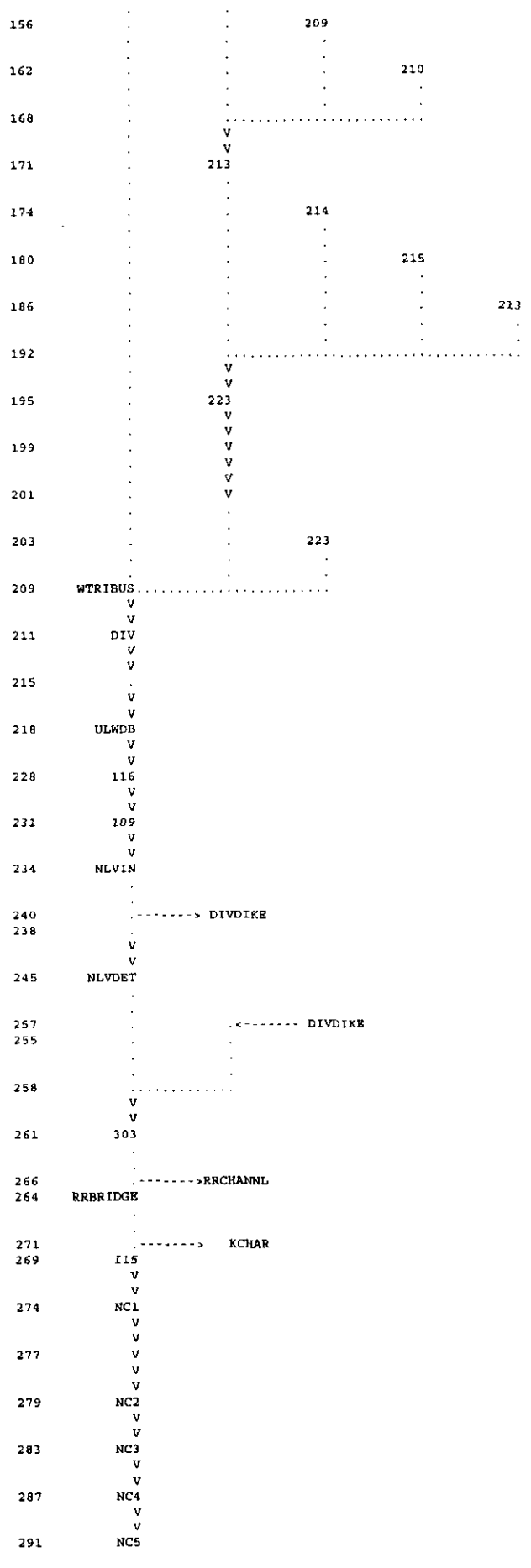
          339          KK     AC6
          340          RK    1300    .0047     .030        0    TRAP       78     1.5

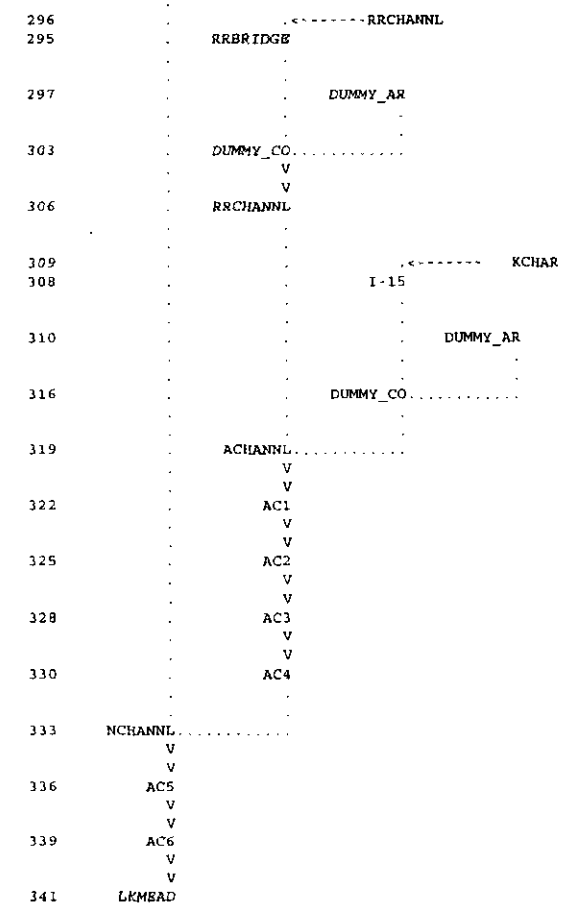
          341          KK  LKMEAD
          342          KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
          343          KM   THRU "A" CHANNEL
          344          RK    4500     .004     .030        0    TRAP       96     1.5
          345          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          201
                  V
                  V
    54          208
                  .
                  .
    57            .          207
                  .           V
                  .           V
    63            .          208
                  .            .
                  .            .
    66            .            .          208
                  .            .           .
                  .            .           .
    72            ..............................
                  V
                  V
    75          218
                  .
                  .
    78            .          205
                  .            .
                  .            .
    84            .            .          206
                  .            .           .
                  .            .           .
    90            .            .           .          211
                  .            .           .           .
                  .            .           .           .
    96            .            ..............................
                  .           V
                  .           V
    99            .          217
                  .            .
                  .            .
   102            ..............
                  V
                  V
   105          221
                  V
                  V
   108          222
                  .
                  .
   111            .          212
                  .           V
                  .           V
   117            .          224
                  .           V
                  .           V
   120            .          222
                  .            .
                  .            .
   123            ..............
                  V
                  V
   126          223
                  .
                  .
   129            .          202
                  .           V
                  .           V
   135            .          203
                  .            .
                  .            .
   138            .            .          203
                  .            .           .
                  .            .           .
   144            .            .           .          204
                  .            .           .           .
                  .            .           .           .
   150            .            ..............................
                  .           V
                  .           V
   153            .          209
                  .            .
```


156
209
162
210
168
171
213
174
214
180
215
186
213
192
195
223
199
201
203
223
209
WTRIBUS
211
DIV
215
218
ULWDB
228
116
231
109
234
NLVIN
240
DIVDIKE
238
245
NLVDET
257
DIVDIKE
255
258
261
303
266
RRCHANNL
264
RRBRIDGE
271
KCHAR
269
I15
274
NC1
277
279
NC2
283
NC3
287
NC4
291
NC5



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/10/96  TIME  16:25:40   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
SPRING MOUNTAIN 100-YEAR STORM EXISTING CONDITIONS

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum rouing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed

Upper Las Vegas Wash Detention Basin, 1/91

```
  17 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                      NMIN           6  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1    0  ENDING DATE
                    NDTIME         1954  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                      TOTAL TIME BASE     19.90 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    0.90

        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

          PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                          FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
                                      TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA     PLAN                 RATIO 1
                                                                0.90

 HYDROGRAPH AT
+                   201       5.54      1    FLOW          2080.
                                               TIME           3.60

 ROUTED TO
+                   208       5.54      1    FLOW          1537.
                                               TIME           4.10

 HYDROGRAPH AT
+                   207       1.22      1    FLOW           182.
                                               TIME           3.80

 ROUTED TO
+                   208       1.22      1    FLOW           171.
                                               TIME           4.00

 HYDROGRAPH AT
+                   208       8.78      1    FLOW           868.
                                               TIME           5.30

   3 COMBINED AT
+                     .      15.54      1    FLOW          2405.
                                               TIME           4.20

 ROUTED TO
+                   218      15.54      1    FLOW          2219.
                                               TIME           4.60

 HYDROGRAPH AT
+                   205       9.59      1    FLOW          1747.
                                               TIME           4.30

 HYDROGRAPH AT
+                   206       6.64      1    FLOW           348.
                                               TIME           5.40

 HYDROGRAPH AT
```

+	211	3.69	1	FLOW	887.
				TIME	4.00
3 COMBINED AT					
+	.	19.91	1	FLOW	2688.
				TIME	4.20
ROUTED TO					
+	217	19.91	1	FLOW	2576.
				TIME	4.60
2 COMBINED AT					
+	.	35.46	1	FLOW	4796.
				TIME	4.60
ROUTED TO					
+	221	35.46	1	FLOW	4543.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	4360.
				TIME	5.70
HYDROGRAPH AT					
+	212	5.64	1	FLOW	1780.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	1702.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	1476.
				TIME	4.60
2 COMBINED AT					
+	.	41.10	1	FLOW	5368.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	4970.
				TIME	7.70
HYDROGRAPH AT					
+	202	5.52	1	FLOW	2259.
				TIME	3.60
ROUTED TO					
+	203	5.52	1	FLOW	1887.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	2450.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	1074.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	5034.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	4339.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	340.
				TIME	5.10
HYDROGRAPH AT					
+	210	9.42	1	FLOW	1879.
				TIME	4.00
3 COMBINED AT					
+	.	26.47	1	FLOW	6540.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	5797.
				TIME	4.60
HYDROGRAPH AT					
+	214	7.17	1	FLOW	1318.
				TIME	4.40
HYDROGRAPH AT					
+	215	9.98	1	FLOW	1645.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	1804.
				TIME	5.40
4 COMBINED AT					
+	.	59.88	1	FLOW	9985.
				TIME	4.60

```
 ROUTED TO
+                    223      59.88     1   FLOW        9732.
                                          TIME         4.90

 ROUTED TO
+                      V      59.88     1   FLOW        9341.
                                          TIME         5.60

 ROUTED TO
+                      V      59.88     1   FLOW        8681.
                                          TIME         7.60

 HYDROGRAPH AT
+                    223      35.36     1   FLOW        1093.
                                          TIME         7.60

   3 COMBINED AT
+                 WTRIBUS     136.34     1   FLOW       14737.
                                          TIME         7.60

 ROUTED TO
+                    DIV      136.34     1   FLOW       14736.
                                          TIME         7.70

 ROUTED TO
+                      .      136.34     1   FLOW       14720.
                                          TIME         7.80

 ROUTED TO
+                   ULWDB     136.34     1   FLOW        5019.
                                          TIME         9.70

                                       ** PEAK STAGES IN FEET **
                                       1  STAGE     2372.40
                                          TIME         9.70

 ROUTED TO
+                    116      136.34     1   FLOW        4928.
                                          TIME        10.30

 ROUTED TO
+                    109      136.34     1   FLOW        4866.
                                          TIME        10.70

 ROUTED TO
+                  NLVIN      136.34     1   FLOW        4796.
                                          TIME        11.20

 DIVERSION TO
+                 DIVDIKE     136.34     1   FLOW           0.
                                          TIME         0.10

 HYDROGRAPH AT
+                      .      136.34     1   FLOW        4796.
                                          TIME        11.20

 ROUTED TO
+                 NLVDET      136.34     1   FLOW        2839.
                                          TIME        17.80

                                       ** PEAK STAGES IN FEET **
                                       1  STAGE       27.42
                                          TIME        17.80

 HYDROGRAPH AT
+                      .        0.00     1   FLOW           0.
                                          TIME         0.10

   2 COMBINED AT
+                      .      136.34     1   FLOW        2839.
                                          TIME        17.80

 ROUTED TO
+                    303      136.34     1   FLOW        2833.
                                          TIME        19.10

 DIVERSION TO
+                RRCHANNL     136.34     1   FLOW           0.
                                          TIME         0.10

 HYDROGRAPH AT
+                RRBRIDGE     136.34     1   FLOW        2833.
                                          TIME        19.10

 DIVERSION TO
+                   KCHAR     136.34     1   FLOW        2266.
                                          TIME        19.10

 HYDROGRAPH AT
+                    I15      136.34     1   FLOW         567.
                                          TIME        19.10

 ROUTED TO
+                    NC1      136.34     1   FLOW         567.
                                          TIME        19.10

 ROUTED TO
+                      V      136.34     1   FLOW         566.
                                          TIME        19.10
```

```
 ROUTED TO
+                    NC2     136.34     1   FLOW         566.
                                            TIME        19.20

 ROUTED TO
+                    NC3     136.34     1   FLOW         566.
                                            TIME        19.20

 ROUTED TO
+                    NC4     136.34     1   FLOW         566.
                                            TIME        19.20

 ROUTED TO
+                    NC5     136.34     1   FLOW         566.
                                            TIME        19.30

 HYDROGRAPH AT
+                RRBRIDGE       0.00     1   FLOW           0.
                                            TIME         0.10

 HYDROGRAPH AT
+                DUMMY_AR       0.00     1   FLOW           0.
                                            TIME         4.50

   2 COMBINED AT
+                DUMMY_CO       0.00     1   FLOW           0.
                                            TIME         4.50

 ROUTED TO
+                RRCHANNL       0.00     1   FLOW           0.
                                            TIME         8.20

 HYDROGRAPH AT
+                   I-15        0.00     1   FLOW        2266.
                                            TIME        19.10

 HYDROGRAPH AT
+                DUMMY_AR       0.00     1   FLOW           0.
                                            TIME         4.50

   2 COMBINED AT
+                DUMMY_CO       0.00     1   FLOW        2266.
                                            TIME        19.10

   2 COMBINED AT
+                 ACHANNL       0.00     1   FLOW        2266.
                                            TIME        19.10

 ROUTED TO
+                     AC1       0.00     1   FLOW        2266.
                                            TIME        19.10

 ROUTED TO
+                     AC2       0.00     1   FLOW        2266.
                                            TIME        19.10

 ROUTED TO
+                     AC3       0.00     1   FLOW        2266.
                                            TIME        19.10

 ROUTED TO
+                     AC4       0.00     1   FLOW        2279.
                                            TIME        19.90

   2 COMBINED AT
+                 NCHANNL     136.34     1   FLOW        2832.
                                            TIME        19.20

 ROUTED TO
+                     AC5     136.34     1   FLOW        2832.
                                            TIME        19.20

 ROUTED TO
+                     AC6     136.34     1   FLOW        2832.
                                            TIME        19.20

 ROUTED TO
+                  LKMBAD     136.34     1   FLOW        2832.
                                            TIME        19.30
1
                          SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                              (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
     ISTAQ    ELEMENT       DT        PEAK    TIME TO     VOLUME      DT        PEAK    TIME TO     VOLUME
                                              PEAK                                      PEAK

                           (MIN)       (CFS)    (MIN)      (IN)    (MIN)       (CFS)    (MIN)       (IN)

   FOR PLAN = 1  RATIO= 0.90
       DIV  MANE           2.99    14736.23   461.92      0.48     6.00    14735.65   462.00      0.48

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3514E+04 EXCESS=0.0000E+00 OUTFLOW=0.3514E+04 BASIN STORAGE=0.2276E+01 PERCENT ERROR=   0.0

   FOR PLAN = 1  RATIO= 0.90
         . MANE           2.07    14734.29   466.27      0.48     6.00    14720.41   468.00      0.48
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3515E+04 EXCESS=0.0000E+00 OUTFLOW=0.3513E+04 BASIN STORAGE=0.2134E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC1	MANE	0.29	566.51	1146.38	0.05	6.00	566.50	1146.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3511E+03 EXCESS=0.0000E+00 OUTFLOW=0.3506E+03 BASIN STORAGE=0.4630E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

V	MANE	1.23	566.49	1148.49	0.05	6.00	566.45	1146.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3483E+03 EXCESS=0.0000E+00 OUTFLOW=0.3473E+03 BASIN STORAGE=0.1225E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC2	MANE	0.76	566.45	1147.51	0.05	6.00	566.40	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3468E+03 EXCESS=0.0000E+00 OUTFLOW=0.3457E+03 BASIN STORAGE=0.9998E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC3	MANE	2.27	566.40	1154.27	0.05	6.00	566.40	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3455E+03 EXCESS=0.0000E+00 OUTFLOW=0.3422E+03 BASIN STORAGE=0.3699E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

NC4	MANE	0.64	566.39	1153.09	0.05	6.00	566.35	1152.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3413E+03 EXCESS=0.0000E+00 OUTFLOW=0.3401E+03 BASIN STORAGE=0.1218E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

NC5	MANE	0.43	566.35	1152.96	0.05	6.00	566.33	1158.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3400E+03 EXCESS=0.0000E+00 OUTFLOW=0.3395E+03 BASIN STORAGE=0.6101E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

RRCHANNL	MANE	6.00	0.11	493.12	0.64	6.00	0.11	492.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2390E-01 EXCESS=0.0000E+00 OUTFLOW=0.3440E-01 BASIN STORAGE=0.2686E-02 PERCENT ERROR= -55.2

FOR PLAN = 1 RATIO= 0.90

AC1	MANE	0.30	2266.03	1146.43	13157.84	6.00	2266.01	1146.00	13148.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1405E+04 EXCESS=0.0000E+00 OUTFLOW=0.1403E+04 BASIN STORAGE=0.1749E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC2	MANE	0.75	2265.98	1147.41	13101.38	6.00	2265.89	1146.00	13090.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1403E+04 EXCESS=0.0000E+00 OUTFLOW=0.1397E+04 BASIN STORAGE=0.5880E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

AC3	MANE	0.68	2284.16	1194.46	13048.25	6.00	2265.73	1146.00	13035.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1396E+04 EXCESS=0.0000E+00 OUTFLOW=0.1392E+04 BASIN STORAGE=0.5555E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

AC4	MANE	0.86	2296.82	1194.31	12978.20	6.00	2279.18	1194.00	12970.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1390E+04 EXCESS=0.0000E+00 OUTFLOW=0.1384E+04 BASIN STORAGE=0.6485E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC5	MANE	0.25	2838.09	1194.12	0.24	6.00	2831.86	1152.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1723E+04 EXCESS=0.0000E+00 OUTFLOW=0.1721E+04 BASIN STORAGE=0.1846E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

AC6	MANE	0.58	2854.92	1194.42	0.24	6.00	2831.76	1152.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1721E+04 EXCESS=0.0000E+00 OUTFLOW=0.1715E+04 BASIN STORAGE=0.6804E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

LKMEAD	MANE	2.28	2861.88	1195.82	0.23	6.00	2831.53	1158.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1714E+04 EXCESS=0.0000E+00 OUTFLOW=0.1693E+04 BASIN STORAGE=0.2625E+02 PERCENT ERROR= -0.3

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         FEBRUARY  1991                *
*          VERSION 4.0.1 (LOCAL)        *
*                                       *
*  RUN DATE  05/10/96  TIME  16:26:00   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSXX- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID        FEMA FLOOD INSURANCE STUDY, 1996
              2     ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID        SPRING MOUNTAIN 500-YEAR STORM
              4     ID
              5     ID        Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID        Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID        Study Hydrology Report dated 9/91.  Three modifications were made
              8     ID        to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID        and outflow characteristics were revised to reflect the as-built
             10     ID        configuration described by construction drawings dated 5/91 and HEC-1
             11     ID        models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID        relationship for the North Las Vegas Detention Basin was revised
             13     ID        to reflect the current three-pipe outlet condition (two of the five
             14     ID        pipes were blocked following construction of the upper basin) and the
             15     ID        hydraulic control created by the 4-foot high barrier wall located
             16     ID        upstream from the pipe inlets.  Third, the source 100-year model
             17     ID        was converted to reflect 500-year conditions by replacing all PB
             18     ID        cards with 500-year amounts.  500-year rainfall amounts were
             19     ID        determined for each subbasin by frequency extrapolation of the
             20     ID        amounts presented by JMM in the 10-, 50-, and 100-year Spring
             21     ID        Mountain Storm models.
             22     ID
             23     ID
             24     ID        Remaining comments are from the original model dated 1/91.
             25     ID
             26     ID        CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             27     ID        NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY
             28     ID        SPRING MOUNTAIN 500-YEAR STORM (100-year model with 500-year rain)
             29     ID
             30     ID        Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
             31     ID        CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
             32     ID        The storm area of 136 sq mi reflects the Spring Mtn Storm minus the
             33     ID        portion within the Gowan Area (which is not tributary to the Upper
             34     ID        Las Vegas Wash Detention Basin diversion)
             35     ID        Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
             36     ID        All routing steps immediately d/s of a diversion converted to
             37     ID        Muskingum routing to avoid zero flow, 8/90
             38     ID
             39     ID        This run models the diversion from the West Tributary to the proposed
             40     ID        Upper Las Vegas Wash Detention Basin, 1/91
             41     ID
*** PREP ***
             42     IT       6        0        0      200
             43     IO       5        0        0
             44     IN       5        0        0
             45     JR     PREC    0.903
                    * REMOVED GOWAN AREA SINCE IT IS NOT TRIBUTARY TO THE DIVERSION INTO THE UPPER
                    * LAS VEGAS WASH DETENTION BASIN
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1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             46     KK      201
             47     KM    RUNOFF FROM SUBBASIN 201
             48     BA    5.543
             49     PB     3.18
             50     PC     .000     .020     .059     .080     .110     .144     .150     .160     .168     .171
             51     PC     .180     .182     .187     .190     .197     .202     .210     .220     .230     .241
             52     PC     .250     .259     .265     .280     .290     .300     .305     .309     .310     .317
```

```
 53          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
 54          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
 55          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
 56          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
 57          PC    .997    .999   1.00
 58          LS      0      80
 59          UD    .208

 60          KK     208
 61          KM   ROUTE SUBBASIN 201 THRU SUBBASIN 208
 62          RM       5    0.53    0.15

 63          KK     207
 64          KM   RUNOFF FROM SUBBASIN 207
 65          BA   1.223
 66          PB    3.14
 67          LS      0      72
 68          UD    .358

 69          KK     208
 70          KM   ROUTE SUBBASIN 207 THRU SUBBASIN 208
 71          RM       2    0.20    0.15

 72          KK     208
 73          KM   RUNOFF FROM SUBBASIN 208
 74          BA   8.778
 75          PB    3.19
 76          LS      0      70
 77          UD    .833

 78          KK       .
 79          KM   COMBINE SUBBASINS 201, 207, & 208
 80          HC       3

 81          KK     218
 82          KM   ROUTE SUBBASINS 201, 207, & 208 THRU SUBBASIN 218
 83          RM       3    0.35    0.15

 84          KK     205
 85          KM   RUNOFF FROM SUBBASIN 205
 86          BA   9.587
 87          PB    3.29
 88          LS      0      78
 89          UD    .794
1                                    HEC-1 INPUT                                    PAGE  3
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 90          KK     206
 91          KM   RUNOFF FROM SUBBASIN 206
 92          BA   6.635
 93          PB    3.04
 94          LS      0      64
 95          UD    .754

 96          KK     211
 97          KM   RUNOFF FROM SUBBASIN 211
 98          BA   3.691
 99          PB    3.14
100          LS      0      80
101          UD    .527

102          KK       .
103          KM   COMBINE SUBBASINS 205, 206, & 211
104          HC       3

105          KK     217
106          KM   ROUTE SUBBASINS 205, 206, & 211 THRU SUBBASIN 217
107          RM       4    0.40    0.15

108          KK       .
109          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, & 211
110          HC       2

111          KK     221
112          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 221
113          RM       5    0.50    0.15

114          KK     222
115          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, & 211 THRU SUBBASIN 222
116          RM       5    0.51    0.15

117          KK     212
118          KM   RUNOFF FROM SUBBASIN 212
119          BA   5.641
120          PB    3.14
121          LS      0      82
122          UD    .403

123          KK     224
124          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 224
125          RM       2    0.17    0.15

126          KK     222
127          KM   ROUTE SUBBASIN 212 THRU SUBBASIN 222
128          RM       6    0.63    0.15
1                                    HEC-1 INPUT                                    PAGE  4
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 129          KK         .
 130          KM   COMBINE SUBBASINS 201, 205, 206, 207, 208, 211, & 212
 131          HC       2

 132          KK     223
 133          KM   ROUTE SUBBASINS 201, 205, 206, 207, 208, 211, & 212 THRU SUBBASIN 223
 134          RM      18    1.84    0.15

 135          KK     202
 136          KM   RUNOFF FROM SUBBASIN 202
 137          BA   5.523
 138          PB    3.16
 139          LS       0       80
 140          UD    .134

 141          KK     203
 142          KM   ROUTE SUBBASIN 202 THRU SUBBASIN 203
 143          RM       3    0.27    0.15

 144          KK     203
 145          KM   RUNOFF FROM SUBBASIN 203
 146          BA   6.249
 147          PB    3.39
 148          LS       0       80
 149          UD    .248

 150          KK     204
 151          KM   RUNOFF FROM SUBBASIN 204
 152          BA   2.458
 153          PB    3.32
 154          LS       0       80
 155          UD    .205

 156          KK         .
 157          KM   COMBINE SUBBASINS 202, 203, & 204
 158          HC       3

 159          KK     209
 160          KM   ROUTE SUBBASINS 202, 203, & 204 THRU SUBBASIN 209
 161          RM       4    0.40    0.15

 162          KK     209
 163          KM   RUNOFF FROM SUBBASIN 209
 164          BA   2.824
 165          PB    3.39
 166          LS       0       69
 167          UD    .500

 168          KK     210
 169          KM   RUNOFF FROM SUBBASIN 210
 170          BA  9.4182
 171          PB    3.23
 172          LS       0       77
 173          UD    .585
1                                        HEC-1 INPUT                                    PAGE  5

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 174          KK         .
 175          KM   COMBINE SUBBASINS 202, 203, 204, 209, & 210
 176          HC       3

 177          KK     213
 178          KM   ROUTE SUBBASINS 202, 203, 204, 209, & 210 THRU SUBBASIN 213
 179          RM       5    0.54    0.15

 180          KK     214
 181          KM   RUNOFF FROM SUBBASIN 214
 182          BA   7.167
 183          PB    3.10
 184          LS       0       80
 185          UD    .869

 186          KK     215
 187          KM   RUNOFF FROM SUBBASIN 215
 188          BA   9.983
 189          PB    3.00
 190          LS       0       78
 191          UD    .717

 192          KK     213
 193          KM   RUNOFF FROM SUBBASIN 213
 194          BA  16.253
 195          PB    2.99
 196          LS       0       77
 197          UD   1.196

 198          KK         .
 199          KM   COMBINE SUBBASINS 202, 203, 204, 209, 210, 213, 214, & 215
 200          HC       4

 201          KK     223
 202          KM   ROUTE SUBBASINS 202, 203, 204, 209, 210, 213,
 203          KM    214, & 215 THRU SUBBASIN 223
 204          RM       3    0.29    0.15
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205          KK       V
206          RM       6    0.58    0.15

207          KK       V
208          RM      18    1.83    0.15

209          KK     223
210          KM   RUNOFF FROM SUBBASIN 223
211          BA  35.362
212          PB    2.21
213          LS       0      77
214          UD    3.44
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

215          KK WTRIBUS
216          HC       3

217          KK     DIV
             *  *** lines from 1/91 model removed 5/96
             * KM DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM TO THE UPPER LAS VEGAS WASH
             * KM DETENTION BASIN
             * RK 9200 0.01 0.030 0 TRAP 300 3
             * KK ULWDB
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
218          KM   DIVERT ALL FLOW EAST ALONG INTERCEPTION BERM/CHANNEL TO THE
219          KM   UPPER LAS VEGAS WASH DETENTION BASIN (INVERT SLOPE 0.0067 ft./ft.)
220          RK    9200  0.0067   0.030       0    TRAP     300       3

221          KK       .
222          KM   ROUTE FLOW FROM INTERCEPTION CHANNEL THROUGH WASH TO BASIN
223          RK    5800  0.0083   0.030       0    TRAP     500       1

224          KK   ULWDB
225          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
226          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
227          RS       1    STOR      -1
228          SV       0      12      80     170     320     560    1000    1610    1800    1980
229          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
230          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
231          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
232          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
233          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

234          KK     116
235          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 116
236          RM       5    0.50    0.15

237          KK     109
238          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 109
239          RM       4    0.42    0.15

240          KK   NLVIN
241          KM   ROUTE UPPER LAS VEGAS WASH DETENTION BASIN OUTFLOW THRU SUBBASIN 101 TO
242          KM   NORTH LAS VEGAS DETENTION BASIN
243          RM       5    0.54    0.15
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

244          KK       .
245          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
246          DT DIVDIKE
247          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
248          DI   17775   20135   23000
249          DQ       0       0       0       0       0     410    1225    2435    3565    5135
250          DQ    6775    8635   11000

251          KK  NLVDET
252          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
253          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
254          RS       1    STOR      -1
255          SV       0      25     100     190     430     665    1095    1285    1435    1540
256          SV    1650    1825    1920    2000    2110    2200    2310    2430
257          SE       0       2       4       6      10      14      21      24      26      27
258          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
259          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
260          SQ    3050    4630    5710    7090    8610   10140   11670   13200

261          KK       .
262          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
263          DR DIVDIKE

264          KK       .
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265          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
266          HC       2

267          KK     303
268          KM   ROUTE OUTFLOW THRU SUBBASIN 303
269          RM      13    1.26    0.15

270          KKRRBRIDGE
271          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
272          DTRRCHANNL
273          DI       0    6000   20000
274          DQ       0       0   13500

275          KK     I15
276          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
277          DT   KCHAR
278          DI       0    1000   10000
279          DQ       0     800    8000

280          KK     NC1
281          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
282          RK     700  0.0058   0.016       0    TRAP      10       2
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

283          KK       V
284          RK    2000  0.0100   0.035       0    TRAP      30       2

285          KK     NC2
286          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM BARR ROAD
287          KM   TO GOWAN AVE.
288          RK    1300   .0056    .030       0    TRAP      12       2

289          KK     NC3
290          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM GOWAN AVE.
291          KM   TO CHEYENNE AVE.
292          RK    2600   .0021    .030       0    TRAP      20     2.5

293          KK     NC4
294          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM CHEYENNE AVE.
295          KM   TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
296          RK    1300    .003    .016       0    TRAP      18       2

297          KK     NC5
298          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL FROM DROP TO "A" CHANNEL
299          KM   (LINED CHANNEL)
300          RK     500    .001    .016       0    TRAP      18       2

301          KKRRBRIDGE
302          DRRRCHANNL

303          KKDUMMY_AREA
304          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
305          BA   0.001
306          PB    2.00
307          LS       0      80
308          UD    1.00

309          KKDUMMY_COMBINE
310          KM   Combine dummy subarea with recalled RRCHANNEL diversion
311          HC       2

312          KKRRCHANNL
313          RK    4900   .0041     .03       0    TRAP      40       2

314          KK    I-15
315          DR   KCHAR

316          KKDUMMY_AREA
317          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
318          BA   0.001
319          PB    2.00
320          LS       0      80
321          UD    1.00
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

322          KKDUMMY_COMBINE
323          KM   Combine dummy subarea with recalled KCHAR diversion
324          HC       2

325          KK ACHANNL
326          KM   COMBINE TWO DIVERSION RECALLS AT START OF "A" CHANNEL
327          HC       2

328          KK     AC1
329          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE
330          RK     750   .0092    .035       0    TRAP      12     1.5

331          KK     AC2
332          KM   ROUTE FLOW THRU "A" CHANNEL TO CHEYENNE AVE.
333          RK    1600   .0065    .035       0    TRAP      37     2.5

334          KK     AC3
335          RK    1600   .0065    .030       0    TRAP      52     1.5
```

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          336          KK     AC4
          337          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          338          RK    1650    .0053     .030        0    TRAP       70      1.5

          339          KK NCHANNL
          340          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          341          HC       2

          342          KK     AC5
          343          KM   ROUTE ALL UPSTREAM SUBBASINS TO CAREY AVE. THRU "A" CHANNEL
          344          RK     450    .0053     .030        0    TRAP       70      1.5

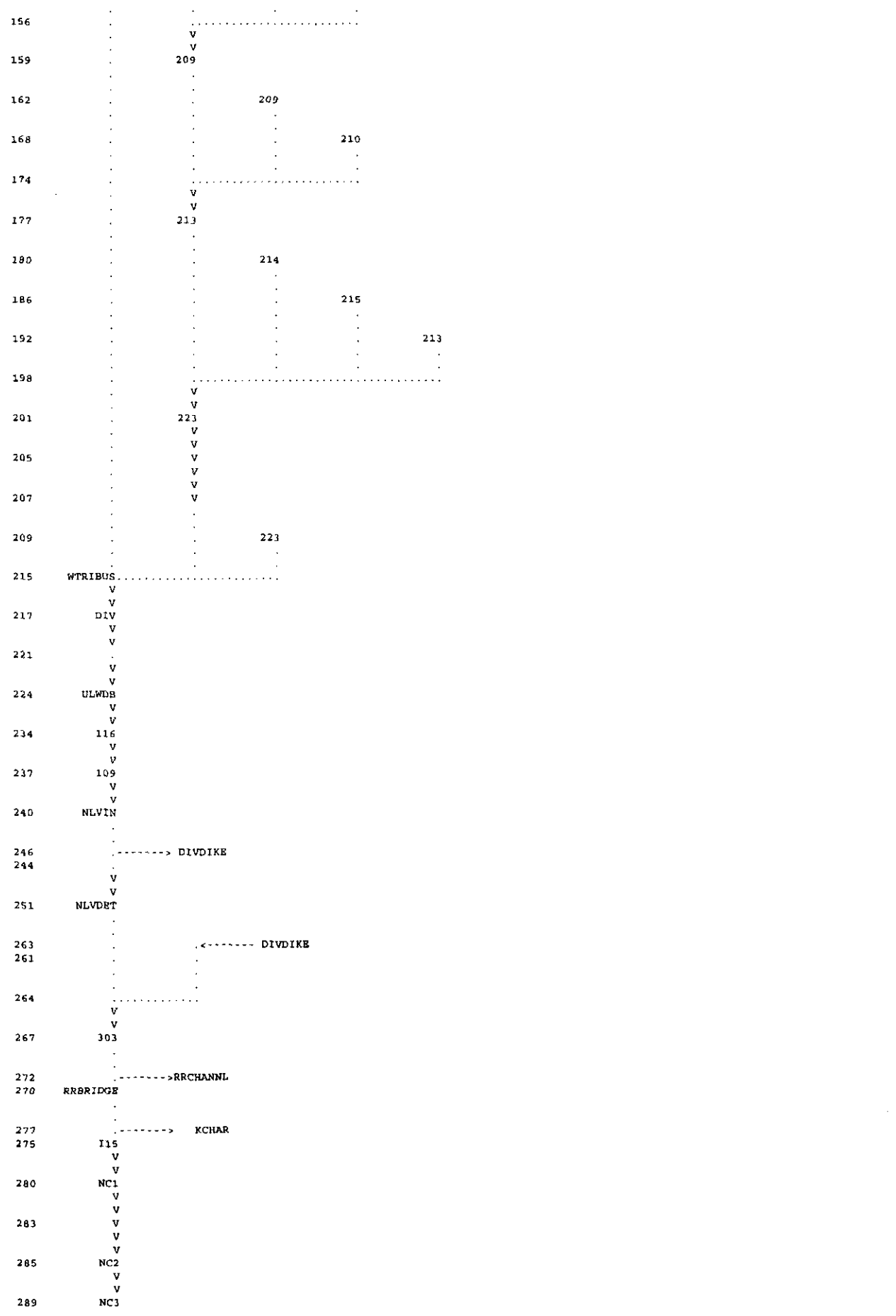
          345          KK     AC6
          346          RK    1300    .0047     .030        0    TRAP       78      1.5

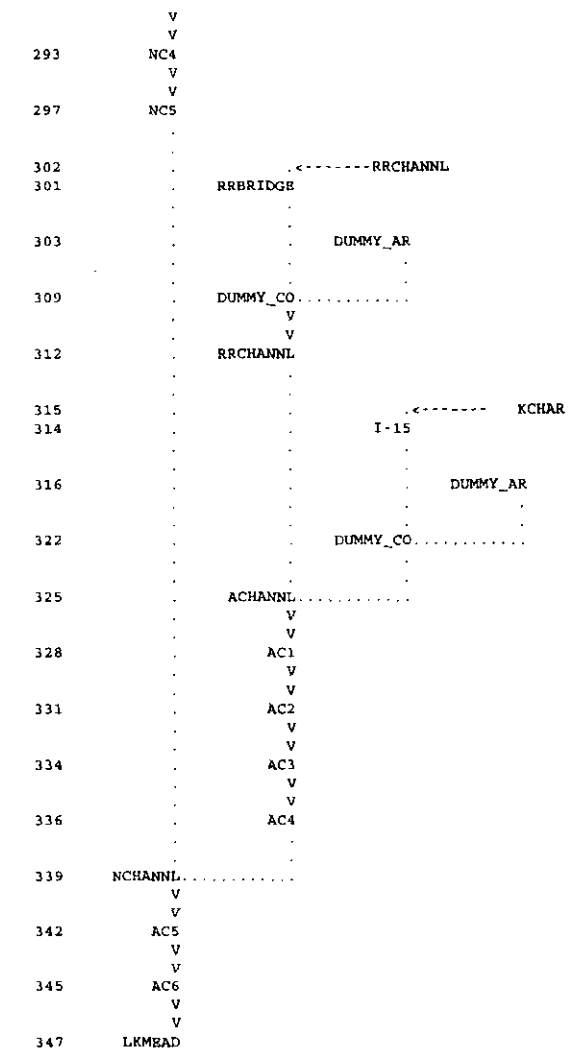
          347          KK  LKMEAD
          348          KM   ROUTE ALL UPSTREAM SUBBASINS FROM CAREY AVE. TO LAKE MEAD BLVD.
          349          KM   THRU "A" CHANNEL
          350          RK    4500     .004     .030        0    TRAP       96      1.5
          351          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE       (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

    46          201
                  V
                  V
    60          208
                  .
                  .
    63            .          207
                  .            V
                  .            V
    69            .          208
                  .            .
                  .            .
    72            .            .          208
                  .            .            .
                  .            .            .
    78            ..........................
                  V
                  V
    81          218
                  .
                  .
    84            .          205
                  .            .
                  .            .
    90            .            .          206
                  .            .            .
                  .            .            .
    96            .            .            .          211
                  .            .            .            .
                  .            .            .            .
   102            .            ..............................
                  .            V
                  .            V
   105            .          217
                  .            .
                  .            .
   108            ..............
                  V
                  V
   111          221
                  V
                  V
   114          222
                  .
                  .
   117            .          212
                  .            V
                  .            V
   123            .          224
                  .            V
                  .            V
   126            .          222
                  .            .
                  .            .
   129            ..............
                  V
                  V
   132          223
                  .
                  .
   135            .          202
                  .            V
                  .            V
   141            .          203
                  .            .
                  .            .
   144            .            .          203
                  .            .            .
                  .            .            .
   150            .            .            .          204
                  .            .            .            .
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156
159
209
162
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168
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174
177
213
180
214
186
215
192
213
198
201
223
205
207
209
223
215
WTRIBUS
217
DIV
221
224
ULWDB
234
116
237
109
240
NLVIN
246
DIVDIKE
244
251
NLVDET
263
DIVDIKE
261
264
267
303
272
RRCHANNL
270
RRBRIDGE
277
KCHAR
275
I15
280
NC1
283
285
NC2
289
NC3



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY  1991             *
*             VERSION 4.0.1 (LOCAL)     *
*                                       *
*  RUN DATE  05/10/96  TIME  16:26:00   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
SPRING MOUNTAIN 500-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) *in 1/91 for the Las Vegas* Valley Flood Insurance Study Hydrology Report dated 9/91. Three modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and *outflow characteristics* were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow *relationship* for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets. Third, the source 100-year model was converted to reflect 500-year conditions by replacing all PB cards with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency *extrapolation of the* amounts presented by JMM in the 10-, 50-, and 100-year Spring Mountain Storm models.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
NORTHERN LAS VEGAS WASH - WESTERN TRIBUTARY

SPRING MOUNTAIN 500-YEAR STORM (100-year model with 500-year rain)

Based on Northern Las Vegas Wash HEC-1 model by Black & Veatch, 8/89
CCRFCD DARF = 0.56 for 136 sq mi storm (JR card = 0.903) - JMM, 1/91
The storm area of 136 sq mi reflects the Spring Mtn Storm minus the portion within the Gowan Area (which is not tributary to the Upper Las Vegas Wash Detention Basin diversion)
Convert nat. channels fr/kinematic wave to Muskingum Routing-JMM, 7/90
All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

This run models the diversion from the West Tributary to the proposed Upper Las Vegas Wash Detention Basin, 1/91

43 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	6	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	200	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1 0	ENDING DATE
NDTIME	1954	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.10 HOURS
TOTAL TIME BASE 19.90 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
0.90
1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 0.90
HYDROGRAPH AT					
+	201	5.54	1	FLOW	3457.
				TIME	3.60
ROUTED TO					
+	208	5.54	1	FLOW	2583.
				TIME	4.10
HYDROGRAPH AT					
+	207	1.22	1	FLOW	360.
				TIME	3.80
ROUTED TO					
+	208	1.22	1	FLOW	338.
				TIME	4.00
HYDROGRAPH AT					
+	208	8.78	1	FLOW	1508.
				TIME	4.40
3 COMBINED AT					
+	.	15.54	1	FLOW	4291.
				TIME	4.20
ROUTED TO					
+	218	15.54	1	FLOW	3992.
				TIME	4.50
HYDROGRAPH AT					
+	205	9.59	1	FLOW	2997.
				TIME	4.20
HYDROGRAPH AT					
+	206	6.64	1	FLOW	719.
				TIME	5.30
HYDROGRAPH AT					
+	211	3.69	1	FLOW	1461.
				TIME	3.90
3 COMBINED AT					

+	.	19.91	1	FLOW	4823.
				TIME	4.20
ROUTED TO					
+	217	19.91	1	FLOW	4625.
				TIME	4.60
2 COMBINED AT					
+	.	35.46	1	FLOW	8580.
				TIME	4.50
ROUTED TO					
+	221	35.46	1	FLOW	8139.
				TIME	5.10
ROUTED TO					
+	222	35.46	1	FLOW	7782.
				TIME	5.60
HYDROGRAPH AT					
+	212	5.64	1	FLOW	2819.
				TIME	3.80
ROUTED TO					
+	224	5.64	1	FLOW	2689.
				TIME	4.00
ROUTED TO					
+	222	5.64	1	FLOW	2344.
				TIME	4.60
2 COMBINED AT					
+	.	41.10	1	FLOW	9237.
				TIME	5.70
ROUTED TO					
+	223	41.10	1	FLOW	8500.
				TIME	7.60
HYDROGRAPH AT					
+	202	5.52	1	FLOW	3705.
				TIME	3.50
ROUTED TO					
+	203	5.52	1	FLOW	3102.
				TIME	3.80
HYDROGRAPH AT					
+	203	6.25	1	FLOW	3977.
				TIME	3.60
HYDROGRAPH AT					
+	204	2.46	1	FLOW	1666.
				TIME	3.60
3 COMBINED AT					
+	.	14.23	1	FLOW	8128.
				TIME	3.70
ROUTED TO					
+	209	14.23	1	FLOW	7028.
				TIME	4.10
HYDROGRAPH AT					
+	209	2.82	1	FLOW	692.
				TIME	4.00
HYDROGRAPH AT					
+	210	9.42	1	FLOW	3184.
				TIME	4.00
3 COMBINED AT					
+	.	26.47	1	FLOW	10826.
				TIME	4.10
ROUTED TO					
+	213	26.47	1	FLOW	9676.
				TIME	4.60
HYDROGRAPH AT					
+	214	7.17	1	FLOW	2120.
				TIME	4.30
HYDROGRAPH AT					
+	215	9.98	1	FLOW	2761.
				TIME	4.20
HYDROGRAPH AT					
+	213	16.25	1	FLOW	3198.
				TIME	5.00
4 COMBINED AT					
+	.	59.88	1	FLOW	16873.
				TIME	4.60
ROUTED TO					
+	223	59.88	1	FLOW	16441.
				TIME	4.90

```
 ROUTED TO
+                      V      59.88     1   FLOW        15762.
                                            TIME            5.50

 ROUTED TO
+                      V      59.88     1   FLOW        14442.
                                            TIME            7.50

 HYDROGRAPH AT
+                    223      35.36     1   FLOW         2022.
                                            TIME            7.50

  3 COMBINED AT
+                WTRIBUS     136.34     1   FLOW        24938.
                                            TIME            7.50

 ROUTED TO
+                    DIV     136.34     1   FLOW        24922.
                                            TIME            7.60

 ROUTED TO
+                      .     136.34     1   FLOW        24874.
                                            TIME            7.60

 ROUTED TO
+                  ULWDB     136.34     1   FLOW        19217.
                                            TIME            8.70

                                          ** PEAK STAGES IN FEET **
                                          1   STAGE     2375.68
                                              TIME            8.70

 ROUTED TO
+                    116     136.34     1   FLOW        18767.
                                            TIME            9.20

 ROUTED TO
+                    109     136.34     1   FLOW        18346.
                                            TIME            9.60

 ROUTED TO
+                  NLVIN     136.34     1   FLOW        17855.
                                            TIME           10.20

 DIVERSION TO
+                 DIVDIKE    136.34     I   FLOW         6838.
                                            TIME           10.20

 HYDROGRAPH AT
+                      .     136.34     1   FLOW        11017.
                                            TIME           10.20

 ROUTED TO
+                 NLVDET     136.34     1   FLOW         6322.
                                            TIME           12.00

                                          ** PEAK STAGES IN FEET **
                                          1   STAGE       31.44
                                              TIME           12.00

 HYDROGRAPH AT
+                      .       0.00     1   FLOW         6838.
                                            TIME           10.20

  2 COMBINED AT
+                      .     136.34     1   FLOW         8988.
                                            TIME           10.20

 ROUTED TO
+                    303     136.34     1   FLOW         8319.
                                            TIME           11.60

 DIVERSION TO
+                RRCHANNL    136.34     1   FLOW         2236.
                                            TIME           11.60

 HYDROGRAPH AT
+                RRBRIDGE    136.34     1   FLOW         6083.
                                            TIME           11.60

 DIVERSION TO
+                   KCHAR    136.34     1   FLOW         4866.
                                            TIME           11.60

 HYDROGRAPH AT
+                     I15    136.34     1   FLOW         1217.
                                            TIME           11.60

 ROUTED TO
+                     NC1    136.34     1   FLOW         1217.
                                            TIME           11.60

 ROUTED TO
+                      V     136.34     1   FLOW         1216.
                                            TIME           11.60

 ROUTED TO
+                     NC2    136.34     1   FLOW         1216.
                                            TIME           11.60
```

```
 ROUTED TO
+                    NC3     136.34      1   FLOW        1216.
                                             TIME       11.70

 ROUTED TO
+                    NC4     136.34      1   FLOW        1216.
                                             TIME       11.70

 ROUTED TO
+                    NC5     136.34      1   FLOW        1216.
                                             TIME       11.70

 HYDROGRAPH AT
+                 RRBRIDGE     0.00      1   FLOW        2236.
                                             TIME       11.60

 HYDROGRAPH AT
+                 DUMMY_AR     0.00      1   FLOW           0.
                                             TIME        4.50

   2 COMBINED AT
+                 DUMMY_CO     0.00      1   FLOW        2236.
                                             TIME       11.60

 ROUTED TO
+                 RRCHANNL     0.00      1   FLOW        2215.
                                             TIME       11.70

 HYDROGRAPH AT
+                    I-15      0.00      1   FLOW        4866.
                                             TIME       11.60

 HYDROGRAPH AT
+                 DUMMY_AR     0.00      1   FLOW           0.
                                             TIME        4.50

   2 COMBINED AT
+                 DUMMY_CO     0.00      1   FLOW        4866.
                                             TIME       11.60

   2 COMBINED AT
+                 ACHANNL      0.00      1   FLOW        7079.
                                             TIME       11.70

 ROUTED TO
+                    AC1       0.00      1   FLOW        7079.
                                             TIME       11.70

 ROUTED TO
+                    AC2       0.00      1   FLOW        7077.
                                             TIME       11.70

 ROUTED TO
+                    AC3       0.00      1   FLOW        7073.
                                             TIME       11.70

 ROUTED TO
+                    AC4       0.00      1   FLOW        7065.
                                             TIME       11.70

   2 COMBINED AT
+                 NCHANNL     136.34      1   FLOW        8281.
                                             TIME       11.70

 ROUTED TO
+                    AC5     136.34      1   FLOW        8279.
                                             TIME       11.70

 ROUTED TO
+                    AC6     136.34      1   FLOW        8269.
                                             TIME       11.70

 ROUTED TO
+                  LKMEAD    136.34      1   FLOW        8254.
                                             TIME       11.80
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                                      PEAK                          PEAK

                                  (MIN)      (CFS)      (MIN)      (IN)     (MIN)      (CFS)      (MIN)      (IN)

        FOR PLAN = 1  RATIO= 0.90
            DIV  MANE            2.55   24933.92     455.12      0.83      6.00   24922.11     456.00      0.83

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6039E+04 EXCESS=0.0000E+00 OUTFLOW=0.6038E+04 BASIN STORAGE=0.2946E+01 PERCENT ERROR=   0.0


        FOR PLAN = 1  RATIO= 0.90
            DIV  MANE            1.79   24906.38     460.11      0.83      6.00   24874.20     456.00      0.83

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6038E+04 EXCESS=0.0000E+00 OUTFLOW=0.6036E+04 BASIN STORAGE=0.2820E+01 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.90
               NC1  MANE          0.26   1216.55    696.21       0.11       6.00   1216.54    696.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7662E+03 EXCESS=0.0000E+00 OUTFLOW=0.7658E+03 BASIN STORAGE=0.5428E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
                 V  MANE          0.86   1216.53    697.46       0.10       6.00   1216.45    696.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7656E+03 EXCESS=0.0000E+00 OUTFLOW=0.7631E+03 BASIN STORAGE=0.2697E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC2  MANE          0.63   1216.42    697.64       0.10       6.00   1216.33    696.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7627E+03 EXCESS=0.0000E+00 OUTFLOW=0.7610E+03 BASIN STORAGE=0.1630E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC3  MANE          1.67   1216.32    699.77       0.10       6.00   1216.29    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7609E+03 EXCESS=0.0000E+00 OUTFLOW=0.7564E+03 BASIN STORAGE=0.5047E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.90
               NC4  MANE          0.60   1216.27    703.11       0.10       6.00   1216.23    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7553E+03 EXCESS=0.0000E+00 OUTFLOW=0.7540E+03 BASIN STORAGE=0.1446E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               NC5  MANE          0.35   1216.21    702.57       0.10       6.00   1216.18    702.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7538E+03 EXCESS=0.0000E+00 OUTFLOW=0.7532E+03 BASIN STORAGE=0.7795E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
           RRCHANNL  MANE          2.18   2229.79    699.53    3612.29       6.00   2215.00    702.00      3610.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1923E+03 EXCESS=0.0000E+00 OUTFLOW=0.1926E+03 BASIN STORAGE=0.1225E-01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.90
               AC1  MANE          0.19   7078.95    702.18   30521.22       6.00   7078.89    702.00     30515.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3257E+04 EXCESS=0.0000E+00 OUTFLOW=0.3255E+04 BASIN STORAGE=0.2161E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC2  MANE          0.58   7077.55    702.41   30465.52       6.00   7077.00    702.00     30451.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3255E+04 EXCESS=0.0000E+00 OUTFLOW=0.3249E+04 BASIN STORAGE=0.6536E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC3  MANE          0.46   7075.17    702.75   30395.28       6.00   7072.84    702.00     30392.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3248E+04 EXCESS=0.0000E+00 OUTFLOW=0.3242E+04 BASIN STORAGE=0.6163E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC4  MANE          0.61   7069.70    703.21   30327.71       6.00   7065.24    702.00     30320.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3242E+04 EXCESS=0.0000E+00 OUTFLOW=0.3235E+04 BASIN STORAGE=0.7417E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC5  MANE          0.18   8280.37    702.25       0.55       6.00   8278.60    702.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3987E+04 EXCESS=0.0000E+00 OUTFLOW=0.3985E+04 BASIN STORAGE=0.2394E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
               AC6  MANE          0.50   8276.12    703.08       0.55       6.00   8269.02    702.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3985E+04 EXCESS=0.0000E+00 OUTFLOW=0.3977E+04 BASIN STORAGE=0.7275E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.90
             LKMEAD  MANE          1.53   8267.90    705.06       0.54       6.00   8254.46    708.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3977E+04 EXCESS=0.0000E+00 OUTFLOW=0.3955E+04 BASIN STORAGE=0.2833E+02 PERCENT ERROR=  -0.1
```

*** NORMAL END OF HEC-1 ***

Paper Copy B
LC Lower Central Valley Storm

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *           FEBRUARY  1991              *
 *            VERSION 4.0.1 (LOCAL)      *
 *                                       *
 *  RUN DATE  05/13/96  TIME  10:51:21   *
 *                                       *
 *****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X         XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THR DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID          FEMA FLOOD INSURANCE STUDY, 1996
              2     ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID          LOWER CENTRAL VALLEY 10-YEAR STORM
              4     ID
              5     ID          Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID          Study Hydrology Report dated 9/91.  Two modifications were made
              8     ID          to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID          and outflow characteristics were revised to reflect the As-built
             10     ID          configuration described by construction drawings dated 5/91 and HEC-1
             11     ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID          relationship for the North Las Vegas Detention Basin was revised
             13     ID          to reflect the current three-pipe outlet condition (two of the five
             14     ID          pipes were blocked following construction of the upper basin) and the
             15     ID          hydraulic control created by the 4-foot high barrier wall located
             16     ID          upstream from the pipe inlets.
             17     ID
             18     ID          Remaining comments are from the original model dated 1/91.
             19     ID
             20     ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             21     ID          Northern Las Vegas Wash - FIS FLOWS
             22     ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
             23     ID
             24     ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
             25     ID          Lower Central Valley 10-Year Storm, Existing Conditions
             26     ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
             27     ID          (SPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
             28     ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
             29     ID
             30     ID          All routing steps immediately d/s of a diversion converted to
             31     ID          Muskingum routing to avoid zero flow, 8/90
             32     ID
             33     ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
             34     ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
             35     ID          Channel and Hualapai Diversion included, 8/90
             36     ID
             37     ID          This data file models DARF's at certain locations where FIS flows are
             38     ID          required.  The original B&V data file used a factor of 0.62; ratios
             39     ID          of this factor are used in the JR card to model DA's at the points
             40     ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
             41     ID
             42     ID           PT OF                 AREA          DARF      DARF/0.62      RATIO
             43     ID          INTEREST              (SQ MI)
             44     ID
             45     ID     RRBRIDGE, NC5, & 304    60.7 - 64.5       0.66        1.06          1
             46     ID          ACHANNL               111.6          0.59        0.95          2
             47     ID          NCHANNL               172.2          0.53        0.85          3
             48     ID
 *** FREE ***
             49     IT       6       0       0     200
             50     IO       5       0       0
             51     IN       5       0       0
             52     JR    PREC    1.06    0.95    0.85
```

1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             53     KK     112
             54     KM   RUNOFF FROM SUBBASIN 112
```

```
55          BA   5.333
56          PB    1.21
57          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
58          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
59          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
60          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
61          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
62          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
63          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
64          PC    .997    .999   1.00
65          LS       0      82
66          UD    .462

67          KK     119
68          KM   RUNOFF FROM SUBBASIN 119
69          BA   2.739
70          PB    1.14
71          LS       0      82
72          UD    .346

73          KK       .
74          KM   COMBINE SUBBASINS 112 & 119
75          HC       2

76          KK     120
77          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
78          RM       3    0.27    0.15

79          KK  125UDB
80          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
81          RM       5    0.53    0.15

82          KK     117
83          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
84          RM       4    0.43    0.15

85          KK     118
86          KM   RUNOFF FROM SUBBASIN 118
87          BA   5.079
88          PB    1.06
89          LS       0      84
90          UD    .233

91          KK     117
92          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
93          RM       1    0.13    0.15
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

94          KK       V
95          RM       3    0.25    0.15

96          KK       V
97          RM       4    0.37    0.15

98          KK     117
99          KM   RUNOFF FROM SUBBASIN 117
100         BA   7.366
101         PB    0.98
102         LS       0      78
103         UD   1.699

104         KK       .
105         KM   COMBINR SUBBASINS 112, 117, 118, & 119
106         HC       3

107         KK   ULWDB
            *  *** lines from 1/91 model removed 5/96
            * KM      UPPER LAS VEGAS WASH DETENTION BASIN
            * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
            * RS 1 STOR -1
            * SV 0 40 75 110 250 500 920 1550 1700 1860
            * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
            * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
            * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
            * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
            * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
108         KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
109         KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
110         RS       1    STOR      -1
111         SV       0      12      80     170     320     560    1000    1610    1800    1980
112         SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
113         SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
114         SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
115         SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
116         SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

117         KK     116
118         KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
119         RM       5    0.50    0.15

120         KK     111
121         KM   RUNOFF FROM SUBBASIN 111
122         BA    4.08
123         PB    1.06
124         LS       0      84
125         UD    .239
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1                                        HEC-1 INPUT                                    PAGE  4

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            126     KK     116
            127     KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
            128     RM       1    0.10    0.15

            129     KK       V
            130     RM       2    0.21    0.15

            131     KK     116
            132     KM   RUNOFF FROM SUBBASIN 116
            133     BA   5.189
            134     PB    0.98
            135     LS       0      78
            136     UD   1.418

            137     KK       .
            138     KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
            139     HC       3

            140     KK     109
            141     KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
            142     RM       4    0.42    0.15

            143     KK     110
            144     KM   RUNOFF FROM SUBBASIN 110
            145     BA   2.945
            146     PB    1.06
            147     LS       0      86
            148     UD    .237

            149     KK     109
            150     KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
            151     RM       1    0.09    0.15

            152     KK       V
            153     RM       2    0.19    0.15

            154     KK     109
            155     KM   RUNOFF FROM SUBBASIN 109
            156     BA   4.183
            157     PB    0.98
            158     LS       0      78
            159     UD   1.281

            160     KK       .
            161     KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
            162     HC       3

            163     KK     101
            164     KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
            165     KM   THRU SUBBASIN 101
            166     RM       5    0.54    0.15
1                                        HEC-1 INPUT                                    PAGE  5

          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            167     KK     103
            168     KM   RUNOFF FROM SUBBASIN 103
            169     BA   6.195
            170     PB    1.21
            171     LS       0      84
            172     UD    .324

            173     KK     102
            174     KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
            175     RM       1    0.11    0.15

            176     KK     102
            177     KM   RUNOFF FROM SUBBASIN 102
            178     BA   8.455
            179     PB    1.06
            180     LS       0      83
            181     UD    .369

            182     KK       .
            183     KM   COMBINE SUBBASINS 102 & 103
            184     HC       2

            185     KK     101
            186     KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
            187     RM       1    0.11    0.15

            188     KK       V
            189     RM       2    0.22    0.15

            190     KK     101
            191     KM   RUNOFF FROM SUBBASIN 101
            192     BA   9.082
            193     PB    0.98
            194     LS       0      77
            195     UD   1.505

            196     KK   NLVIN
            197     KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
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          198          HC       3

          199          KK       .
          200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          201          DT DIVDIKE
          202          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          203          DI   17775   20135   23000
          204          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          205          DQ    6775    8635   11000

          206          KK  NLVDET
          207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
          208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
          209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          210          RS       1    STOR      -1
          211          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                                HEC-1 INPUT                                          PAGE  6

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          212          SV    1650    1825    1920    2000    2110    2200    2310    2430
          213          SE       0       2       4       6      10      14      21      24      26      27
          214          SE      28      30      31      32      33      34      35      36
                       *  *** lines from 1/91 model removed 5/96
                       * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
                       * SQ 4180 5968 7095 8334 9676 11101 12630 14294
          215          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          216          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          217          KK       .
          218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          219          DR DIVDIKE

          220          KK       .
          221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          222          HC       2

          223          KK     303
          224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
          225          RM      13    1.28    0.15

          226          KKRRBRIDGE
          227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
          228          DTRRCHANNL
          229          DI       0    6000   20000
          230          DQ       0       0   13500

          231          KK     I15
          232          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
          233          DT   KCHAR
          234          DI       0    1000   10000
          235          DQ       0     800    8000

          236          KK     NC1
          237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
          238          RK     700  0.0058   0.016       0    TRAP      10       2

          239          KK       V
          240          RK    2000  0.0100   0.035       0    TRAP      30       2

          241          KK     NC2
          242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
          243          KM   TO GOWAN AVE.
          244          RK    1300   .0056    .030       0    TRAP      12       2

          245          KK     NC3
          246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
          247          KM   TO CHEYENNE AVE.
          248          RK    2600   .0021    .030       0    TRAP      20     2.5
1                                                HEC-1 INPUT                                          PAGE  7

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          249          KK     NC4
          250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
          251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
          252          RK    1300    .003    .016       0    TRAP      18       2

          253          KK     NC5
          254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
          255          KM   TO "A" CHANNEL (LINED CHANNEL)
          256          RK     500    .001    .016       0    TRAP      18       2
          257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

          258          KK    AP.1
          259          KM       Begin subareas tributary to Gowan-South Detention Basin
          260          KM       Begin subareas tributary to Angel Park Detention Basin
          261          KM       From Wallace Angel Park Model
          262          BA   0.001
          263          PB    1.29
          264          LS       0      89
          265          UD    0.62

          266          KK       V
          267          KM   Route AP.1
          268          RM       7    0.67    0.15

          269          KK    AP.2
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344          KM   Combine GD.1 & GD.2
345          HC       2

346          KK  TO_DIV
347          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
348          RM       3    0.34    0.15

349          KK    GD.3(=AP.12)
350          KM   From VTN
351          BA    0.80
352          PB    1.19
353          LS       0      87
354          UD    0.32

355          KKHUALAPAI
356          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
357          HC       2

358          KK     HUA& NO.CH
359          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
360          HC       2

361          KK       V
362          KM   Route Combined Flows
363          RK    5500    .023     .04       0    TRAP     100       2

364          KK       V
365          KM   Routing Cont'd
366          RK    4500    .004     .03       0    TRAP      30       4

367          KK    AP.8
368          BA    0.93
369          PB    1.14
370          LS       0      89
371          UD    0.62

372          KK     BOX
373          KM   SUMMERLIN PARKWAY CULVERT
374          HC       2
1                                        HEC-1 INPUT                                        PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

375          KK       V
376          KM   ROUTE TO ANGEL PARK DETENTION BASIN
377          RK    3000    .027     .04       0    TRAP     100       2

378          KK    AP.9
379          BA    0.68
380          PB    1.14
381          LS       0      89
382          UD     .83

383          KK  N_CHAN
384          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
385          HC       2

386          KKANGEL.PK
387          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
388          HC       2

389          KKSPILLWAY
390          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
391          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
392          RS       1    STOR      -1
393          SV       0       3      22      45      80     125     190     270     369     492
394          SV     630     780     942    1115    1209
395          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
396          SE    2616    2618    2620    2622    2623
397          SL  2592.5    3.14     0.6     0.5
398          SS  2619.1    1275     3.2     1.5

399          KKAP_TO_VEGAS/PIONEER
400          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
401          KM   From VTN
402          RK    7500    0.03   0.012       0    CIRC       5       0

403          KKBUFFALO_1
404          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
405          RK    1500    0.02    0.03       0    TRAP      20       4

406          KK    GD.7
407          KM   INTERSECTION OF LAKE MEAD & BUFFALO
408          BA    1.13
409          PB    1.14
410          LS       0      89
411          UD    1.38

412          KKBUFFALO_1
413          KM   Combine GD.7 W/ Buffalo Channel
414          HC       2
1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

415          KKBUFFALO_2
416          KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
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417          RK    5000   0.005   0.025       0    TRAP      30       4

418          KK    GD.4
419          KM    From B&V-La Madre
420          BA   0.001
421          PB    1.25
422          LS       0      88
423          UD    0.62

424          KK       V
425          KM    ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
426          RM       7    0.74    0.15

427          KK    GD.5
428          BA    3.31
429          PB    1.20
430          LS       0      86
431          UD    1.38

432          KK       .
433          KM    Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
434          HC       2

435          KK       V
436          KM    ROUTE NORTH ALONG RAMPART
437          RM       4    0.43    0.15

438          KK    GD.6
439          KM    DEL WEBB-SUN CITY SUMMERLIN
440          BA     1.6
441          PB    1.14
442          LS       0      86
443          UD     .96

444          KK       .
445          KM    Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
446          HC       2

447          KK       V
448          KM    ROUTE TO BUFFALO along Cheyenne Channel
449          RK    5500    .015    .015       0    TRAP      20       2

450          KK    GD.8
451          KM    R.A. HOMES-DESERT SHORES
452          BA    1.53
453          PB    1.08
454          LS       0      85
455          UD    1.11
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

456          KK       .
457          KM    INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
458          HC       2

459          KK   GD.34
460          KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
461          BA    3.84
462          PB    1.08
463          LS       0      84
464          UD    1.72

465          KKGOWAN_SOUTH
466          KM    TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
467          HC       3

468          KK  DET.GS
469          KM    Gowan-South Detention Basin data from VTN
470          RS       1    STOR      -1
471          SV       0     9.8     113     435     454     680
472          SE    2326    2330    2340  2349.6    2350    2354
473          SQ       0     112     328     455     459   30700

474          KK R.GSOUT
475          KM    ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
476          RK    3200   0.007   0.012       0    CIRC       5       0

477          KK    GD.9
478          KM    Begin subareas tributary to Gowan-North Detention Basin
479          KM    From B&V-LaMadre
480          BA   0.001
481          PB    1.29
482          LS       0      89
483          UD    0.30

484          KK       V
485          RM       5    0.52    0.15

486          KK   GD.10
487          KM    From B&V-LaMadre
488          BA   0.001
489          PB    1.20
490          LS       0      88
491          UD    0.90

492          KK       .
493          KM    Combine GD.9 & GD.10
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494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6    0.61    0.15
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1 *HEC-1 INPUT* PAGE 13

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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

498          KK       V
499          KM   Routing Cont'd
500          RM       7    0.74    0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB    1.14
505          LS       0      85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB    1.14
514          LS       0      89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0    1545    3129    4000    8000
521          DQ       0    1545    1545    2416    6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2    0.15    0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB    1.13
530          LS       0      86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0     900    2484    4000    8000
540          DQ       0     900     900    2416    6416
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1 *HEC-1 INPUT* PAGE 14

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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1    0.14    0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    1.35
550          LS       0      80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12    1.23    0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB    1.12
559          LS       0      81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0     520    1889    4000    8000
568          DQ       0     520     520    2631    6631
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569          KK       V
570          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
571          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
572          RM       1    0.14    0.15

573          KK   GD.28
574          KM   From Wallace
575          BA   0.001
576          PB    1.14
577          LS       0      77
578          UD    2.52

579          KK       .
580          KM   Combine GD.28 & GD.30 - GD.33
581          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

582          KK  RANCHO
583          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
584          DTCENTNIAL
585          DI       0    1040    5456    8000
586          DQ       0    1040    1040    3585

587          KK       V
588          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
589          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
590          RM       1    0.07    0.15

591          KK   GD.25
592          KM   From Wallace
593          BA   0.001
594          PB    1.21
595          LS       0      89
596          UD    1.09

597          KK       V
598          RM       7    0.69    0.15

599          KK   GD.26
600          KM   From Wallace
601          BA   0.001
602          PB    1.17
603          LS       0      78
604          UD    1.23

605          KK       .
606          KM   Combine GD.25 & GD.26
607          HC       2

608          KK       V
609          KM   ROUTE WEST TO ANN ROAD AND HWY 95
610          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
611          RM       4    0.43    0.15

612          KK       V
613          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
614          RM       5    0.49    0.15

615          KK   GD.27
616          KM   From Wallace
617          BA    1.13
618          PB    1.10
619          LS       0      78
620          UD    1.61

621          KK       .
622          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
623          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

624          KK       V
625          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
626          RK    3000   0.009   0.025       0    TRAP      50       3

627          KK       V
628          RK    3000   0.004   0.022       0    TRAP      25       8

629          KK   GD.29
630          KM   From Wallace
631          BA    0.76
632          PB    1.12
633          LS       0      77
634          UD    1.49

635          KK       V
636          RK    8000    0.01   0.025       0    TRAP      20       8

637          KK    PDGC
638          KM   PAINTED DESERT GOLF COURSE
639          KM   From Wallace
640          BA    0.53
641          PB    1.08
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642          LS       0      80
643          UD     1.2

644          KK
645          KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
646          HC       3

647          KK  RANCHO
648          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
649          DTP.DESERT
650          DI       0     233    1318    8000
651          DQ       0     233     233    6915

652          KK       V
653          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
654          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
655          RM       1    0.14    0.15

656          KK   GD.21
657          KM   From Wallace
658          BA   0.001
659          PB    1.28
660          LS       0      89
661          UD    0.72

662          KK       V
663          RM       8    0.81    0.15
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

664          KK   GD.22
665          KM   From Wallace
666          BA   0.001
667          PB    1.21
668          LS       0      86
669          UD     1.5

670          KK   GD.23
671          KM   From Wallace
672          BA   0.001
673          PB    1.23
674          LS       0      86
675          UD    1.41

676          KK
677          KM   Combine GD.21 - GD.23
678          HC       3

679          KK       V
680          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
681          RM       7    0.65    0.15

682          KK   GD.24
683          KM   From Wallace
684          BA    0.64
685          PB    1.14
686          LS       0      77
687          UD     1.2

688          KK
689          KM   Combine GD.21 - GD.24
690          HC       2

691          KK       V
692          KM   ROUTE WEST TO HWY 95
693          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
694          RM       7    0.65    0.15

695          KK   GD.18
696          KM   From Wallace
697          BA   0.001
698          PB    1.26
699          LS       0      89
700          UD    0.31

701          KK       V
702          RM       6    0.62    0.15

703          KK   GD.19
704          KM   From Wallace
705          BA   0.001
706          PB    1.21
707          LS       0      82
708          UD    1.24
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

709          KK
710          KM   Combine GD.18 & GD.19
711          HC       2

712          KK       V
713          KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
714          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
715          RM       9    0.88    0.15
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716          KK   GD.20
717          KM   From Wallace
718          BA    2.35
719          PB    1.09
720          LS       0      82
721          UD    2.51

722          KK       .
723          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724          HC       4

725          KK  HWY.95
726          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727          DT   CRAIG
728          DI       0     465    2056   10000
729          DQ       0     465     465    8409

730          KK       V
731          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733          RM       1    0.07    0.15

734          KK   GD.15
735          KM   From Wallace
736          BA   0.001
737          PB    1.29
738          LS       0      88
739          UD    0.48

740          KK       V
741          RM       7    0.74    0.15

742          KK   GD.16
743          KM   From Wallace
744          BA   0.001
745          PB    1.23
746          LS       0      82
747          UD    1.63

748          KK       .
749          HC       2
1                                        HEC-1 INPUT                                        PAGE 19

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


750          KK       V
751          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752          RM      10    1.01    0.15

753          KK   GD.17
754          KM   From Wallace
755          BA    0.56
756          PB    1.09
757          LS       0      80
758          UD     2.0

759          KK       .
760          KM   Combine GD.15 - GD.17
761          HC       3

762          KK   HWY95
763          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764          DTALEXANDR
765          DI       0     155    1746   10000
766          DQ       0     155     155    8409

767          KK       V
768          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770          RM       1    0.11    0.15

771          KK   GD.12
772          KM   From Wallace
773          BA   0.001
774          PB    1.26
775          LS       0      89
776          UD     0.3

777          KK       V
778          RM       4    0.42    0.15

779          KK   GD.13
780          KM   From Wallace
781          BA   0.001
782          PB    1.23
783          LS       0      86
784          UD    1.10

785          KK       .
786          KM   Combine GD.12 & GD.13
787          HC       2

788          KK       V
789          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790          RM       4    0.43    0.15
1                                        HEC-1 INPUT                                        PAGE 20
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 791          KK       V
 792          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 793          RM      11    1.06    0.15

 794          KK  GD.14A
 795          KM   From Wallace
 796          BA    1.71
 797          PB    1.15
 798          LS       0      81
 799          UD    0.88

 800          KK       .
 801          KM   Combine GD.12, GD.13 & GD.14A
 802          HC       2

 803          KK       V
 804          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 805          RM       5    0.53    0.15

 806          KK  GD.14B
 807          KM   From Wallace
 808          BA    0.68
 809          PB    1.12
 810          LS       0      83
 811          UD    1.67

 812          KK       .
 813          KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
 814          HC       3

 815          KK   GN_IN
 816          KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
 817          HC       3

 818          KK  DET.GN
 819          KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
 820          KM   From VTN
 821          RS       1    STOR      -1
 822          SV       0      28      46     113     774     885    1163
 823          SE    2308    2311    2312    2314    2324  2325.5    2329
 824          SQ       0       0     126     251     519     539   35800

 825          KKR.G-UPS.
 826          KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
 827          RK    2000   0.005   0.013       0    CIRC       6       0

 828          KK       V
 829          KM   Route Gowan outflow along Gowan Outfall Channel
 830          RK    7000   0.009   0.015       0    TRAP      10       0
1                                        HEC-1 INPUT                                        PAGE 21

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 831          KK       .
 832          KM   Recall flow diverted at Craig Road
 833          DR   CRAIG

 834          KK       V
 835          KM   Route to Rancho
 836          RM       4    0.42    0.15

 837          KK       .
 838          KM   Recall flow diverted at Alexander
 839          DRALEXANDR

 840          KK       V
 841          KM   Route to Rancho
 842          RM       9    0.92    0.15

 843          KK       .
 844          KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
 845          KM   at Rancho
 846          HC       3

 847          KK       V
 848          KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
 849          KM   App. F)
 850          RK    8400   0.007   0.015       0    TRAP      10       0

 851          KK       V
 852          KM   Routing Cont'd
 853          RK    4000   0.005   0.015       0    TRAP      10       0

 854          KK       V
 855          KM   Routing Cont'd
 856          RK    4000   0.005   0.015       0    TRAP      10       0

 857          KK       .
 858          KM   Begin modeling of subareas on the east side of Rancho Road
 859          KM   Recall flow diverted at Centenial
 860          DRCENTNIAL

 861          KK       .
 862          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 863          RM      20    2.03    0.15
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          KK   EPT.1
          BA    3.76
          PB    1.03
          LS       0      85
          UD    3.36
1                                        HEC-1 INPUT                                        PAGE 22

        LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          KK       .
          KM   Combine EPT.1 & flow diverted at Centenial
          HC       2

          KK       V
          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          RM       8    0.76    0.15

          KK       .
          KM   Recall flow diverted at Painted Desert
          DRP.DESERT

          KK       V
          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          RM      20    2.03    0.15

          KK   EPT.3
          BA   4.391
          PB    1.01
          LS       0      88
          UD    3.67

          KK       .
          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
          HC       3

          KK   EPT.4
          BA   1.372
          PB    1.01
          LS       0      89
          UD     2.7

          KK       V
          RM       9    0.88    0.15

          KK       .
          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
          KM   Gowan Outfall Channel
          HC       2

          KK       .
          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
          KM   Alexander, Painted Desert & Centenial
          HC       2

          KK   EPT.5
          BA   3.005
          PB    1.01
          LS       0      87
          UD     4.7
1                                        HEC-1 INPUT                                        PAGE 23

        LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          KK       .
          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
          KM   Alexander, Painted Desert & Centenial
          HC       2

          KK       V
          RK   10000     .013     .015       0     TRAP      10       0

          KK   EPT.2
          BA   1.492
          PB    1.00
          LS       0      85
          UD    2.51

          KK  LVWASH
          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
          HC       2
          KM   ********************************* END GOWAN MODEL ***********************************

          KKGOWANDIV
          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
          DRCULVERTS

          KK     301
          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
          RM      22    2.17    0.15

          KK     301
          KM   RUNOFF FROM SUBBASIN 301
          BA  18.616
          PB    0.98
          LS       0      85
          UD     4.3
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          936          KK WTRIBUS
          937          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
          938          HC       2

          939          KKWTRIBTOT
          940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
          941          HC       2

          942          KK     304
          943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
          944          RM       3    0.28    0.15

          945          KK    SNIC
          946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
          947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
          948          RK    3850   .0122   0.016        0    TRAP      20       2
1                                                HEC-1 INPUT                                          PAGE 24

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

          949          KK     LBC
          950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
          951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
          952          RK    2800    .002   0.016        0    TRAP      80       2

          953          KK    310W
          954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
          955          BA      .8
          956          PB    0.91
          957          LS       0      87        0        0      87
          958          UK     150    .010       .3       38
          959          UK     300    .015      .25       62
          960          RK    1000   .0075      .02     .013    TRAP      51       0
          961          RK    2600   .0075      .02       .2    TRAP      80       0
          962          RK    8700   .0150      .02        0    TRAP     100       0

          963          KK    R310W
          964          KM   ROUTE RUNOFF FROM 310W TO 310E
          965          RK   10500    .015      .02        0    TRAP     100       0

          966          KK    310E
          967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
          968          BA   1.238
          969          PB    0.91
          970          LS       0      86        0        0      83
          971          UK     150     .01       .3       46
          972          UK     300    .015      .25       54
          973          RK    1000   .0075      .02     .019    TRAP      51       0
          974          RK    2000   .0075      .02      .31    TRAP      80       0
          975          RK   10500    .015      .02        0    TRAP     100       0

          976          KK    310E
          977          KM   COMBINE ROUTED 310W WITH 310E
          978          HC       2

          979          KK    R310E
          980          KM   ROUTE FROM 310E TO 311W
          981          RK    5300   .0132      .02        0    TRAP     100       0

          982          KK    311W
          983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
          984          BA     .96
          985          PB    0.91
          986          LS       0      85        0        0      83
          987          UK     150    .010       .3       60
          988          UK     300   .0132      .25       40
          989          RK     650   .0065      .02      .01    TRAP      51       0
          990          RK    2200   .0065      .02      .14    TRAP      80       0
          991          RK    5300   .0132      .02        0    TRAP     100       0
1                                                HEC-1 INPUT                                          PAGE 25

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

          992          KK    311W
          993          KM   COMBINE ROUTED 310E WITH 311W
          994          HC       2

          995          KK    R311W
          996          KM   ROUTE FROM 311W TO 311E
          997          RK    7500   .0132      .02        0    TRAP     100       0

          998          KK    311E
          999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311E
         1000          KM   CONVERT TO SCS RUNOFF
         1001          BA     .77
         1002          PB    0.91
         1003          LS       0    74.3
         1004          UD    0.49

         1005          KK    311E
         1006          KM   COMBINE ROUTED 311W WITH 311E
         1007          HC       2

         1008          KK    309W
         1009          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
         1010          BA     .81
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1011          PB    0.91
1012          LS       0      71       0       0      70
1013          UK     150     .01      .3      22
1014          UK     300   .0144     .25      78
1015          RK    1000    .007     .02    .013    TRAP      51       0
1016          RK    2600    .007     .02     .20    TRAP      80       0
1017          RK    8700   .0144     .02       0    TRAP     100       0
              *  lines removed; zero flow from 309W for 10-year storm
              *  causing crash at step R309W
              * KK R309W
              * KM ROUTE FROM 309W TO 309E
              * RK 21000 .0144 .02 0 TRAP 100 0

1018          KK    309E
1019          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1020          BA    1.19
1021          PB    0.91
1022          LS       0      87       0       0      80
1023          UK     150     .01      .3      52
1024          UK     300   .0144     .25      48
1025          RK    1000    .007     .02    .019    TRAP      51       0
1026          RK    2600    .007     .02    .30     TRAP      80       0
1027          RK   21000   .0144     .02       0    TRAP     100       0

1028          KK    309E
1029          KM   COMBINE ROUTED 309W WITH 309E
1030          HC       2
1                                    HEC-1 INPUT                                    PAGE 26

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1031          KK       .
1032          KM   COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1033          HC       2

1034          KK    FCP1
1035          KM   ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1036          KM   TO LAKE MEAD BLVD.
1037          RK     410   .0045    .016       0    CIRC       5       0

1038          KK    FCP2
1039          RK     740   .0048    .016       0    CIRC     5.5       0

1040          KK   FCBC1
1041          RK     800   .0056    .016       0    TRAP       8       0

1042          KK     FC1
1043          RK    1250   .0195    .016       0    TRAP       8       0

1044          KKFCBC2/FC2/FCBC3
1045          KM   COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1046          RK    1430     .03    .016       0    TRAP       7       0

1047          KK   307NW
1048          KM   RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1049          BA    1.33
1050          PB    0.91
1051          LS       0      85       0       0      87
1052          UK     150    .010      .3      32
1053          UK     300    .011     .25      68
1054          RK    1000   .0055     .02    .017    TRAP      51       0
1055          RK    2600   .0055     .02     .27    TRAP      80       0
1056          RK    6400    .011     .02       0    TRAP     100       0

1057          KK  R307NW
1058          KM   ROUTE FROM 307NW TO 307NE
1059          RK    4000    .011     .02       0    TRAP     100       0

1060          KK   307NE
1061          KM   RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1062          BA     .64
1063          PB    0.91
1064          LS       0      87       0       0      87
1065          UK     150    .010      .3      11
1066          UK     300    .011     .25      89
1067          RK    1000   .0055     .02    .013    TRAP      51       0
1068          RK    2600   .0055     .02     .21    TRAP      80       0
1069          RK    4000    .011     .02       0    TRAP     100       0

1070          KK   307NE
1071          KM   COMBINE ROUTED 307NW WITH 307NE
1072          HC       2
1                                    HEC-1 INPUT                                    PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1073          KK       .
1074          KM   COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1075          HC       2

1076          KK       V
1077          KM   ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1078          RM       4    0.37    0.15

1079          KK   307SW
1080          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1081          BA     1.1
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1082          PB    0.91
1083          LS      0      61       0       0      64
1084          UK    150    .010      .3      16
1085          UK    300    .011     .25      84
1086          RK   1000   .0055     .02     .01    TRAP      51
1087          RK   2200   .0055     .02     .16    TRAP      80
1088          RK   6100    .011     .02       0    TRAP     100       0
              *  lines removed; zero flow from 307SW for 10-year storm
              *  causing crash at step R307SW
              * KK R307SW
              * KM ROUTE FROM 307SW TO 307SE
              * RK 7300 .011 .02 0 TRAP 100 0

1089          KK   307SE
1090          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1091          BA    1.58
1092          PB    0.91
1093          LS      0      85       0       0      87
1094          UK    150     .01      .3      40
1095          UK    300    .011     .25      60
1096          RK   1000   .0055     .02     .01    TRAP      51       0
1097          RK   2200   .0055     .02     .17    TRAP      80       0
1098          RK   7300    .011     .02       0    TRAP     100       0

1099          KK   307SE
1100          KM   COMBINE ROUTED 307SW WITH 307SE
1101          HC      2

1102          KK      .
1103          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1104          HC      2

1105          KK      V
1106          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1107          RM      2    0.18    0.15

1108          KK    308W
1109          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1110          BA     .81
1111          PB    0.91
1112          LS      0      71       0       0      70
1113          UK    150     .01      .3      19
1114          UK    300   .0134     .25      81
1                                  HEC-1 INPUT                                PAGE 28

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1115          RK   1000    .006     .02    .017    TRAP      51       0
1116          RK   2600    .006     .02     .27    TRAP      80       0
1117          RK   8700   .0134     .02       0    TRAP     100       0
              *  lines removed; zero flow from 308W for 10-year storm
              *  causing crash at step R308W
              * KK R308W
              * KM ROUTE FROM 308W TO 308E
              * RK 6500 .0134 .02 0 TRAP 100 0

1118          KK    308E
1119          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1120          BA     .72
1121          PB    0.91
1122          LS      0      85       0       0      87
1123          UK    150     .01      .3      59
1124          UK    300   .0134     .25      41
1125          RK   1000    .006     .02    .015    TRAP      51       0
1126          RK   2600    .006     .02     .24    TRAP      80       0
1127          RK   6500   .0134     .02       0    TRAP     100       0

1128          KK    308E
1129          KM   COMBINE ROUTED 308W WITH 308E
1130          HC      2

1131          KK      .
1132          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1133          HC      2

1134          KKR307/308
1135          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1136          RK    6100   .0132     .02       0    TRAP     100       0

1137          KK    312W
1138          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1139          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1140          BA     .77
1141          PB    0.91
1142          LS      0      81       0       0      80
1143          UK    150    .010      .3      20
1144          UK    300   .0132     .25      80
1145          RK   1000   .0065     .02    .012    TRAP      51       0
1146          RK   2600   .0065     .02    .175    TRAP      80       0
1147          RK   6100   .0132     .02       0    TRAP     100       0

1148          KK    312W
1149          KM   COMBINE ROUTED 307 & 308 WITH 312W
1150          HC      2

1151          KK   R312W
1152          KM   ROUTE FROM 312W TO 312E
1153          RK    6100   .0132     .02       0    TRAP     100       0
1                                  HEC-1 INPUT                                PAGE 29
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1154          KK    312E
1155          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1156          BA      .7
1157          PB    0.91
1158          LS       0      79       0       0      76
1159          UK     150    .010      .3      50
1160          UK     300   .0132     .25      50
1161          RK     500   .0065     .02    .012    TRAP      51       0
1162          RK    2600   .0065     .02    .175    TRAP      80       0
1163          RK    6100   .0132     .02       0    TRAP     100       0

1164          KK    312E
1165          KM   COMBINE ROUTED 312W WITH 312E
1166          HC       2

1167          KK     306
1168          KM   RUNOFF FROM SUBBASIN 306
1169          BA   5.073
1170          PB    0.91
1171          LS       0      84
1172          UD    3.02

1173          KK       .
1174          KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1175          HC       3

1176          KK     FC3
1177          KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1178          KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1179          RK     900   .0012    .016       0    TRAP      10     1.5

1180          KK FC4/FC5
1181          RK     600  0.0012   0.016       0    TRAP      24     1.5

1182          KK     FC6
1183          RK    5150   .0011    .016       0    TRAP      16     1.5

1184          KK     FC7
1185          RK    2400   .0010    .016       0    TRAP      20     1.5

1186          KKFCBC4/FC8
1187          KM   COMBINE FCBC4 & FC8 ROUTING STEPS
1188          RK    3475   .0012    .016       0    TRAP      20     1.5

1189          KK     302
1190          KM   RUNOFF SUBBASIN 302
1191          BA  12.113
1192          PB    0.91
1193          LS       0      86
1194          UD     3.1
1                                        HEC-1 INPUT                                        PAGE 30
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1195          KK     303
1196          KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
1197          RM       8    0.83    0.15

1198          KK     303
1199          KM   RUNOFF FROM 303
1200          BA  10.217
1201          PB    0.91
1202          LS       0      84
1203          UD    4.24

1204          KK       .
1205          KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1206          HC       2

1207          KK     304
1208          KM   RUNOFF FROM SUBBASIN 304
1209          BA   2.903
1210          PB    0.91
1211          LS       0      86
1212          UD    1.98

1213          KK     305
1214          KM   RUNOFF FROM SUBBASIN 305
1215          BA   3.298
1216          PB    0.91
1217          LS       0      87
1218          UD    1.49

1219          KK       .
1220          KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1221          HC       2

1222          KKRRBRIDGE
1223          DRRRCHANNL

1224          KKDUMMY_AREA
1225          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
1226          BA   0.001
1227          PB    2.00
1228          LS       0      80
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          1229          UD    1.00

          1230          KKDUMMY_COMBINE
          1231          KM    Combine dummy subarea with recalled RRCHANNEL diversion
          1232          HC       2

          1233          KKRRCHANNL
          1234          RK    4900   .0041     .03       0    TRAP      40       2
1                                                HEC-1 INPUT                                                PAGE 31

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          1235          KK    I-15
          1236          DR   KCHAR

          1237          KKDUMMY_AREA
          1238          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1239          BA    0.001
          1240          PB    2.00
          1241          LS       0      80
          1242          UD    1.00

          1243          KKDUMMY_COMBINE
          1244          KM    Combine dummy subarea with recalled KCHAR diversion
          1245          HC       2

          1246          KK ACHANNL
          1247          KM    COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1248          HC       5

          1249          KK AC1/AC2
          1250          KM    COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1251          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1252          RK     2350  0.0074   0.035       0    TRAP      30       2

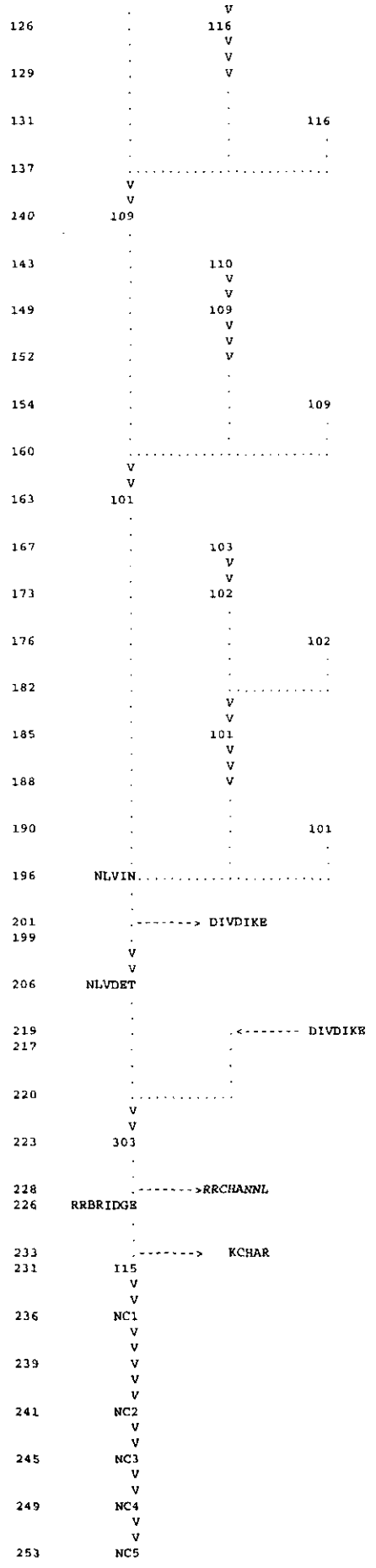
          1253          KK      AC3
          1254          RK     1600   .0065    .030       0    TRAP      52     1.5

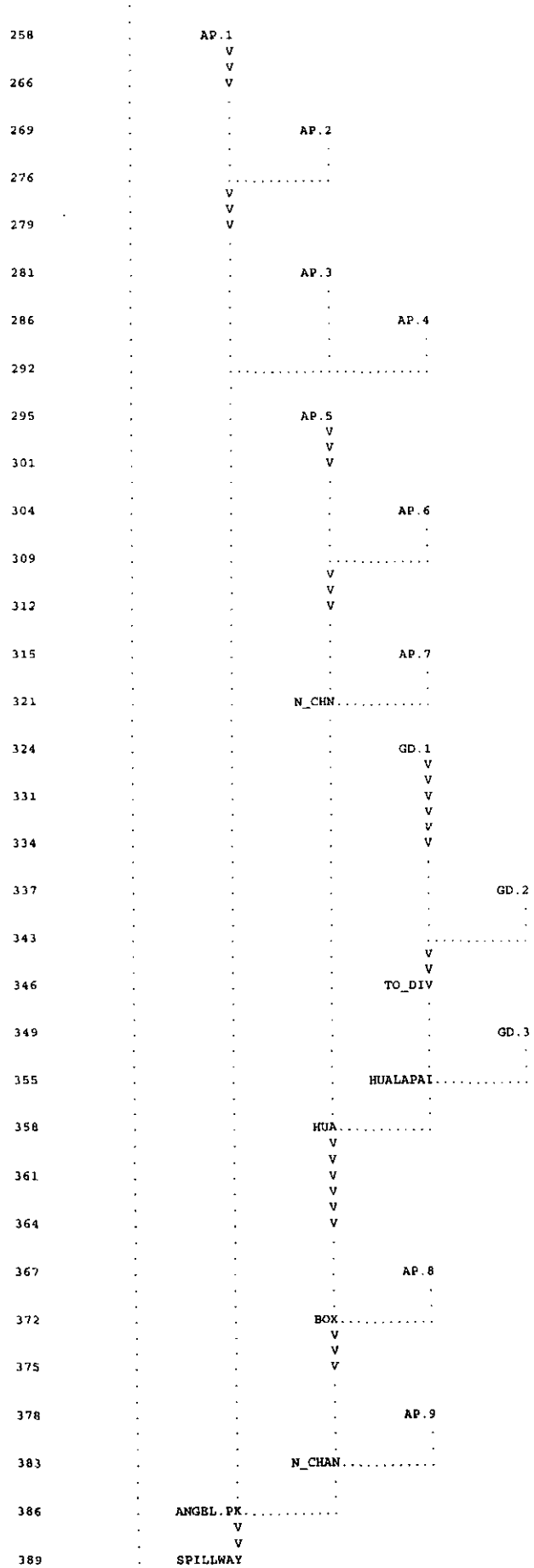
          1255          KK      AC4
          1256          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1257          RK     1650   .0053    .030       0    TRAP      70     1.5

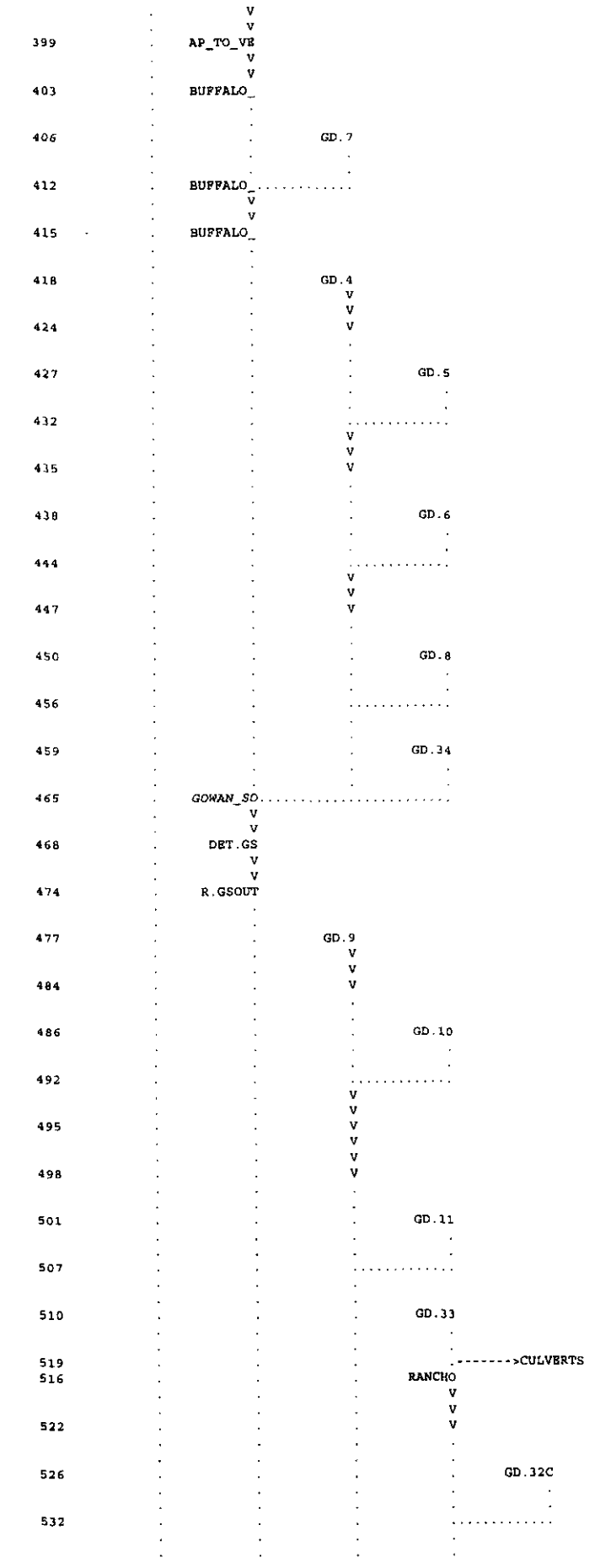
          1258          KK NCHANNL
          1259          KM    COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1260          HC       2
                        * Truncate this run at NCHANNL
          1261          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

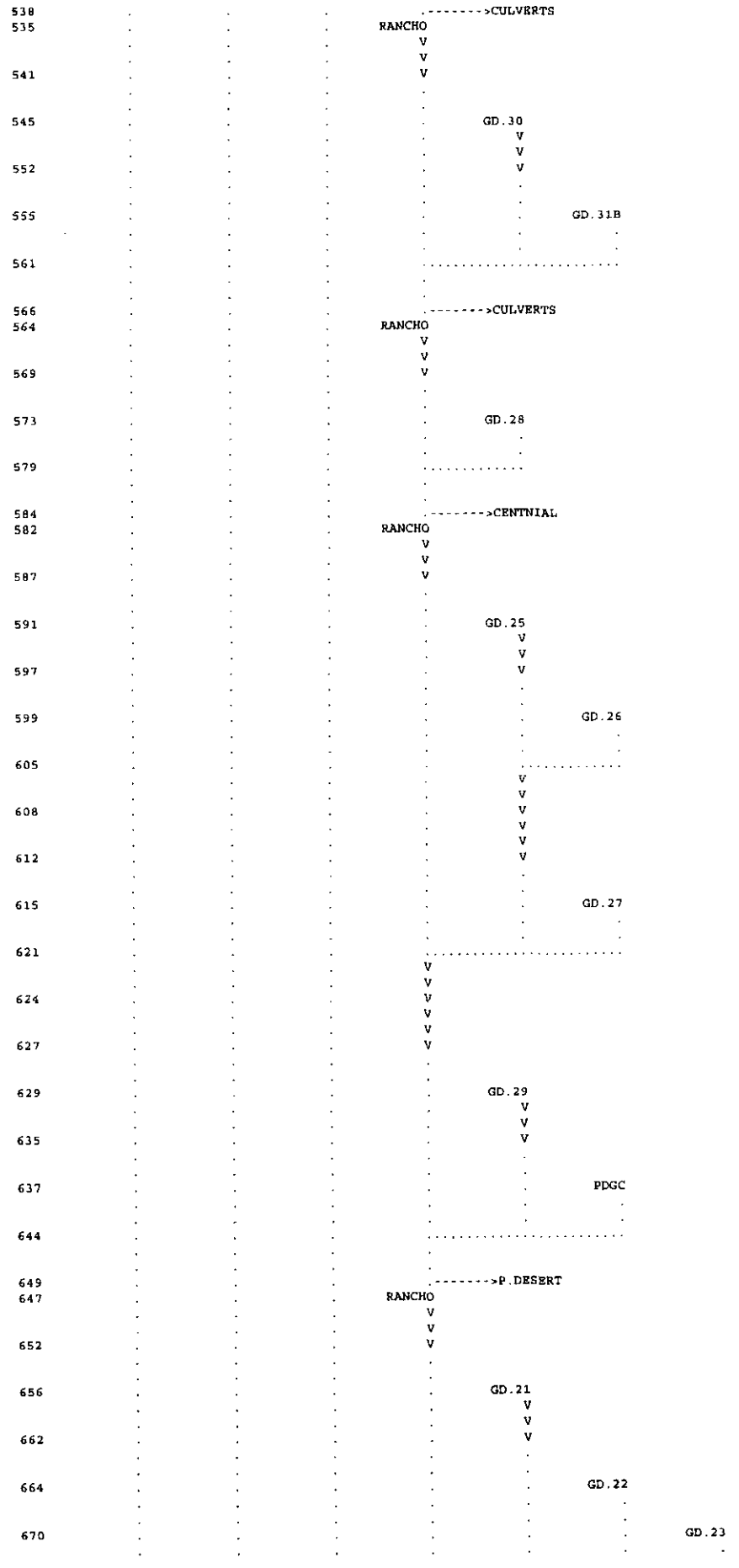
   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

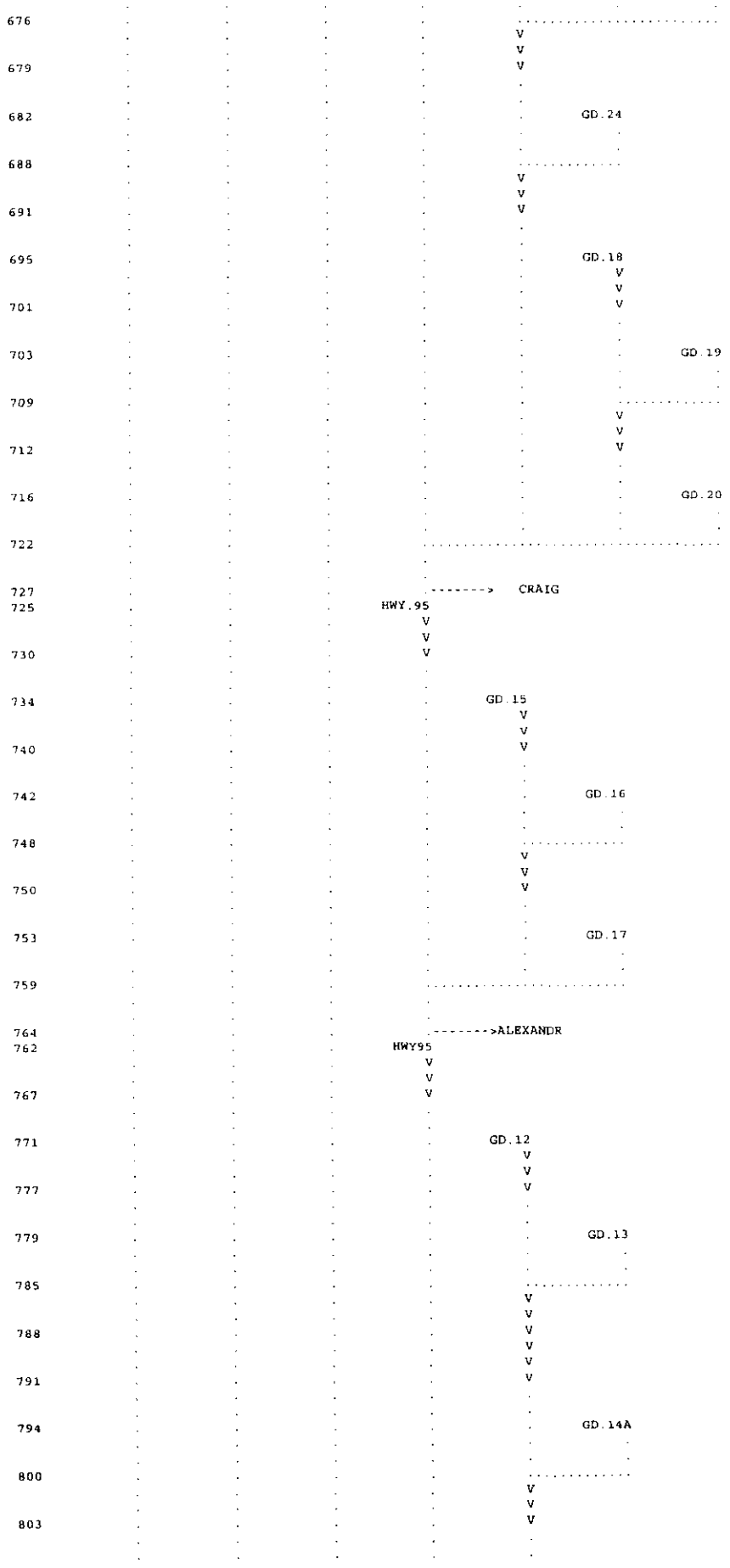
    53         112
               .
               .
    67         .          119
               .            .
               .            .
    73         ..............
               V
               V
    76         120
               V
               V
    79       125UDB
               V
               V
    82         117
               .
               .
    85         .          118
               .            V
               .            V
    91         .          117
               .            V
               .            V
    94         .            V
               .            V
               .            V
    96         .            V
               .            .
               .            .
    98         .            .          117
               .            .            .
               .            .            .
   104         ............................
               V
               V
   107       ULWDB
               V
               V
   117         116
               .
               .
   120         .          111
               .            V
```

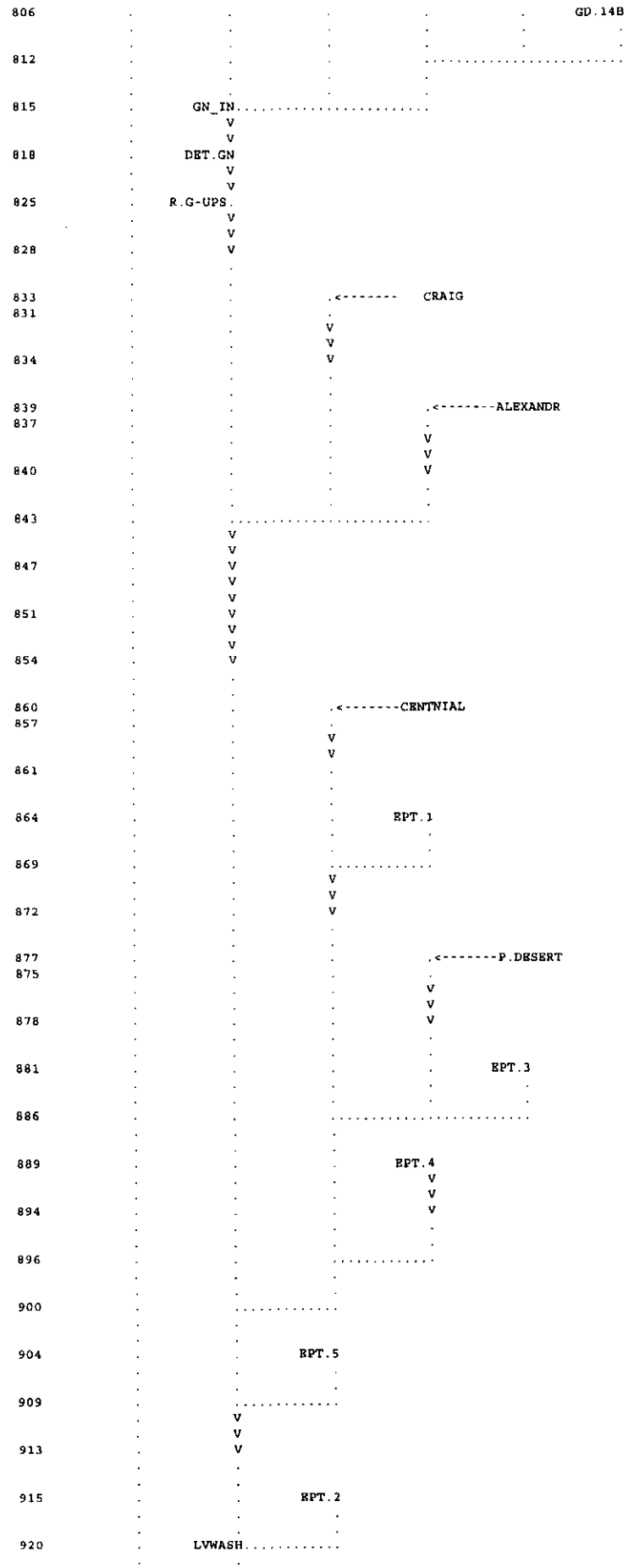

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116
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182
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101
188
190
101
196
NLVIN
201
DIVDIKE
199
206
NLVDET
219
DIVDIKE
217
220
223
303
228
RRCHANNL
226
RRBRIDGE
233
KCHAR
231
I15
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NC1
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241
NC2
245
NC3
249
NC4
253
NC5

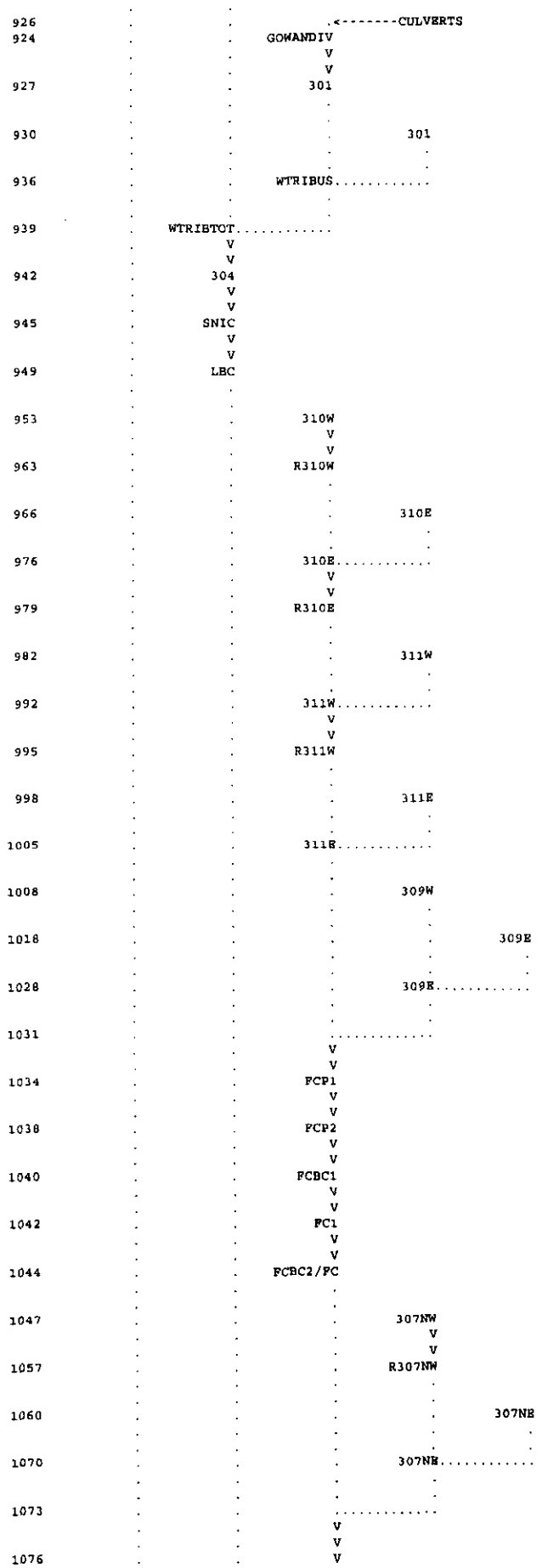

258
AP.1
266
269
AP.2
276
279
281
AP.3
286
AP.4
292
295
AP.5
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AP.6
309
312
315
AP.7
321
N_CHN
324
GD.1
331
334
337
GD.2
343
346
TO_DIV
349
GD.3
355
HUALAPAI
358
HUA
361
364
367
AP.8
372
BOX
375
378
AP.9
383
N_CHAN
386
ANGBL.PK
389
SPILLWAY

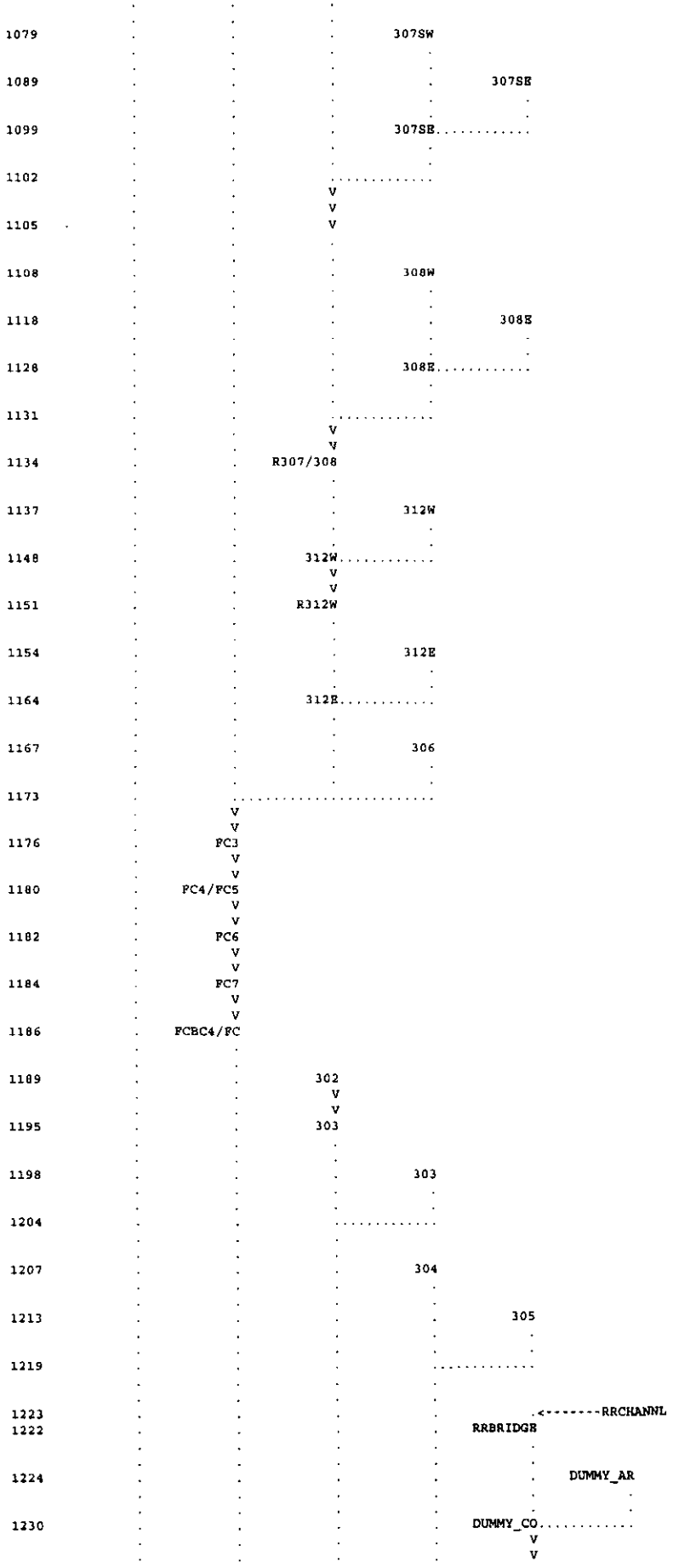

399
AP_TO_VE
403
BUFFALO_
406
GD.7
412
BUFFALO_
415
BUFFALO_
418
GD.4
424
427
GD.5
432
435
438
GD.6
444
447
450
GD.8
456
459
GD.34
465
GOWAN_SO
468
DET.GS
474
R.GSOUT
477
GD.9
484
486
GD.10
492
495
498
501
GD.11
507
510
GD.33
519
->CULVERTS
516
RANCHO
522
526
GD.32C
532

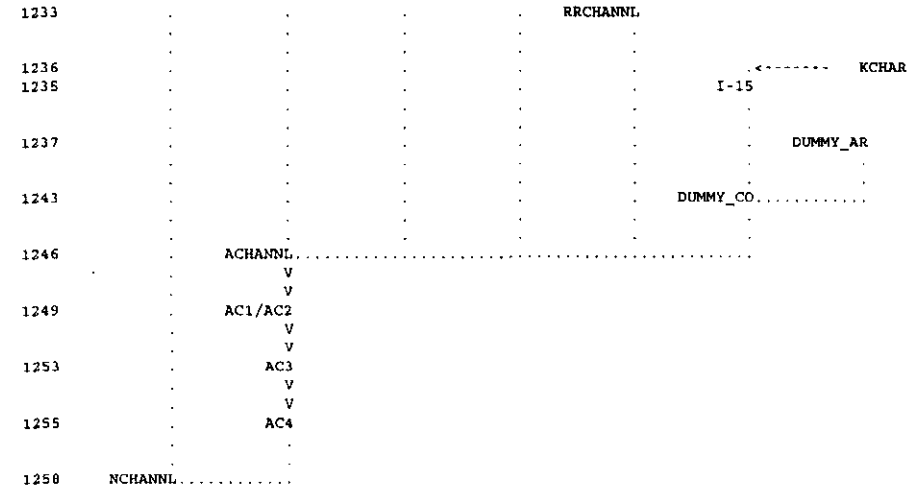

538
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RANCHO
541
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GD.30
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555
GD.31B
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566
564
RANCHO
569
573
GD.28
579
584
582
RANCHO
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GD.25
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GD.26
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GD.27
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GD.29
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637
PDGC
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649
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RANCHO
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GD.21
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GD.22
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GD.23


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GD.24
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GD.18
701
703
GD.19
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712
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GD.20
722
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CRAIG
HWY.95
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734
GD.15
740
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GD.16
748
750
753
GD.17
759
764
762
ALEXANDR
HWY95
767
771
GD.12
777
779
GD.13
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791
794
GD.14A
800
803


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GD.14B
812
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GN_IN
818
DET.GN
825
R.G-UPS
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833
CRAIG
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ALEXANDR
837
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843
847
851
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860
CENTNIAL
857
861
864
EPT.1
869
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877
P.DESERT
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881
EPT.3
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889
EPT.4
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904
EPT.5
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913
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EPT.2
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LVWASH


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1008
1018
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.<--------CULVERTS
GOWANDIV
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WTRIBUS.....
WTRIBTOT.....
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SNIC
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LBC
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R310E
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311W.....
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R311W
311E
311E.....
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309E
309E.....
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FCP1
V
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FCP2
V
V
FCBC1
V
V
FC1
V
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FCBC2/FC
307NW
V
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R307NW
307NE
307NE.....
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V
V


1079
307SW
1089
307SE
1099
307SE
1102
1105
1108
308W
1118
308E
1128
308E
1131
1134
R307/308
1137
312W
1148
312W
1151
R312W
1154
312E
1164
312E
1167
306
1173
1176
FC3
1180
FC4/FC5
1182
FC6
1184
FC7
1186
FCBC4/FC
1189
302
1195
303
1198
303
1204
1207
304
1213
305
1219
1223
<--------RRCHANNL
1222
RRBRIDGE
1224
DUMMY_AR
1230
DUMMY_CO



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/13/96  TIME  10:51:21   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 10-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 10-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
 50 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
```

```
                    ITIME        0000  STARTING TIME
                       NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE       1    0  ENDING DATE
                   NDTIME        1954  ENDING TIME
                   ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     0.10 HOURS
                    TOTAL TIME BASE     19.90 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT

   JP        MULTI-PLAN OPTION
                NPLAN           1  NUMBER OF PLANS

   JR        MULTI-RATIO OPTION
                RATIOS OF PRECIPITATION
              1.06      0.95      0.85


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1



      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5


      *** ROFGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KWSOLUTION. TO REDUCE ERRORS SHORTEN OVERLAND FLOW LENGTH PLANE 2


      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3


      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 4


      *** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
       THIS MAY AFFECT ACCURACY OF KW  SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.


      KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION     309W


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


      *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.


      KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION    307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION.  RUNOFF SET EQUAL TO ZERO.
```

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 307SW

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5

*** ROFGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KWSOLUTION. TO REDUCE ERRORS SHORTEN OVERLAND FLOW LENGTH PLANE 2 .

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 3

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 4

*** FLOGRD - MAXIMUM NUMBER OF DX INTERVALS REACHED. MDX=201
THIS MAY AFFECT ACCURACY OF KW SOLUTION. TO REDUCE ERRORS SHORTEN CHANNEL ELEMENT = 5
1 NO RAINFALL EXCESS FOR SUBAREA RUNOFF COMPUTATION. RUNOFF SET EQUAL TO ZERO.

KINOFF - NO VOLUME FOR MAIN CHANNEL ROUTING - OUTFLOW SET TO ZERO STATION 308W

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

				RATIOS APPLIED TO PRECIPITATION		
OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIO 3
				1.06	0.95	0.85

HYDROGRAPH AT							
+	112	5.33	1	FLOW	434.	319.	245.
				TIME	3.90	5.10	5.10
HYDROGRAPH AT							
+	119	2.74	1	FLOW	214.	158.	121.
				TIME	3.80	5.00	5.00
2 COMBINED AT							
+	.	8.07	1	FLOW	639.	469.	360.
				TIME	3.90	5.10	5.10
ROUTED TO							
+	120	8.07	1	FLOW	605.	442.	338.
				TIME	4.20	5.30	5.30
ROUTED TO							
+	125UDB	8.07	1	FLOW	543.	403.	307.
				TIME	4.80	5.80	5.80
ROUTED TO							
+	117	8.07	1	FLOW	513.	384.	292.
				TIME	5.20	6.20	6.20
HYDROGRAPH AT							
+	118	5.08	1	FLOW	504.	359.	262.
				TIME	3.60	3.70	4.90
ROUTED TO							
+	117	5.08	1	FLOW	462.	328.	242.
				TIME	3.80	3.80	5.00
ROUTED TO							
+	V	5.08	1	FLOW	418.	300.	221.
				TIME	4.10	4.10	5.30
ROUTED TO							
+	V	5.08	1	FLOW	380.	273.	201.
				TIME	4.50	4.50	5.60
HYDROGRAPH AT							
+	117	7.37	1	FLOW	114.	72.	41.
				TIME	6.10	6.20	6.30
3 COMBINED AT							
+	.	20.52	1	FLOW	880.	654.	470.
				TIME	5.60	5.60	5.70
ROUTED TO							
+	ULWDB	20.52	1	FLOW	782.	615.	451.
				TIME	6.00	5.90	5.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2340.82	2340.07	2338.76
				TIME	6.00	5.90	5.90
ROUTED TO							
+	116	20.52	1	FLOW	774.	610.	443.
				TIME	6.50	6.40	6.40
HYDROGRAPH AT							
+	111	4.08	1	FLOW	400.	287.	209.
				TIME	3.70	3.70	4.90
ROUTED TO							
+	116	4.08	1	FLOW	377.	269.	198.
				TIME	3.80	3.80	5.00
ROUTED TO							
+	V	4.08	1	FLOW	343.	244.	181.
				TIME	4.00	4.00	5.20
HYDROGRAPH AT							
+	116	5.19	1	FLOW	89.	57.	33.
				TIME	5.90	6.00	6.10
3 COMBINED AT							
+	.	29.79	1	FLOW	896.	687.	492.
				TIME	5.40	6.30	6.30
ROUTED TO							
+	109	29.79	1	FLOW	872.	681.	484.
				TIME	6.70	6.70	6.70
HYDROGRAPH AT							
+	110	2.94	1	FLOW	381.	284.	205.
				TIME	3.60	3.60	3.70
ROUTED TO							
+	109	2.94	1	FLOW	361.	269.	194.
				TIME	3.70	3.70	3.80
ROUTED TO							
+	V	2.94	1	FLOW	329.	245.	178.
				TIME	3.90	4.00	4.00
HYDROGRAPH AT							
+	109	4.18	1	FLOW	76.	49.	29.
				TIME	5.80	5.80	5.90

3 COMBINED AT							
+	.	36.91	1	FLOW	1000.	729.	509.
				TIME	5.80	6.40	6.60
ROUTED TO							
+	101	36.91	1	FLOW	980.	725.	504.
				TIME	6.40	6.90	7.10
HYDROGRAPH AT							
+	103	6.20	1	FLOW	770.	568.	405.
				TIME	3.70	3.70	3.80
ROUTED TO							
+	102	6.20	1	FLOW	728.	543.	388.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	102	8.45	1	FLOW	590.	442.	336.
				TIME	3.80	5.00	5.00
2 COMBINED AT							
+	.	14.65	1	FLOW	1312.	947.	698.
				TIME	3.80	3.90	5.10
ROUTED TO							
+	101	14.65	1	FLOW	1268.	916.	673.
				TIME	4.00	4.00	5.20
ROUTED TO							
+	V	14.65	1	FLOW	1193.	857.	633.
				TIME	4.20	4.20	5.40
HYDROGRAPH AT							
+	101	9.08	1	FLOW	128.	78.	42.
				TIME	6.00	6.10	6.20
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	1698.	1274.	936.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	1698.	1274.	936.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	818.	623.	400.
				TIME	8.00	7.80	8.00
			** PEAK STAGES IN FEET **				
			1	STAGE	7.24	6.15	5.18
				TIME	8.00	7.80	8.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	818.	623.	400.
				TIME	8.00	7.80	8.00
ROUTED TO							
+	303	60.65	1	FLOW	814.	620.	395.
				TIME	9.20	9.10	9.30
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	814.	620.	395.
				TIME	9.20	9.10	9.30
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	163.	124.	79.
				TIME	9.20	9.10	9.30
ROUTED TO							
+	NC1	60.65	1	FLOW	163.	124.	79.
				TIME	9.20	9.10	9.30
ROUTED TO							
+	V	60.65	1	FLOW	163.	124.	79.
				TIME	9.30	9.20	9.40
ROUTED TO							
+	NC2	60.65	1	FLOW	163.	124.	79.
				TIME	9.30	9.20	9.40
ROUTED TO							
+	NC3	60.65	1	FLOW	163.	124.	79.
				TIME	9.40	9.30	9.60

ROUTED TO							
+	NC4	60.65	1	FLOW	163.	124.	79.
				TIME	9.50	9.40	9.60
ROUTED TO							
+	NC5	60.65	1	FLOW	163.	124.	79.
				TIME	9.50	9.40	9.60
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	122.	95.	71.
				TIME	3.80	3.80	3.80
2 COMBINED AT							
+	.	0.85	1	FLOW	122.	95.	71.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	0.85	1	FLOW	96.	75.	56.
				TIME	4.90	4.90	4.90
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	255.	206.	164.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
3 COMBINED AT							
+	.	4.47	1	FLOW	320.	259.	206.
				TIME	6.10	6.10	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	0.	0.	0.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.20	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	151.	118.	91.
				TIME	4.00	4.00	4.10
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	151.	118.	91.
				TIME	4.00	4.00	4.10
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	134.	105.	80.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	134.	105.	80.
				TIME	3.70	3.70	3.70

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  2 COMBINED AT
+                    HUA       1.82     1   FLOW          259.      203.      155.
                                             TIME          3.80      3.90      3.90

 ROUTED TO
+                      V       1.82     1   FLOW          258.      202.      154.
                                             TIME          4.00      4.00      4.10

 ROUTED TO
+                      V       1.82     1   FLOW          256.      201.      152.
                                             TIME          4.20      4.20      4.30

 HYDROGRAPH AT
+                   AP.8       0.93     1   FLOW          126.      101.       79.
                                             TIME          4.10      4.10      4.10

  2 COMBINED AT
+                    BOX       2.75     1   FLOW          379.      298.      228.
                                             TIME          4.10      4.20      4.20

 ROUTED TO
+                      V       2.75     1   FLOW          378.      296.      227.
                                             TIME          4.20      4.30      4.30

 HYDROGRAPH AT
+                   AP.9       0.68     1   FLOW           79.       63.       49.
                                             TIME          4.30      4.30      4.30

  2 COMBINED AT
+                 N_CHAN       3.43     1   FLOW          456.      359.      276.
                                             TIME          4.20      4.30      4.30

  2 COMBINED AT
+               ANGEL.PK       7.91     1   FLOW          619.      502.      401.
                                             TIME          5.40      5.40      5.50

 ROUTED TO
+               SPILLWAY       7.91     1   FLOW           56.       54.       51.
                                             TIME          9.60      9.40      9.10

                                         ** PEAK STAGES IN FEET **
                                         1   STAGE     2606.48   2605.27   2604.06
                                             TIME          9.60      9.40      9.10

 ROUTED TO
+               AP_TO_VE       7.91     1   FLOW           56.       54.       51.
                                             TIME          9.60      9.40      9.20

 ROUTED TO
+               BUFFALO_       7.91     1   FLOW           56.       54.       51.
                                             TIME          9.70      9.50      9.20

 HYDROGRAPH AT
+                   GD.7       1.13     1   FLOW          103.       84.       67.
                                             TIME          5.30      5.40      5.40

  2 COMBINED AT
+               BUFFALO_       9.04     1   FLOW          152.      130.      111.
                                             TIME          5.40      5.50      5.60

 ROUTED TO
+               BUFFALO_       9.04     1   FLOW          152.      130.      111.
                                             TIME          5.60      5.60      5.70

 HYDROGRAPH AT
+                   GD.4       0.00     1   FLOW            0.        0.        0.
                                             TIME          4.00      4.00      4.10

 ROUTED TO
+                      V       0.00     1   FLOW            0.        0.        0.
                                             TIME          4.80      4.80      4.80

 HYDROGRAPH AT
+                   GD.5       3.31     1   FLOW          256.      203.      157.
                                             TIME          5.40      5.50      5.50

  2 COMBINED AT
+                      .       3.31     1   FLOW          256.      203.      157.
                                             TIME          5.40      5.50      5.50

 ROUTED TO
+                      V       3.31     1   FLOW          253.      200.      155.
                                             TIME          5.80      5.90      6.00

 HYDROGRAPH AT
+                   GD.6       1.60     1   FLOW          123.       95.       75.
                                             TIME          4.50      5.40      5.40

  2 COMBINED AT
+                      .       4.91     1   FLOW          362.      285.      220.
                                             TIME          5.60      5.60      5.70

 ROUTED TO
+                      V       4.91     1   FLOW          362.      285.      219.
                                             TIME          5.60      5.70      5.70

 HYDROGRAPH AT
+                   GD.8       1.53     1   FLOW           90.       70.       53.
                                             TIME          5.40      5.50      5.50
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  2 COMBINED AT
+                    .      6.44     1   FLOW        450.      354.      271.
                                         TIME        5.60      5.60      5.70

 HYDROGRAPH AT
+                 GD.34      3.84     1   FLOW        176.      133.       97.
                                         TIME        5.90      5.90      6.00

  3 COMBINED AT
+                GOWAN_SO    19.32     1   FLOW        772.      612.      476.
                                         TIME        5.60      5.70      5.80

 ROUTED TO
+                 DET.GS     19.32     1   FLOW        317.      262.      216.
                                         TIME        7.50      7.50      7.50

                                      ** PEAK STAGES IN FEET **
                                         1   STAGE    2339.51   2336.95   2334.82
                                         TIME        7.40      7.50      7.50

 ROUTED TO
+                R.GSOUT     19.32     1   FLOW        317.      262.      216.
                                         TIME        7.50      7.50      7.50

 HYDROGRAPH AT
+                   GD.9      0.00     1   FLOW          0.        0.        0.
                                         TIME        3.70      3.70      3.70

 ROUTED TO
+                     V       0.00     1   FLOW          0.        0.        0.
                                         TIME        4.20      4.20      4.20

 HYDROGRAPH AT
+                  GD.10      0.00     1   FLOW          0.        0.        0.
                                         TIME        4.30      4.30      4.40

  2 COMBINED AT
+                    .       0.00     1   FLOW          0.        0.        0.
                                         TIME        4.20      4.30      4.30

 ROUTED TO
+                     V       0.00     1   FLOW          0.        0.        0.
                                         TIME        4.90      4.90      4.90

 ROUTED TO
+                     V       0.00     1   FLOW          0.        0.        0.
                                         TIME        5.70      5.70      5.70

 HYDROGRAPH AT
+                  GD.11      3.17     1   FLOW        148.      114.       86.
                                         TIME        6.50      6.60      6.60

  2 COMBINED AT
+                    .       3.17     1   FLOW        148.      114.       86.
                                         TIME        6.50      6.60      6.60

 HYDROGRAPH AT
+                  GD.33      0.00     1   FLOW          0.        0.        0.
                                         TIME        7.20      7.30      7.10

 DIVERSION TO
+                CULVERTS     0.00     1   FLOW          0.        0.        0.
                                         TIME        7.20      7.30      7.10

 HYDROGRAPH AT
+                 RANCHO      0.00     1   FLOW          0.        0.        0.
                                         TIME        0.10      0.10      0.10

 ROUTED TO
+                     V       0.00     1   FLOW          0.        0.        0.
                                         TIME        0.10      0.10      0.10

 HYDROGRAPH AT
+                 GD.32C      0.37     1   FLOW         53.       40.       30.
                                         TIME        3.70      3.70      3.70

  2 COMBINED AT
+                    .       0.37     1   FLOW         53.       40.       30.
                                         TIME        3.70      3.70      3.70

 DIVERSION TO
+                CULVERTS     0.37     1   FLOW         53.       40.       30.
                                         TIME        3.70      3.70      3.70

 HYDROGRAPH AT
+                 RANCHO      0.37     1   FLOW          0.        0.        0.
                                         TIME        0.10      0.10      0.10

 ROUTED TO
+                     V       0.37     1   FLOW          0.        0.        0.
                                         TIME        0.10      0.10      0.10

 HYDROGRAPH AT
+                  GD.30      0.00     1   FLOW          0.        0.        0.
                                         TIME        6.80      6.60      6.90

 ROUTED TO
+                     V       0.00     1   FLOW          0.        0.        0.
                                         TIME        7.90      8.00      8.00
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HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
3 COMBINED AT							
+	.	1.03	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	30.	22.	16.
				TIME	5.40	5.50	5.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.50
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.60	5.60	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.60	5.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.90	5.90	6.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	27.	18.	12.
				TIME	6.00	6.00	6.10
3 COMBINED AT							
+	.	2.16	1	FLOW	27.	19.	12.
				TIME	6.00	6.10	6.20
ROUTED TO							
+	V	2.16	1	FLOW	27.	19.	12.
				TIME	6.10	6.20	6.40
ROUTED TO							
+	V	2.16	1	FLOW	27.	18.	12.
				TIME	6.30	6.40	6.60
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	18.	12.	7.
				TIME	5.90	6.00	6.10
ROUTED TO							
+	V	0.76	1	FLOW	18.	12.	7.
				TIME	6.40	6.60	6.70
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	18.	13.	9.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	3.45	1	FLOW	59.	40.	25.
				TIME	6.20	6.30	6.40
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	59.	40.	25.
				TIME	6.20	6.30	6.40

HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.00	5.00	5.00
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.60	5.60
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.50	5.50
3 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.90
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	18.	12.	8.
				TIME	5.70	5.70	5.80
2 COMBINED AT							
+	.	0.64	1	FLOW	18.	12.	8.
				TIME	5.70	5.70	5.80
ROUTED TO							
+	V	0.64	1	FLOW	17.	12.	8.
				TIME	6.30	6.40	6.50
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.50	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	69.	50.	35.
				TIME	6.70	6.80	6.90
4 COMBINED AT							
+	.	6.45	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.70	4.70
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40
3 COMBINED AT							
+	.	7.01	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	15.	11.	7.
.				TIME	6.30	6.40	6.40
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.80	5.30
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	86.	65.	47.
				TIME	5.40	5.40	5.40
2 COMBINED AT							
+	.	1.71	1	FLOW	86.	65.	47.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	V	1.71	1	FLOW	83.	62.	45.
				TIME	5.90	5.90	5.90
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	31.	23.	17.
				TIME	5.80	5.90	6.00
3 COMBINED AT							
+	.	9.40	1	FLOW	114.	86.	62.
				TIME	5.90	5.90	5.90
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	526.	421.	334.
				TIME	6.40	6.50	6.50
ROUTED TO							
+	DET.GN	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	9.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2314.25	2313.71	2313.12
				TIME	10.50	10.10	9.90
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	10.00
ROUTED TO							
+	V	31.90	1	FLOW	258.	233.	196.
				TIME	10.60	10.10	10.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	85.	61.	42.
				TIME	6.60	6.60	6.70
ROUTED TO							
+	V	0.00	1	FLOW	85.	61.	42.
				TIME	7.00	7.10	7.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	15.	11.	7.
				TIME	6.30	6.40	6.40

ROUTED TO							
+	V	0.00	1	FLOW	15.	10.	7.
				TIME	7.20	7.30	7.40
3 COMBINED AT							
+	.	31.90	1	FLOW	330.	271.	223.
				TIME	7.80	7.90	8.00
ROUTED TO							
+	V	31.90	1	FLOW	330.	271.	223.
				TIME	7.80	7.90	8.10
ROUTED TO							
+	V	31.90	1	FLOW	330.	271.	223.
				TIME	7.90	8.00	8.10
ROUTED TO							
+	V	31.90	1	FLOW	330.	271.	223.
				TIME	7.90	8.00	8.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.50	6.60
ROUTED TO							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	8.60	8.70	8.40
HYDROGRAPH AT							
+	EPT.1	3.76	1	FLOW	107.	81.	59.
				TIME	7.50	7.50	7.60
2 COMBINED AT							
+	.	3.76	1	FLOW	107.	81.	59.
				TIME	7.50	7.50	7.60
ROUTED TO							
+	V	3.76	1	FLOW	107.	80.	59.
				TIME	8.20	8.30	8.30
HYDROGRAPH AT							
+	.	0.00	1	FLOW	59.	40.	25.
				TIME	6.20	6.30	6.40
ROUTED TO							
+	V	0.00	1	FLOW	55.	37.	23.
				TIME	8.20	8.40	8.50
HYDROGRAPH AT							
+	EPT.3	4.39	1	FLOW	156.	122.	94.
				TIME	7.70	7.70	7.80
3 COMBINED AT							
+	.	8.15	1	FLOW	314.	236.	172.
				TIME	8.10	8.10	8.20
HYDROGRAPH AT							
+	EPT.4	1.37	1	FLOW	69.	55.	43.
				TIME	6.70	6.70	6.80
ROUTED TO							
+	V	1.37	1	FLOW	68.	54.	43.
				TIME	7.60	7.60	7.70
2 COMBINED AT							
+	.	9.52	1	FLOW	380.	288.	213.
				TIME	8.00	8.00	8.10
2 COMBINED AT							
+	.	41.42	1	FLOW	710.	559.	436.
				TIME	7.90	8.00	8.10
HYDROGRAPH AT							
+	EPT.5	3.01	1	FLOW	77.	60.	45.
				TIME	8.70	8.70	8.80
2 COMBINED AT							
+	.	44.42	1	FLOW	784.	616.	479.
				TIME	8.00	8.10	8.20
ROUTED TO							
+	V	44.42	1	FLOW	783.	616.	478.
				TIME	8.00	8.10	8.20
HYDROGRAPH AT							
+	EPT.2	1.49	1	FLOW	50.	37.	27.
				TIME	6.70	6.70	6.80
2 COMBINED AT							
+	LVWASH	45.92	1	FLOW	817.	641.	497.
				TIME	8.00	8.00	8.10
HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.30	7.10
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.30	9.50	9.40

HYDROGRAPH AT							
+	301	18.62	1	FLOW	379.	282.	204.
				TIME	8.40	8.40	8.50
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	379.	282.	204.
				TIME	8.40	8.40	8.50
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	1192.	920.	698.
				TIME	8.10	8.20	8.20
ROUTED TO							
+	304	64.53	1	FLOW	1188.	918.	697.
				TIME	8.40	8.50	8.50
ROUTED TO							
+	SNIC	64.53	1	FLOW	1188.	918.	697.
				TIME	8.40	8.50	8.60
ROUTED TO							
+	LBC	64.53	1	FLOW	1188.	918.	696.
				TIME	8.40	8.50	8.60
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	39.	28.	18.
				TIME	5.60	5.90	6.30
ROUTED TO							
+	R310W	0.80	1	FLOW	39.	28.	18.
				TIME	6.20	6.60	7.20
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	40.	26.	16.
				TIME	5.80	6.20	6.70
2 COMBINED AT							
+	310E	2.04	1	FLOW	76.	52.	32.
				TIME	6.10	6.50	7.10
ROUTED TO							
+	R310E	2.04	1	FLOW	76.	50.	32.
				TIME	6.30	6.90	7.40
HYDROGRAPH AT							
+	311W	0.96	1	FLOW	32.	21.	12.
				TIME	5.70	6.00	6.40
2 COMBINED AT							
+	311W	3.00	1	FLOW	101.	66.	42.
				TIME	6.30	6.80	7.40
ROUTED TO							
+	R311W	3.00	1	FLOW	99.	65.	41.
				TIME	6.60	7.20	7.80
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	9.	4.	1.
				TIME	5.20	5.20	5.40
2 COMBINED AT							
+	311E	3.77	1	FLOW	100.	65.	41.
				TIME	6.60	7.20	7.80
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	0.	0.	0.
				TIME	19.80	0.10	0.10
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	27.	17.	10.
				TIME	6.80	7.50	8.30
2 COMBINED AT							
+	309E	2.00	1	FLOW	27.	17.	10.
				TIME	6.80	7.50	8.30
2 COMBINED AT							
+	.	5.77	1	FLOW	125.	81.	50.
				TIME	6.60	7.20	7.80
ROUTED TO							
+	FCP1	5.77	1	FLOW	125.	81.	50.
				TIME	6.60	7.20	7.80
ROUTED TO							
+	FCP2	5.77	1	FLOW	125.	81.	50.
				TIME	6.70	7.20	7.90
ROUTED TO							
+	FCBC1	5.77	1	FLOW	125.	80.	50.
				TIME	6.70	7.20	7.90
ROUTED TO							
+	FC1	5.77	1	FLOW	124.	80.	50.
				TIME	6.70	7.30	7.90
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	124.	80.	50.
				TIME	6.70	7.30	7.90

HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	61.	42.	27.
				TIME	5.60	5.90	6.30
ROUTED TO							
+	R307NW	1.33	1	FLOW	60.	42.	27.
				TIME	5.80	6.10	6.60
HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	31.	22.	14.
				TIME	5.60	5.90	6.30
2 COMBINED AT							
+	307NE	1.97	1	FLOW	91.	63.	40.
	.			TIME	5.70	6.00	6.50
2 COMBINED AT							
+	.	7.74	1	FLOW	183.	118.	73.
				TIME	6.60	7.20	7.90
ROUTED TO							
+	V	7.74	1	FLOW	179.	115.	71.
				TIME	7.00	7.60	8.30
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	70.	48.	31.
				TIME	5.70	6.00	6.40
2 COMBINED AT							
+	307SE	2.68	1	FLOW	70.	48.	31.
				TIME	5.70	6.00	6.40
2 COMBINED AT							
+	.	10.42	1	FLOW	216.	138.	85.
				TIME	6.90	7.50	8.20
ROUTED TO							
+	V	10.42	1	FLOW	215.	137.	84.
				TIME	7.10	7.70	8.40
HYDROGRAPH AT							
+	308W	0.81	1	FLOW	0.	0.	0.
				TIME	19.90	0.10	0.10
HYDROGRAPH AT							
+	308E	0.72	1	FLOW	31.	21.	14.
				TIME	5.70	6.00	6.40
2 COMBINED AT							
+	308E	1.53	1	FLOW	31.	21.	14.
				TIME	5.70	6.00	6.40
2 COMBINED AT							
+	.	11.95	1	FLOW	230.	147.	90.
				TIME	7.00	7.60	8.40
ROUTED TO							
+	R307/308	11.95	1	FLOW	229.	147.	90.
				TIME	7.20	7.80	8.60
HYDROGRAPH AT							
+	312W	0.77	1	FLOW	10.	5.	2.
				TIME	7.00	7.90	9.30
2 COMBINED AT							
+	312W	12.72	1	FLOW	239.	151.	91.
				TIME	7.10	7.80	8.60
ROUTED TO							
+	R312W	12.72	1	FLOW	239.	151.	91.
				TIME	7.30	7.90	8.80
HYDROGRAPH AT							
+	312E	0.70	1	FLOW	5.	2.	1.
				TIME	7.30	8.50	10.50
2 COMBINED AT							
+	312E	13.42	1	FLOW	244.	153.	92.
				TIME	7.30	8.00	8.80
HYDROGRAPH AT							
+	306	5.07	1	FLOW	100.	72.	49.
				TIME	7.20	7.30	7.40
3 COMBINED AT							
+	.	83.02	1	FLOW	1450.	1118.	825.
				TIME	8.00	8.30	8.60
ROUTED TO							
+	FC3	83.02	1	FLOW	1450.	1118.	825.
				TIME	8.10	8.30	8.60
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	1450.	1118.	825.
				TIME	8.10	8.30	8.60

ROUTED TO							
+	FC6	83.02	1	FLOW	1450.	1117.	825.
				TIME	8.10	8.40	8.70
ROUTED TO							
+	FC7	83.02	1	FLOW	1449.	1117.	824.
				TIME	8.20	8.40	8.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	1449.	1117.	824.
				TIME	8.20	8.50	8.80
HYDROGRAPH AT							
+	302	12.11	1	FLOW	306.	228.	165.
				TIME	7.20	7.30	7.30
ROUTED TO							
+	303	12.11	1	FLOW	303.	226.	164.
				TIME	8.10	8.10	8.20
HYDROGRAPH AT							
+	303	10.22	1	FLOW	151.	108.	74.
				TIME	8.40	8.50	8.50
2 COMBINED AT							
+	.	22.33	1	FLOW	452.	333.	237.
				TIME	8.20	8.20	8.30
HYDROGRAPH AT							
+	304	2.90	1	FLOW	101.	76.	55.
				TIME	6.10	6.20	6.30
HYDROGRAPH AT							
+	305	3.30	1	FLOW	150.	115.	86.
				TIME	5.60	5.70	5.70
2 COMBINED AT							
+	.	6.20	1	FLOW	245.	186.	138.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	652.	496.	316.
				TIME	9.20	9.10	9.30
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	2582.	1967.	1380.
				TIME	8.20	8.40	8.80
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	2581.	1967.	1379.
				TIME	8.30	8.50	8.80
ROUTED TO							
+	AC3	111.56	1	FLOW	2581.	1967.	1379.
				TIME	8.30	8.50	8.80
ROUTED TO							
+	AC4	111.56	1	FLOW	2580.	1966.	1379.
				TIME	8.30	8.50	8.90
2 COMBINED AT							
+	NCHANNL	172.20	1	FLOW	2733.	2083.	1452.
				TIME	8.30	8.50	8.90

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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.06									
NC1	MANE	0.50	162.87	552.67	0.03	6.00	162.86	552.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8932E+02 EXCESS=0.0000E+00 OUTFLOW=0.8927E+02 BASIN STORAGE=0.4698E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC1	MANE	0.50	123.95	546.77	0.02	6.00	123.95	546.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6302E+02 EXCESS=0.0000E+00 OUTFLOW=0.6296E+02 BASIN STORAGE=0.4533E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC1	MANE	0.57	79.07	558.73	0.01	6.00	79.06	558.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4233E+02 EXCESS=0.0000E+00 OUTFLOW=0.4229E+02 BASIN STORAGE=0.4397E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.71	162.86	555.21	0.03	6.00	162.85	558.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8927E+02 EXCESS=0.0000E+00 OUTFLOW=0.8902E+02 BASIN STORAGE=0.2702E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.98	123.94	549.64	0.02	6.00	123.92	552.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6297E+02 EXCESS=0.0000E+00 OUTFLOW=0.6272E+02 BASIN STORAGE=0.2613E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.24	79.05	563.08	0.01	6.00	79.04	564.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4228E+02 EXCESS=0.0000E+00 OUTFLOW=0.4203E+02 BASIN STORAGE=0.2541E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	1.17	162.84	560.41	0.03	6.00	162.83	568.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8897E+02 EXCESS=0.0000E+00 OUTFLOW=0.8883E+02 BASIN STORAGE=0.1437E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	1.15	123.92	554.38	0.02	6.00	123.91	552.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6268E+02 EXCESS=0.0000E+00 OUTFLOW=0.6257E+02 BASIN STORAGE=0.1386E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	1.35	79.03	566.45	0.01	6.00	79.00	564.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4200E+02 EXCESS=0.0000E+00 OUTFLOW=0.4186E+02 BASIN STORAGE=0.1346E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	3.31	162.80	566.75	0.03	6.00	162.80	564.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8881E+02 EXCESS=0.0000E+00 OUTFLOW=0.8832E+02 BASIN STORAGE=0.4683E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	3.65	123.89	558.01	0.02	6.00	123.89	558.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6252E+02 EXCESS=0.0000E+00 OUTFLOW=0.6202E+02 BASIN STORAGE=0.4527E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	4.20	78.98	575.17	0.01	6.00	78.96	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4185E+02 EXCESS=0.0000E+00 OUTFLOW=0.4147E+02 BASIN STORAGE=0.4387E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	1.02	162.80	566.68	0.03	6.00	162.78	570.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8829E+02 EXCESS=0.0000E+00 OUTFLOW=0.8816E+02 BASIN STORAGE=0.1318E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	1.10	123.88	560.39	0.02	6.00	123.86	564.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6201E+02 EXCESS=0.0000E+00 OUTFLOW=0.6191E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	1.29	78.95	576.49	0.01	6.00	78.95	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4136E+02 EXCESS=0.0000E+00 OUTFLOW=0.4122E+02 BASIN STORAGE=0.1238E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC5	MANE	0.62	162.78	570.41	0.03	6.00	162.78	570.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8814E+02 EXCESS=0.0000E+00 OUTFLOW=0.8807E+02 BASIN STORAGE=0.7332E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC5	MANE	0.54	123.86	565.15	0.02	6.00	123.86	564.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6187E+02 EXCESS=0.0000E+00 OUTFLOW=0.6179E+02 BASIN STORAGE=0.7086E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC5	MANE	0.74	78.95	577.35	0.01	6.00	78.93	576.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4122E+02 EXCESS=0.0000E+00 OUTFLOW=0.4116E+02 BASIN STORAGE=0.6882E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.78	258.69	241.04	0.42	6.00	258.00	240.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4052E+02 EXCESS=0.0000E+00 OUTFLOW=0.4059E+02 BASIN STORAGE=0.8477E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V	MANE	5.26	202.76	244.60	0.33	6.00	202.15	240.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3204E+02 EXCESS=0.0000E+00 OUTFLOW=0.3214E+02 BASIN STORAGE=0.8357E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.85

V	MANE	5.80	154.07	247.35	0.26	6.00	154.01	246.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2489E+02 EXCESS=0.0000E+00 OUTFLOW=0.2498E+02 BASIN STORAGE=0.6105E-02 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.39	257.22	248.26	0.42	6.00	255.86	252.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4059E+02 EXCESS=0.0000E+00 OUTFLOW=0.4057E+02 BASIN STORAGE=0.7386E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	4.89	201.49	252.88	0.33	6.00	201.02	252.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3218E+02 EXCESS=0.0000E+00 OUTFLOW=0.3221E+02 BASIN STORAGE=0.8044E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	5.32	153.38	255.39	0.26	6.00	152.38	258.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2498E+02 EXCESS=0.0000E+00 OUTFLOW=0.2503E+02 BASIN STORAGE=0.8100E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 1.06

V	MANE	2.10	378.84	250.75	0.42	6.00	378.43	252.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6144E+02 EXCESS=0.0000E+00 OUTFLOW=0.6143E+02 BASIN STORAGE=0.1091E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	2.37	297.40	255.18	0.33	6.00	296.25	258.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4889E+02 EXCESS=0.0000E+00 OUTFLOW=0.4888E+02 BASIN STORAGE=0.1135E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.66	227.28	257.20	0.26	6.00	226.99	258.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3817E+02 EXCESS=0.0000E+00 OUTFLOW=0.3816E+02 BASIN STORAGE=0.1139E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AP_TO_VE	MANE	1.85	56.48	579.62	0.19	6.00	56.48	582.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8051E+02 EXCESS=0.0000E+00 OUTFLOW=0.8029E+02 BASIN STORAGE=0.2664E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

AP_TO_VE	MANE	1.85	53.95	567.53	0.18	6.00	53.95	564.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7682E+02 EXCESS=0.0000E+00 OUTFLOW=0.7654E+02 BASIN STORAGE=0.2558E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AP_TO_VE	MANE	1.85	51.38	553.81	0.17	6.00	51.38	552.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7300E+02 EXCESS=0.0000E+00 OUTFLOW=0.7281E+02 BASIN STORAGE=0.2440E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	1.44	56.48	582.76	0.19	6.00	56.48	582.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8018E+02 EXCESS=0.0000E+00 OUTFLOW=0.7993E+02 BASIN STORAGE=0.2575E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	1.34	53.95	566.97	0.18	6.00	53.95	570.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7650E+02 EXCESS=0.0000E+00 OUTFLOW=0.7624E+02 BASIN STORAGE=0.2602E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	1.42	51.38	555.15	0.17	6.00	51.38	558.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7269E+02 EXCESS=0.0000E+00 OUTFLOW=0.7250E+02 BASIN STORAGE=0.2427E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	4.89	151.69	336.99	0.22	6.00	151.68	336.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1052E+03 EXCESS=0.0000E+00 OUTFLOW=0.1040E+03 BASIN STORAGE=0.1435E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	5.03	130.41	339.16	0.20	6.00	130.31	336.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9653E+02 EXCESS=0.0000E+00 OUTFLOW=0.9553E+02 BASIN STORAGE=0.1375E+01 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	5.36	111.27	346.64	0.18	6.00	111.25	342.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8845E+02 EXCESS=0.0000E+00 OUTFLOW=0.8733E+02 BASIN STORAGE=0.1226E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.73	361.80	338.91	0.34	6.00	361.71	336.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8794E+02 EXCESS=0.0000E+00 OUTFLOW=0.8794E+02 BASIN STORAGE=0.2515E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.89	284.88	340.69	0.26	6.00	284.65	342.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6848E+02 EXCESS=0.0000E+00 OUTFLOW=0.6849E+02 BASIN STORAGE=0.2917E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	2.00	219.53	345.25	0.20	6.00	219.49	342.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5222E+02 EXCESS=0.0000E+00 OUTFLOW=0.5223E+02 BASIN STORAGE=0.3310E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

R.GSOUT	MANE	1.02	317.43	449.68	0.24	6.00	317.43	450.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2514E+03 EXCESS=0.0000E+00 OUTFLOW=0.2511E+03 BASIN STORAGE=0.2214E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.GSOUT	MANE	1.01	262.18	451.53	0.20	6.00	262.17	450.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2078E+03 EXCESS=0.0000E+00 OUTFLOW=0.2076E+03 BASIN STORAGE=0.1994E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.GSOUT	MANE	1.01	216.20	451.11	0.17	6.00	216.20	450.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1707E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1857E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	4.82	27.32	365.87	0.06	6.00	27.32	366.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6412E+01 EXCESS=0.0000E+00 OUTFLOW=0.6415E+01 BASIN STORAGE=0.9782E-03 PERCENT ERROR= -0.1

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.50     18.53    372.87      0.04      6.00     18.51    372.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4247E+01 EXCESS=0.0000E+00 OUTFLOW=0.4250E+01 BASIN STORAGE=0.8856E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          6.00     11.77    382.02      0.02      6.00     11.75    384.00         0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2617E+01 EXCESS=0.0000E+00 OUTFLOW=0.2619E+01 BASIN STORAGE=0.7901E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          5.21     27.31    377.57      0.06      6.00     27.31    378.00         0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6416E+01 EXCESS=0.0000E+00 OUTFLOW=0.6416E+01 BASIN STORAGE=0.9939E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.80     18.49    387.85      0.04      6.00     18.47    384.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4250E+01 EXCESS=0.0000E+00 OUTFLOW=0.4251E+01 BASIN STORAGE=0.9160E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          6.00     11.75    396.38      0.02      6.00     11.75    396.00         0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2619E+01 EXCESS=0.0000E+00 OUTFLOW=0.2618E+01 BASIN STORAGE=0.1011E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          6.00     17.68    382.10      0.10      6.00     17.66    384.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3942E+01 EXCESS=0.0000E+00 OUTFLOW=0.3943E+01 BASIN STORAGE=0.8031E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          5.79     11.82    395.04      0.06      6.00     11.80    396.00         0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2555E+01 EXCESS=0.0000E+00 OUTFLOW=0.2556E+01 BASIN STORAGE=0.7932E-03 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          5.75      7.34    404.41      0.04      6.00      7.32    402.00         0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1525E+01 EXCESS=0.0000E+00 OUTFLOW=0.1525E+01 BASIN STORAGE=0.7336E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          R.G-UPS.  MANE          0.76    257.83    636.74      0.17      6.00    257.83    636.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2851E+03 EXCESS=0.0000E+00 OUTFLOW=0.2847E+03 BASIN STORAGE=0.3704E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          R.G-UPS.  MANE          0.77    232.57    606.97      0.14      6.00    232.57    606.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2418E+03 EXCESS=0.0000E+00 OUTFLOW=0.2414E+03 BASIN STORAGE=0.3077E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          R.G-UPS.  MANE          0.76    196.15    596.09      0.12      6.00    196.15    600.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1996E+03 EXCESS=0.0000E+00 OUTFLOW=0.1994E+03 BASIN STORAGE=0.1929E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.66    257.83    639.01      0.17      6.00    257.83    636.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2846E+03 EXCESS=0.0000E+00 OUTFLOW=0.2831E+03 BASIN STORAGE=0.1420E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.81    232.56    609.24      0.14      6.00    232.55    606.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2414E+03 EXCESS=0.0000E+00 OUTFLOW=0.2404E+03 BASIN STORAGE=0.1233E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.93    196.14    602.41      0.12      6.00    196.14    600.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1993E+03 EXCESS=0.0000E+00 OUTFLOW=0.1984E+03 BASIN STORAGE=0.8759E+00 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 1.06
                V  MANE          2.07    330.06    471.05      0.18      6.00    330.02    468.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3130E+03 EXCESS=0.0000E+00 OUTFLOW=0.3114E+03 BASIN STORAGE=0.1842E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          2.19    270.69    477.42      0.15      6.00    270.66    474.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2613E+03 EXCESS=0.0000E+00 OUTFLOW=0.2597E+03 BASIN STORAGE=0.1606E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          2.32    222.99    483.79      0.12      6.00    222.97    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2129E+03 EXCESS=0.0000E+00 OUTFLOW=0.2119E+03 BASIN STORAGE=0.1145E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.05    330.02    470.74      0.18      6.00    329.99    474.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3110E+03 EXCESS=0.0000E+00 OUTFLOW=0.3100E+03 BASIN STORAGE=0.9753E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.13    270.66    477.25      0.15      6.00    270.65    480.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2596E+03 EXCESS=0.0000E+00 OUTFLOW=0.2590E+03 BASIN STORAGE=0.8475E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.32    222.97    486.89      0.12      6.00    222.97    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2116E+03 EXCESS=0.0000E+00 OUTFLOW=0.2111E+03 BASIN STORAGE=0.6103E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.04    329.99    475.62      0.18      6.00    329.96    474.00      0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3100E+03 EXCESS=0.0000E+00 OUTFLOW=0.3091E+03 BASIN STORAGE=0.9770E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.18    270.64    481.67      0.15      6.00    270.62    480.00      0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2587E+03 EXCESS=0.0000E+00 OUTFLOW=0.2579E+03 BASIN STORAGE=0.8504E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.32    222.96    488.67      0.12      6.00    222.93    486.00      0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+03 EXCESS=0.0000E+00 OUTFLOW=0.2105E+03 BASIN STORAGE=0.6143E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.38    783.39    483.39      0.21      6.00    783.05    480.00      0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5012E+03 EXCESS=0.0000E+00 OUTFLOW=0.4993E+03 BASIN STORAGE=0.1873E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.51    615.76    488.53      0.17      6.00    615.56    486.00      0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4048E+03 EXCESS=0.0000E+00 OUTFLOW=0.4032E+03 BASIN STORAGE=0.1629E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.82    478.50    494.75      0.13      6.00    478.46    492.00      0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3201E+03 EXCESS=0.0000E+00 OUTFLOW=0.3191E+03 BASIN STORAGE=0.1192E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             SNIC  MANE          0.91   1188.44    505.56      0.20      6.00   1188.37    504.00      0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7001E+03 EXCESS=0.0000E+00 OUTFLOW=0.6991E+03 BASIN STORAGE=0.1142E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             SNIC  MANE          0.95    917.94    511.81      0.16      6.00    917.93    510.00      0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5522E+03 EXCESS=0.0000E+00 OUTFLOW=0.5514E+03 BASIN STORAGE=0.9771E+00 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 0.85
              SNIC  MANE          1.12    696.77    512.73      0.12      6.00    696.59    516.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4265E+03 EXCESS=0.0000E+00 OUTFLOW=0.4258E+03 BASIN STORAGE=0.7209E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
               LBC  MANE          1.58   1188.18    506.28      0.20      6.00   1187.73    504.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6989E+03 EXCESS=0.0000E+00 OUTFLOW=0.6966E+03 BASIN STORAGE=0.2351E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
               LBC  MANE          1.80    917.80    512.69      0.16      6.00    917.54    510.00         0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5511E+03 EXCESS=0.0000E+00 OUTFLOW=0.5492E+03 BASIN STORAGE=0.2033E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
               LBC  MANE          1.91    696.55    518.26      0.12      6.00    696.49    516.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4257E+03 EXCESS=0.0000E+00 OUTFLOW=0.4241E+03 BASIN STORAGE=0.1546E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          5.76     32.86    346.78      0.17      6.00     32.79    348.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7569E+01 OUTFLOW=0.7254E+01 BASIN STORAGE=0.1577E+00 PERCENT ERROR=    2.1

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          6.00     39.09    337.72      0.20      6.00     38.96    336.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8754E+01 OUTFLOW=0.8426E+01 BASIN STORAGE=0.1568E+00 PERCENT ERROR=    2.0

          FOR PLAN = 1  RATIO= 0.95
              310W  MANE          6.00     27.72    352.45      0.15      6.00     27.71    354.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6627E+01 OUTFLOW=0.6330E+01 BASIN STORAGE=0.1579E+00 PERCENT ERROR=    2.1

          FOR PLAN = 1  RATIO= 0.85
              310W  MANE          6.00     18.43    379.26      0.11      6.00     18.37    378.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4882E+01 OUTFLOW=0.4620E+01 BASIN STORAGE=0.1487E+00 PERCENT ERROR=    2.3

          FOR PLAN = 1  RATIO= 1.06
             R310W  MANE          5.89     38.80    375.49      0.19      6.00     38.76    372.00         0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8421E+01 EXCESS=0.0000E+00 OUTFLOW=0.8289E+01 BASIN STORAGE=0.2026E+00 PERCENT ERROR=   -0.8

          FOR PLAN = 1  RATIO= 0.95
             R310W  MANE          5.92     27.57    399.44      0.15      6.00     27.55    396.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6328E+01 EXCESS=0.0000E+00 OUTFLOW=0.6274E+01 BASIN STORAGE=0.2043E+00 PERCENT ERROR=   -2.4

          FOR PLAN = 1  RATIO= 0.85
             R310W  MANE          6.00     18.30    431.36      0.11      6.00     18.27    432.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4611E+01 EXCESS=0.0000E+00 OUTFLOW=0.4616E+01 BASIN STORAGE=0.2009E+00 PERCENT ERROR=   -4.5

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          6.00     32.18    357.98      0.12      6.00     32.16    360.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8191E+01 OUTFLOW=0.7814E+01 BASIN STORAGE=0.1980E+00 PERCENT ERROR=    2.2

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          6.00     40.22    352.53      0.14      6.00     40.19    348.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9689E+01 OUTFLOW=0.9305E+01 BASIN STORAGE=0.1855E+00 PERCENT ERROR=    2.0

          FOR PLAN = 1  RATIO= 0.95
              310E  MANE          5.84     26.07    370.31      0.10      6.00     26.03    372.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7018E+01 OUTFLOW=0.6664E+01 BASIN STORAGE=0.1919E+00 PERCENT ERROR=    2.3

          FOR PLAN = 1  RATIO= 0.85
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          310E  MANE          6.00     15.58    398.26       0.07       6.00     15.56    402.00         0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4892E+01 OUTFLOW=0.4551E+01 BASIN STORAGE=0.1936E+00 PERCENT ERROR=   3.0

       FOR PLAN = 1  RATIO= 1.06
          R310E  MANE          5.43     75.65    377.39       0.16       6.00     75.64    378.00         0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1757E+02 EXCESS=0.0000E+00 OUTFLOW=0.1744E+02 BASIN STORAGE=0.1337E+00 PERCENT ERROR=   0.0

       FOR PLAN = 1  RATIO= 0.95
          R310E  MANE          6.00     50.93    410.58       0.12       6.00     50.24    414.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1293E+02 EXCESS=0.0000E+00 OUTFLOW=0.1277E+02 BASIN STORAGE=0.1344E+00 PERCENT ERROR=   0.2

       FOR PLAN = 1  RATIO= 0.85
          R310E  MANE          5.74     32.36    444.88       0.08       6.00     32.36    444.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9157E+01 EXCESS=0.0000E+00 OUTFLOW=0.9016E+01 BASIN STORAGE=0.1526E+00 PERCENT ERROR=  -0.1

       FOR PLAN = 1  RATIO= 1.06
          311W  MANE          5.89     25.54    348.61       0.11       6.00     25.51    348.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6117E+01 OUTFLOW=0.5862E+01 BASIN STORAGE=0.1186E+00 PERCENT ERROR=   2.2

       FOR PLAN = 1  RATIO= 1.06
          311W  MANE          5.46     31.96    340.42       0.14       6.00     31.88    342.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7259E+01 OUTFLOW=0.6993E+01 BASIN STORAGE=0.1243E+00 PERCENT ERROR=   2.0

       FOR PLAN = 1  RATIO= 0.95
          311W  MANE          6.00     20.66    355.93       0.10       6.00     20.63    360.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5224E+01 OUTFLOW=0.4979E+01 BASIN STORAGE=0.1178E+00 PERCENT ERROR=   2.4

       FOR PLAN = 1  RATIO= 0.85
          311W  MANE          6.00     12.39    384.83       0.07       6.00     12.37    384.00         0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3610E+01 OUTFLOW=0.3392E+01 BASIN STORAGE=0.1150E+00 PERCENT ERROR=   2.9

       FOR PLAN = 1  RATIO= 1.06
          R311W  MANE          6.00     99.94    393.41       0.15       6.00     99.31    396.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2441E+02 EXCESS=0.0000E+00 OUTFLOW=0.2415E+02 BASIN STORAGE=0.2405E+00 PERCENT ERROR=   0.1

       FOR PLAN = 1  RATIO= 0.95
          R311W  MANE          6.00     65.42    430.18       0.11       6.00     64.99    432.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1772E+02 EXCESS=0.0000E+00 OUTFLOW=0.1744E+02 BASIN STORAGE=0.2760E+00 PERCENT ERROR=   0.0

       FOR PLAN = 1  RATIO= 0.85
          R311W  MANE          6.00     41.43    467.93       0.08       6.00     41.43    468.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1239E+02 EXCESS=0.0000E+00 OUTFLOW=0.1212E+02 BASIN STORAGE=0.2939E+00 PERCENT ERROR=  -0.2

       FOR PLAN = 1  RATIO= 1.06
          309W  MANE          6.00      0.00   1206.01       0.00       6.00      0.00   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4141E-01 OUTFLOW=0.4307E-05 BASIN STORAGE=0.1519E-01 PERCENT ERROR=  63.3

       FOR PLAN = 1  RATIO= 1.06
          309W  MANE          6.00      0.03   1200.16       0.00       6.00      0.02   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1375E+00 OUTFLOW=0.5556E-02 BASIN STORAGE=0.7553E-01 PERCENT ERROR=  41.0

       FOR PLAN = 1  RATIO= 0.95
          309W  MANE       4479.84      0.00   4479.84       0.00       6.00      0.00   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5635E-02 OUTFLOW=0.1072E-08 BASIN STORAGE=0.1231E-02 PERCENT ERROR=  78.2

       FOR PLAN = 1  RATIO= 0.85
          309W  MANE          0.00      0.00      0.00       0.00       6.00      0.00      0.00         0.00
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          FOR PLAN = 1  RATIO= 1.06
              309E  MANE          6.00     21.32    428.87      0.11      6.00     21.17    426.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7614E+01 OUTFLOW=0.7043E+01 BASIN STORAGE=0.4065E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 1.06
              309E  MANE          6.00     27.30    409.12      0.13      6.00     27.19    408.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8990E+01 OUTFLOW=0.8395E+01 BASIN STORAGE=0.4121E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 0.95
              309E  MANE          6.00     16.94    448.55      0.09      6.00     16.86    450.00         0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6539E+01 OUTFLOW=0.5989E+01 BASIN STORAGE=0.3996E+00 PERCENT ERROR=   2.3

          FOR PLAN = 1  RATIO= 0.85
              309E  MANE          6.00      9.82    499.14      0.06      6.00      9.81    498.00         0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4598E+01 OUTFLOW=0.4057E+01 BASIN STORAGE=0.4066E+00 PERCENT ERROR=   2.9

          FOR PLAN = 1  RATIO= 1.06
              FCP1  MANE          0.33    125.43    396.70      0.11      6.00    124.90    396.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3331E+02 EXCESS=0.0000E+00 OUTFLOW=0.3330E+02 BASIN STORAGE=0.3160E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP1  MANE          0.33     80.94    432.59      0.08      6.00     80.87    432.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2372E+02 BASIN STORAGE=0.3125E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP1  MANE          0.36     50.32    468.64      0.05      6.00     50.15    468.00         0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1623E+02 EXCESS=0.0000E+00 OUTFLOW=0.1622E+02 BASIN STORAGE=0.3122E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              FCP2  MANE          0.43    124.87    397.24      0.11      6.00    124.59    402.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3331E+02 EXCESS=0.0000E+00 OUTFLOW=0.3330E+02 BASIN STORAGE=0.5498E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP2  MANE          0.53     80.81    432.89      0.08      6.00     80.61    432.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2371E+02 BASIN STORAGE=0.5440E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP2  MANE          0.58     50.13    469.30      0.05      6.00     49.95    474.00         0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1622E+02 EXCESS=0.0000E+00 OUTFLOW=0.1622E+02 BASIN STORAGE=0.5439E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             FCBC1  MANE          0.34    124.56    402.40      0.11      6.00    124.53    402.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3330E+02 EXCESS=0.0000E+00 OUTFLOW=0.3329E+02 BASIN STORAGE=0.1379E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             FCBC1  MANE          0.48     80.58    432.98      0.08      6.00     80.30    432.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2372E+02 EXCESS=0.0000E+00 OUTFLOW=0.2370E+02 BASIN STORAGE=0.1366E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
             FCBC1  MANE          0.55     49.93    474.78      0.05      6.00     49.91    474.00         0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1622E+02 EXCESS=0.0000E+00 OUTFLOW=0.1621E+02 BASIN STORAGE=0.1366E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               FC1  MANE          0.34    124.47    402.49      0.11      6.00    124.37    402.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3329E+02 EXCESS=0.0000E+00 OUTFLOW=0.3328E+02 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 0.95
               FC1  MANE          0.38     80.30    432.83      0.08      6.00     80.13    438.00          0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2370E+02 EXCESS=0.0000E+00 OUTFLOW=0.2369E+02 BASIN STORAGE=0.1476E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
               FC1  MANE          0.49     49.90    474.91      0.05      6.00     49.79    474.00          0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1621E+02 EXCESS=0.0000E+00 OUTFLOW=0.1619E+02 BASIN STORAGE=0.1477E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
            FCBC2/FC  MANE          0.41    124.29    402.69      0.11      6.00    124.15    402.00          0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3328E+02 EXCESS=0.0000E+00 OUTFLOW=0.3327E+02 BASIN STORAGE=0.1425E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
            FCBC2/FC  MANE          0.37     80.11    438.33      0.08      6.00     80.10    438.00          0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2369E+02 EXCESS=0.0000E+00 OUTFLOW=0.2368E+02 BASIN STORAGE=0.1414E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
            FCBC2/FC  MANE          0.51     49.77    475.26      0.05      6.00     49.59    474.00          0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1619E+02 EXCESS=0.0000E+00 OUTFLOW=0.1618E+02 BASIN STORAGE=0.1411E-01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
              307NW  MANE          5.80     49.92    347.88      0.16      6.00     49.90    348.00          0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1159E+02 OUTFLOW=0.1112E+02 BASIN STORAGE=0.2165E+00 PERCENT ERROR=    2.2

          FOR PLAN = 1  RATIO= 1.06
              307NW  MANE          5.33     60.86    334.76      0.18      6.00     60.80    336.00          0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1347E+02 OUTFLOW=0.1297E+02 BASIN STORAGE=0.2155E+00 PERCENT ERROR=    2.1

          FOR PLAN = 1  RATIO= 0.95
              307NW  MANE          6.00     41.86    354.06      0.14      6.00     41.86    354.00          0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1010E+02 OUTFLOW=0.9661E+01 BASIN STORAGE=0.2149E+00 PERCENT ERROR=    2.2

          FOR PLAN = 1  RATIO= 0.85
              307NW  MANE          5.91     26.79    378.72      0.10      6.00     26.75    378.00          0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7356E+01 OUTFLOW=0.6938E+01 BASIN STORAGE=0.2107E+00 PERCENT ERROR=    2.8

          FOR PLAN = 1  RATIO= 1.06
             R307NW  MANE          4.85     60.61    344.51      0.18      6.00     60.44    348.00          0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1297E+02 EXCESS=0.0000E+00 OUTFLOW=0.1287E+02 BASIN STORAGE=0.7215E-01 PERCENT ERROR=    0.2

          FOR PLAN = 1  RATIO= 0.95
             R307NW  MANE          5.52     41.79    366.05      0.13      6.00     41.79    366.00          0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9657E+01 EXCESS=0.0000E+00 OUTFLOW=0.9569E+01 BASIN STORAGE=0.6988E-01 PERCENT ERROR=    0.2

          FOR PLAN = 1  RATIO= 0.85
             R307NW  MANE          6.00     26.68    394.95      0.10      6.00     26.63    396.00          0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6932E+01 EXCESS=0.0000E+00 OUTFLOW=0.6839E+01 BASIN STORAGE=0.6962E-01 PERCENT ERROR=    0.3

          FOR PLAN = 1  RATIO= 1.06
              307NE  MANE          6.00     25.83    343.52      0.17      6.00     25.72    342.00          0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6055E+01 OUTFLOW=0.5810E+01 BASIN STORAGE=0.1115E+00 PERCENT ERROR=    2.2

          FOR PLAN = 1  RATIO= 1.06
              307NE  MANE          5.64     31.08    335.86      0.20      6.00     31.07    336.00          0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7004E+01 OUTFLOW=0.6748E+01 BASIN STORAGE=0.1044E+00 PERCENT ERROR=    2.2
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          FOR PLAN = 1  RATIO= 0.95
             307NE  MANE          5.08     21.61    351.56      0.15      6.00     21.57    354.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5302E+01 OUTFLOW=0.5070E+01 BASIN STORAGE=0.1119E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 0.85
             307NE  MANE          5.94     14.07    375.51      0.11      6.00     14.04    378.00         0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3905E+01 OUTFLOW=0.3690E+01 BASIN STORAGE=0.1096E+00 PERCENT ERROR=   2.7

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          0.00      0.00      0.00      0.00      6.00      0.00      0.00          0.00


          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          0.00      0.00      0.00      0.00      6.00      0.00      0.00          0.00


          FOR PLAN = 1  RATIO= 0.95
             307SW  MANE          0.00      0.00      0.00      0.00      6.00      0.00      0.00          0.00


          FOR PLAN = 1  RATIO= 0.85
             307SW  MANE          0.00      0.00      0.00      0.00      6.00      0.00      0.00          0.00


          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE          6.00     57.43    352.89      0.15      6.00     57.25    354.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1347E+02 OUTFLOW=0.1291E+02 BASIN STORAGE=0.2745E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE          5.77     69.67    339.36      0.18      6.00     69.54    342.00         0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1568E+02 OUTFLOW=0.1508E+02 BASIN STORAGE=0.2833E+00 PERCENT ERROR=   2.1

          FOR PLAN = 1  RATIO= 0.95
             307SE  MANE          5.42     47.82    359.86      0.13      6.00     47.81    360.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1173E+02 OUTFLOW=0.1119E+02 BASIN STORAGE=0.2782E+00 PERCENT ERROR=   2.2

          FOR PLAN = 1  RATIO= 0.85
             307SE  MANE          5.38     30.64    387.64      0.09      6.00     30.54    390.00         0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8513E+01 OUTFLOW=0.8003E+01 BASIN STORAGE=0.2809E+00 PERCENT ERROR=   2.7

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE          6.00      0.00   1212.78      0.00      6.00      0.00   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3956E-01 OUTFLOW=0.4500E-05 BASIN STORAGE=0.1386E-01 PERCENT ERROR=  65.0

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE          6.00      0.02   1194.84      0.00      6.00      0.02   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1343E+00 OUTFLOW=0.5063E-02 BASIN STORAGE=0.7091E-01 PERCENT ERROR=  43.4

          FOR PLAN = 1  RATIO= 0.95
             308W  MANE       5192.54      0.00   5192.54      0.00      6.00      0.00   1194.00         0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4941E-02 OUTFLOW=0.9070E-09 BASIN STORAGE=0.1083E-02 PERCENT ERROR=  78.1

          FOR PLAN = 1  RATIO= 0.85
             308W  MANE          0.00      0.00      0.00      0.00      6.00      0.00      0.00          0.00


          FOR PLAN = 1  RATIO= 1.06
             308E  MANE          5.89     25.63    347.36      0.15      6.00     25.61    348.00         0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5821E+01 OUTFLOW=0.5589E+01 BASIN STORAGE=0.1184E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 1.06
             308E  MANE          5.34     31.07    339.51      0.17      6.00     30.93    342.00         0.17
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6797E+01 OUTFLOW=0.6546E+01 BASIN STORAGE=0.1195E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 0.95

308E	MANE	6.00	21.34	360.16	0.13	6.00	21.33	360.00	0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5050E+01 OUTFLOW=0.4827E+01 BASIN STORAGE=0.1181E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.85

308E	MANE	6.00	13.58	382.29	0.09	6.00	13.58	384.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3635E+01 OUTFLOW=0.3425E+01 BASIN STORAGE=0.1212E+00 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 1.06

R307/308	MANE	4.09	229.63	429.56	0.12	6.00	229.47	432.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7433E+02 EXCESS=0.0000E+00 OUTFLOW=0.7388E+02 BASIN STORAGE=0.3828E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R307/308	MANE	4.87	146.59	467.92	0.08	6.00	146.59	468.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5414E+02 EXCESS=0.0000E+00 OUTFLOW=0.5375E+02 BASIN STORAGE=0.3759E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R307/308	MANE	5.98	89.92	514.51	0.06	6.00	89.82	516.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3794E+02 EXCESS=0.0000E+00 OUTFLOW=0.3757E+02 BASIN STORAGE=0.3740E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312W	MANE	6.00	6.77	443.48	0.05	6.00	6.77	444.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2471E+01 OUTFLOW=0.2239E+01 BASIN STORAGE=0.1391E+00 PERCENT ERROR= 3.7

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.93	9.62	418.20	0.07	6.00	9.61	420.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3102E+01 OUTFLOW=0.2865E+01 BASIN STORAGE=0.1389E+00 PERCENT ERROR= 3.1

FOR PLAN = 1 RATIO= 0.95

312W	MANE	6.00	4.82	476.69	0.04	6.00	4.82	474.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1992E+01 OUTFLOW=0.1768E+01 BASIN STORAGE=0.1392E+00 PERCENT ERROR= 4.3

FOR PLAN = 1 RATIO= 0.85

312W	MANE	6.00	2.05	561.13	0.02	6.00	2.05	558.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1173E+01 OUTFLOW=0.9576E+00 BASIN STORAGE=0.1375E+00 PERCENT ERROR= 6.6

FOR PLAN = 1 RATIO= 1.06

R312W	MANE	4.09	238.96	436.94	0.11	6.00	238.86	438.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7669E+02 EXCESS=0.0000E+00 OUTFLOW=0.7624E+02 BASIN STORAGE=0.4196E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R312W	MANE	4.79	151.28	478.43	0.08	6.00	151.14	474.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5543E+02 EXCESS=0.0000E+00 OUTFLOW=0.5504E+02 BASIN STORAGE=0.4116E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	5.93	91.30	527.75	0.06	6.00	91.28	528.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3843E+02 EXCESS=0.0000E+00 OUTFLOW=0.3800E+02 BASIN STORAGE=0.4160E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	3.06	469.95	0.03	6.00	3.05	474.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1301E+01 OUTFLOW=0.1142E+01 BASIN STORAGE=0.9629E-01 PERCENT ERROR= 4.9

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	4.66	437.52	0.04	6.00	4.66	438.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1725E+01 OUTFLOW=0.1556E+01 BASIN STORAGE=0.9653E-01 PERCENT ERROR= 4.2

FOR PLAN = 1 RATIO= 0.95

312E	MANE	6.00	2.02	506.29	0.02	6.00	2.02	510.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9900E+00 OUTFLOW=0.8367E+00 BASIN STORAGE=0.9342E-01 PERCENT ERROR= 6.1

FOR PLAN = 1 RATIO= 0.85

312E	MANE	6.00	0.70	634.64	0.01	6.00	0.69	630.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4904E+00 OUTFLOW=0.3478E+00 BASIN STORAGE=0.8868E-01 PERCENT ERROR= 11.0

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.48	1450.15	480.99	0.18	6.00	1450.01	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8110E+03 EXCESS=0.0000E+00 OUTFLOW=0.8106E+03 BASIN STORAGE=0.5073E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.56	1117.86	498.25	0.14	6.00	1117.85	498.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6312E+03 EXCESS=0.0000E+00 OUTFLOW=0.6308E+03 BASIN STORAGE=0.4346E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.59	825.07	516.97	0.11	6.00	824.95	516.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4805E+03 EXCESS=0.0000E+00 OUTFLOW=0.4802E+03 BASIN STORAGE=0.3276E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.35	1449.99	486.33	0.18	6.00	1449.99	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8105E+03 EXCESS=0.0000E+00 OUTFLOW=0.8101E+03 BASIN STORAGE=0.4078E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.32	1117.82	498.63	0.14	6.00	1117.77	498.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6307E+03 EXCESS=0.0000E+00 OUTFLOW=0.6304E+03 BASIN STORAGE=0.3521E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.37	824.94	516.80	0.11	6.00	824.82	516.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4802E+03 EXCESS=0.0000E+00 OUTFLOW=0.4799E+03 BASIN STORAGE=0.2697E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	2.37	1449.86	490.20	0.18	6.00	1449.60	486.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8101E+03 EXCESS=0.0000E+00 OUTFLOW=0.8074E+03 BASIN STORAGE=0.3283E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	2.51	1117.50	501.65	0.14	6.00	1117.39	504.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6304E+03 EXCESS=0.0000E+00 OUTFLOW=0.6277E+03 BASIN STORAGE=0.2829E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	2.79	824.76	523.65	0.11	6.00	824.71	522.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4799E+03 EXCESS=0.0000E+00 OUTFLOW=0.4779E+03 BASIN STORAGE=0.2178E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	1.25	1449.57	488.70	0.18	6.00	1449.41	492.00	0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8064E+03 EXCESS=0.0000E+00 OUTFLOW=0.8049E+03 BASIN STORAGE=0.1677E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	1.26	1117.32	506.10	0.14	6.00	1117.13	504.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6272E+03 EXCESS=0.0000E+00 OUTFLOW=0.6259E+03 BASIN STORAGE=0.1447E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	1.43	824.64	524.52	0.11	6.00	824.47	528.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4774E+03 EXCESS=0.0000E+00 OUTFLOW=0.4763E+03 BASIN STORAGE=0.1136E+01 PERCENT ERROR= 0.0

```
          FOR PLAN = 1  RATIO= 1.06
          FCBC4/FC  MANE          1.56   1449.24    494.11      0.18      6.00   1448.94    492.00        0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8046E+03 EXCESS=0.0000E+00 OUTFLOW=0.8021E+03 BASIN STORAGE=0.2307E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          FCBC4/FC  MANE          1.64   1117.07    507.11      0.14      6.00   1116.63    510.00        0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6256E+03 EXCESS=0.0000E+00 OUTFLOW=0.6237E+03 BASIN STORAGE=0.1989E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          FCBC4/FC  MANE          1.84    824.44    531.37      0.11      6.00    824.30    528.00        0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4762E+03 EXCESS=0.0000E+00 OUTFLOW=0.4746E+03 BASIN STORAGE=0.1580E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          RRCHANNL  MANE          5.97      0.16    463.63      0.87      6.00      0.16    462.00        0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

          FOR PLAN = 1  RATIO= 0.95
          RRCHANNL  MANE          5.97      0.12    484.09      0.71      6.00      0.12    486.00        0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

          FOR PLAN = 1  RATIO= 0.85
          RRCHANNL  MANE          6.00      0.09    550.79      0.57      6.00      0.09    552.00        0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

          FOR PLAN = 1  RATIO= 1.06
           AC1/AC2  MANE          0.99   2581.40    493.84      0.24      6.00   2580.71    498.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1414E+04 EXCESS=0.0000E+00 OUTFLOW=0.1412E+04 BASIN STORAGE=0.2022E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
           AC1/AC2  MANE          1.06   1967.03    506.79      0.18      6.00   1966.68    510.00        0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1063E+04 EXCESS=0.0000E+00 OUTFLOW=0.1061E+04 BASIN STORAGE=0.1806E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
           AC1/AC2  MANE          1.19   1379.57    528.97      0.13      6.00   1379.49    528.00        0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7776E+03 EXCESS=0.0000E+00 OUTFLOW=0.7760E+03 BASIN STORAGE=0.1546E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                AC3  MANE          0.58   2580.70    498.73      0.24      6.00   2580.68    498.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1412E+04 EXCESS=0.0000E+00 OUTFLOW=0.1410E+04 BASIN STORAGE=0.1527E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                AC3  MANE          0.68   1966.61    511.19      0.18      6.00   1966.51    510.00        0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1061E+04 EXCESS=0.0000E+00 OUTFLOW=0.1060E+04 BASIN STORAGE=0.1367E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                AC3  MANE          0.73   1379.48    529.47      0.13      6.00   1379.16    528.00        0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7759E+03 EXCESS=0.0000E+00 OUTFLOW=0.7747E+03 BASIN STORAGE=0.1182E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                AC4  MANE          0.79   2580.55    498.74      0.24      6.00   2580.43    498.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1410E+04 EXCESS=0.0000E+00 OUTFLOW=0.1408E+04 BASIN STORAGE=0.1867E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                AC4  MANE          0.78   1966.44    511.36      0.18      6.00   1966.05    510.00        0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1060E+04 EXCESS=0.0000E+00 OUTFLOW=0.1058E+04 BASIN STORAGE=0.1673E+01 PERCENT ERROR=   0.0
```

```
          FOR PLAN = 1  RATIO= 0.85
               AC4  MANE          0.87   1379.11    530.13      0.13      6.00   1378.72    534.00        0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7746E+03 EXCESS=0.0000E+00 OUTFLOW=0.7732E+03 BASIN STORAGE=0.1453E+01 PERCENT ERROR=   0.0


*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY  1991             *
*             VERSION 4.0.1 (LOCAL)     *
*                                       *
*  RUN DATE  05/10/96  TIME  16:18:56   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL *PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB,* AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID        FEMA FLOOD INSURANCE STUDY, 1996
               2    ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
               3    ID        LOWER CENTRAL VALLEY 50-YEAR STORM
               4    ID
               5    ID        Current (05/96) model based on a HEC-1 model prepared by James M
               6    ID        Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
               7    ID        Study Hydrology Report dated 9/91.  Two modifications were made
               8    ID        to the source model.  First, Upper Las Vegas Detention Basin storage
               9    ID        and outflow characteristics were revised to reflect the as-built
              10    ID        configuration described by construction drawings dated 5/91 and HEC-1
              11    ID        models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
              12    ID        relationship for the North Las Vegas Detention Basin was revised
              13    ID        to reflect the current three-pipe outlet condition (two of the five
              14    ID        pipes were blocked following construction of the upper basin) and the
              15    ID        hydraulic control created by the 4-foot high barrier wall located
              16    ID        upstream from the pipe inlets.
              17    ID
              18    ID        Remaining comments are from the original model dated 1/91.
              19    ID
              20    ID        CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
              21    ID        Northern Las Vegas Wash - FIS FLOWS
              22    ID        Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
              23    ID
              24    ID        Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
              25    ID        Lower Central Valley 50-Year Storm, Existing Conditions
              26    ID        Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
              27    ID        (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
              28    ID        PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
              29    ID
              30    ID        All routing steps immediately d/s of a diversion converted to
              31    ID        Muskingum routing to avoid zero flow, 8/90
              32    ID
              33    ID        Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
              34    ID        Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
              35    ID        Channel and Hualapai Diversion included, 8/90
              36    ID
              37    ID        This data file models DARF's at certain locations where FIS flows are
              38    ID        required.  The original B&V data file used a factor of 0.62; ratios
              39    ID        of this factor are used in the JR card to model DA's at the points
              40    ID        of interest (JMM DARF's extracted from CCRFCD Design Manual):
              41    ID
              42    ID          PT OF                 AREA          DARF       DARF/0.62      RATIO
              43    ID          INTEREST            (SQ MI)
              44    ID
              45    ID     RRBRIDGE, NC5, & 304    60.7 - 64.5      0.66        1.06          1
              46    ID          ACHANNL              111.6          0.59        0.95          2
              47    ID          NCHANNL              172.2          0.53        0.85          3
              48    ID
 *** FREE ***
              49    IT       6       0       0     200
              50    IO       5       0       0
              51    IN       5       0       0
              52    JR    PREC    1.06    0.95    0.85
```

1 HEC-1 INPUT PAGE 2

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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


              53    KK     112
              54    KM   RUNOFF FROM SUBBASIN 112
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 55          BA   5.333
 56          PB    1.86
 57          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
 58          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
 59          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
 60          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
 61          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
 62          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
 63          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
 64          PC    .997    .999    1.00
 65          LS       0      82
 66          UD    .462

 67          KK     119
 68          KM   RUNOFF FROM SUBBASIN 119
 69          BA   2.739
 70          PB    1.95
 71          LS       0      82
 72          UD    .346

 73          KK       .
 74          KM   COMBINE SUBBASINS 112 & 119
 75          HC       2

 76          KK     120
 77          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
 78          RM       3    0.27    0.15

 79          KK  125UDB
 80          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
 81          RM       5    0.53    0.15

 82          KK     117
 83          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
 84          RM       4    0.43    0.15

 85          KK     118
 86          KM   RUNOFF FROM SUBBASIN 118
 87          BA   5.079
 88          PB    1.69
 89          LS       0      84
 90          UD    .233

 91          KK     117
 92          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
 93          RM       1    0.13    0.15
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 94          KK       V
 95          RM       3    0.25    0.15

 96          KK       V
 97          RM       4    0.37    0.15

 98          KK     117
 99          KM   RUNOFF FROM SUBBASIN 117
100          BA   7.366
101          PB    1.61
102          LS       0      78
103          UD   1.699

104          KK       .
105          KM   COMBINE SUBBASINS 112, 117, 118, & 119
106          HC       3

107          KK   ULWDB
             *  *** lines from 1/91 model removed 5/96
             * KM      UPPER LAS VEGAS WASH DETENTION BASIN
             * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
             * RS 1 STOR -1
             * SV 0 40 75 110 250 500 920 1550 1700 1860
             * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
             * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
             * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
             * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
             * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
108          KM       UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
109          KM          (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
110          RS       1    STOR      -1
111          SV       0      12      80     170     320     560    1000    1610    1800    1980
112          SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
113          SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
114          SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
115          SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
116          SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

117          KK     116
118          KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
119          RM       5    0.50    0.15

120          KK     111
121          KM   RUNOFF FROM SUBBASIN 111
122          BA    4.08
123          PB    1.69
124          LS       0      84
125          UD    .239
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1 HEC-1 INPUT PAGE 4

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  126     KK    116
  127     KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
  128     RM       1    0.10    0.15

  129     KK       V
  130     RM       2    0.21    0.15

  131     KK    116
  132     KM   RUNOFF FROM SUBBASIN 116
  133     BA   5.189
  134     PB    1.44
  135     LS       0      78
  136     UD   1.418

  137     KK       .
  138     KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
  139     HC       3

  140     KK    109
  141     KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
  142     RM       4    0.42    0.15

  143     KK    110
  144     KM   RUNOFF FROM SUBBASIN 110
  145     BA   2.945
  146     PB    1.61
  147     LS       0      86
  148     UD    .237

  149     KK    109
  150     KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
  151     RM       1    0.09    0.15

  152     KK       V
  153     RM       2    0.19    0.15

  154     KK    109
  155     KM   RUNOFF FROM SUBBASIN 109
  156     BA   4.183
  157     PB    1.44
  158     LS       0      78
  159     UD   1.281

  160     KK       .
  161     KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  162     HC       3

  163     KK    101
  164     KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  165     KM   THRU SUBBASIN 101
  166     RM       5    0.54    0.15
```

1 HEC-1 INPUT PAGE 5

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  167     KK    103
  168     KM   RUNOFF FROM SUBBASIN 103
  169     BA   6.195
  170     PB    1.78
  171     LS       0      84
  172     UD    .324

  173     KK    102
  174     KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
  175     RM       1    0.11    0.15

  176     KK    102
  177     KM   RUNOFF FROM SUBBASIN 102
  178     BA   8.455
  179     PB    1.61
  180     LS       0      83
  181     UD    .369

  182     KK       .
  183     KM   COMBINE SUBBASINS 102 & 103
  184     HC       2

  185     KK    101
  186     KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
  187     RM       1    0.11    0.15

  188     KK       V
  189     RM       2    0.22    0.15

  190     KK    101
  191     KM   RUNOFF FROM SUBBASIN 101
  192     BA   9.082
  193     PB    1.44
  194     LS       0      77
  195     UD   1.505

  196     KK   NLVIN
  197     KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
```

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198          HC       3

199          KK       .
200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
201          DT DIVDIKE
202          DI        0    2000    6000    8000    8200    8910   10225   11935   13565   15635
203          DI    17775   20135   23000
204          DQ        0       0       0       0       0     410    1225    2435    3565    5135
205          DQ     6775    8635   11000

206          KK  NLVDET
207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
210          RS       1    STOR      -1
211          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                          HEC-1 INPUT                                        PAGE  6

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

212          SV    1650    1825    1920    2000    2110    2200    2310    2430
213          SE       0       2       4       6      10      14      21      24      26      27
214          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
215          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
216          SQ    3050    4630    5710    7090    8610   10140   11670   13200

217          KK       .
218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
219          DR DIVDIKE

220          KK       .
221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
222          HC       2

223          KK     303
224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
225          RM      13    1.28    0.15

226          KKRRBRIDGE
227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
228          DTRRCHANNL
229          DI        0    6000   20000
230          DQ        0       0   13500

231          KK     I15
232          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
233          DT   KCHAR
234          DI        0    1000   10000
235          DQ        0     800    8000

236          KK     NC1
237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
238          RK      700  0.0058   0.016       0    TRAP      10       2

239          KK       V
240          RK     2000  0.0100   0.035       0    TRAP      30       2

241          KK     NC2
242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
243          KM   TO GOWAN AVE.
244          RK     1300   .0056    .030       0    TRAP      12       2

245          KK     NC3
246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
247          KM   TO CHEYENNE AVE.
248          RK     2600   .0021    .030       0    TRAP      20     2.5
1                                          HEC-1 INPUT                                        PAGE  7

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

249          KK     NC4
250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
252          RK     1300    .003    .016       0    TRAP      18       2

253          KK     NC5
254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
255          KM   TO "A" CHANNEL (LINED CHANNEL)
256          RK      500    .001    .016       0    TRAP      18       2
257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

258          KK    AP.1
259          KM       Begin subareas tributary to Gowan-South Detention Basin
260          KM       Begin subareas tributary to Angel Park Detention Basin
261          KM       From Wallace Angel Park Model
262          BA   0.001
263          PB    1.93
264          LS       0      89
265          UD    0.62

266          KK       V
267          KM   Route AP.1
268          RM       7    0.67    0.15

269          KK    AP.2
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          270          KM   One-third of subbasin AP.2
          271          KM   From Wallace Angel Park Model
          272          BA   0.853
          273          PB    1.65
          274          LS       0       87
          275          UD   0.363

          276          KK        .
          277          KM   Combine AP.1 & AP.2
          278          HC        2

          279          KK        V
          280          RM       11    1.06    0.15

          281          KK    AP.3
          282          BA    3.62
          283          PB    1.67
          284          LS       0       89
          285          UD    2.41

          286          KK    AP.4
          287          KM   From Wallace Angel Park Model
          288          BA   0.001
          289          PB    1.63
          290          LS       0       89
          291          UD    1.03
1                                        HEC-1 INPUT                                                    PAGE  8

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          292          KK        .
          293          KM   Combine AP.1, AP.2, AP.3, AP.4
          294          HC        3

          295          KK    AP.5
          296          KM   From Wallace Angel Park Model
          297          BA   0.001
          298          PB    1.93
          299          LS       0       89
          300          UD    0.39

          301          KK        V
          302          KM   Route AP.5
          303          RM        8    0.82    0.15

          304          KK    AP.6
          305          BA   0.001
          306          PB    1.93
          307          LS       0       88
          308          UD    0.75

          309          KK        .
          310          KM   Combine AP.5 & AP.6
          311          HC        2

          312          KK        V
          313          KM   Route AP.5 & AP.6
          314          RM        7    0.66    0.15

          315          KK    AP.7
          316          KM      One-half of subbasin AP.7
          317          BA    1.02
          318          PB    1.80
          319          LS       0       86
          320          UD    0.59

          321          KK   N_CHN
          322          KM   COMBINE NORTH CHANNEL FLOWS
          323          HC        2

          324          KK    GD.1
          325          KM   Begin subareas tributary to Hualapai Diversion
          326          KM   From VTN (PB & CN from B&V-La Madre)
          327          BA   0.001
          328          PB    1.96
          329          LS       0       87
          330          UD    0.62

          331          KK        V
          332          KM   Route GD.1
          333          RM        2    0.24    0.15
1                                        HEC-1 INPUT                                                    PAGE  9

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          334          KK        V
          335          KM   Routing Cont'd
          336          RM        3    0.27    0.15

          337          KK    GD.2
          338          KM   From VTN
          339          BA   0.001
          340          PB    1.89
          341          LS       0       89
          342          UD    0.83

          343          KK        .
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344          KM   Combine GD.1 & GD.2
345          HC       2

346          KK  TO_DIV
347          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
348          RM       3    0.34    0.15

349          KK    GD.3(=AP.12)
350          KM   From VTN
351          BA    0.80
352          PB    1.79
353          LS       0      87
354          UD    0.32

355          KKHUALAPAI
356          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
357          HC       2

358          KK     HUA& NO.CH
359          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
360          HC       2

361          KK       V
362          KM   Route Combined Flows
363          RK    5500     .023     .04       0    TRAP     100       2

364          KK       V
365          KM   Routing Cont'd
366          RK    4500     .004     .03       0    TRAP      30       4

367          KK    AP.8
368          BA    0.93
369          PB    1.65
370          LS       0      89
371          UD    0.62

372          KK     BOX
373          KM   SUMMERLIN PARKWAY CULVERT
374          HC       2
1                                        HEC-1 INPUT                                        PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

375          KK       V
376          KM   ROUTE TO ANGEL PARK DETENTION BASIN
377          RK    3000     .027     .04       0    TRAP     100       2

378          KK    AP.9
379          BA    0.68
380          PB    1.65
381          LS       0      89
382          UD     .83

383          KK  N_CHAN
384          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
385          HC       2

386          KKANGEL_PK
387          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
388          HC       2

389          KKSPILLWAY
390          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
391          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
392          RS       1    STOR      -1
393          SV       0       3      22      45      80     125     190     270     369     492
394          SV     630     780     942    1115    1209
395          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
396          SE    2616    2618    2620    2622    2623
397          SL  2592.5    3.14     0.6     0.5
398          SS  2619.1    1275     3.2     1.5

399          KKAP_TO_VEGAS/PIONEER
400          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
401          KM   From VTN
402          RK    7500    0.03   0.012       0    CIRC       5       0

403          KKBUFFALO_1
404          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
405          RK    1500    0.02    0.03       0    TRAP      20       4

406          KK    GD.7
407          KM   INTERSECTION OF LAKE MEAD & BUFFALO
408          BA    1.13
409          PB    1.65
410          LS       0      89
411          UD    1.38

412          KKBUFFALO_1
413          KM   Combine GD.7 W/ Buffalo Channel
414          HC       2
1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

415          KKBUFFALO_2
416          KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
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417          RK    5000   0.005   0.025       0    TRAP      30       4

418          KK    GD.4
419          KM   From B&V-La Madre
420          BA   0.001
421          PB    1.89
422          LS       0       88
423          UD    0.62

424          KK       V
425          KM   ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
426          RM       7    0.74    0.15

427          KK    GD.5
428          BA    3.31
429          PB    1.73
430          LS       0       86
431          UD    1.38

432          KK       .
433          KM   Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
434          HC       2

435          KK       V
436          KM   ROUTE NORTH ALONG RAMPART
437          RM       4    0.43    0.15

438          KK    GD.6
439          KM   DEL WEBB-SUN CITY SUMMERLIN
440          BA     1.6
441          PB    1.59
442          LS       0       86
443          UD     .96

444          KK       .
445          KM   Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
446          HC       2

447          KK       V
448          KM   ROUTE TO BUFFALO along Cheyenne Channel
449          RK    5500    .015    .015       0    TRAP      20       2

450          KK    GD.8
451          KM   R.A. HOMES-DESERT SHORES
452          BA    1.53
453          PB    1.57
454          LS       0       85
455          UD    1.11
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


456          KK       .
457          KM    INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
458          HC       2

459          KK   GD.34
460          KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
461          BA    3.84
462          PB    1.57
463          LS       0       84
464          UD    1.72

465          KKGOWAN_SOUTH
466          KM   TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
467          HC       3

468          KK  DET.GS
469          KM   Gowan-South Detention Basin data from VTN
470          RS       1    STOR      -1
471          SV       0     9.8     113     435     454     680
472          SE    2326    2330    2340  2349.6    2350    2354
473          SQ       0     112     328     455     459   30700

474          KK R.GSOUT
475          KM   ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
476          RK    3200   0.007   0.012       0    CIRC       5       0

477          KK    GD.9
478          KM   Begin subareas tributary to Gowan-North Detention Basin
479          KM   From B&V-LaMadre
480          BA   0.001
481          PB    1.93
482          LS       0       89
483          UD    0.30

484          KK       V
485          RM       5    0.52    0.15

486          KK   GD.10
487          KM   From B&V-LaMadre
488          BA   0.001
489          PB    1.73
490          LS       0       88
491          UD    0.90

492          KK       .
493          KM   Combine GD.9 & GD.10
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494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6    0.61    0.15
1                                        HEC-1 INPUT                                    PAGE 13

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


498          KK       V
499          KM   Routing Cont'd
500          RM       7    0.74    0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB    1.59
505          LS       0      85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 + GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB    1.64
514          LS       0      89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0    1545    3129    4000    8000
521          DQ       0    1545    1545    2416    6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2    0.15    0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB    1.57
530          LS       0      86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0     900    2484    4000    8000
540          DQ       0     900     900    2416    6416
1                                        HEC-1 INPUT                                    PAGE 14

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1    0.14    0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    1.98
550          LS       0      80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12    1.23    0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB    1.55
559          LS       0      81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0     520    1889    4000    8000
568          DQ       0     520     520    2631    6631
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569          KK       V
570          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
571          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
572          RM       1    0.14    0.15

573          KK   GD.28
574          KM   From Wallace
575          BA   0.001
576          PB    1.55
577          LS       0      77
578          UD    2.52

579          KK       .
580          KM   Combine GD.28 & GD.30 - GD.33
581          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

582          KK  RANCHO
583          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
584          DTCENTNIAL
585          DI       0    1040    5456    8000
586          DQ       0    1040    1040    3585

587          KK       V
588          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
589          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
590          RM       1    0.07    0.15

591          KK   GD.25
592          KM   From Wallace
593          BA   0.001
594          PB    1.72
595          LS       0      89
596          UD    1.09

597          KK       V
598          RM       7    0.69    0.15

599          KK   GD.26
600          KM   From Wallace
601          BA   0.001
602          PB    1.59
603          LS       0      78
604          UD    1.23

605          KK       .
606          KM   Combine GD.25 & GD.26
607          HC       2

608          KK       V
609          KM   ROUTE WEST TO ANN ROAD AND HWY 95
610          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
611          RM       4    0.43    0.15

612          KK       V
613          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
614          RM       5    0.49    0.15

615          KK   GD.27
616          KM   From Wallace
617          BA    1.13
618          PB    1.55
619          LS       0      78
620          UD    1.61

621          KK       .
622          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
623          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

624          KK       V
625          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
626          RK    3000   0.009   0.025       0    TRAP      50       3

627          KK       V
628          RK    3000   0.004   0.022       0    TRAP      25       8

629          KK   GD.29
630          KM   From Wallace
631          BA    0.76
632          PB    1.55
633          LS       0      77
634          UD    1.49

635          KK       V
636          RK    8000    0.01   0.025       0    TRAP      20       8

637          KK    PDGC
638          KM   PAINTED DESERT GOLF COURSE
639          KM   From Wallace
640          BA    0.53
641          PB    1.55
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642          LS       0      80
643          UD     1.2

644          KK       .
645          KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
646          HC       3

647          KK  RANCHO
648          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
649          DTP.DESERT
650          DI       0     233    1318    8000
651          DQ       0     233     233    6915

652          KK       V
653          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
654          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
655          RM       1    0.14    0.15

656          KK   GD.21
657          KM   From Wallace
658          BA   0.001
659          PB    1.93
660          LS       0      89
661          UD    0.72

662          KK       V
663          RM       8    0.81    0.15
1                                        HEC-1 INPUT                                        PAGE 17

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

664          KK   GD.22
665          KM   From Wallace
666          BA   0.001
667          PB    1.66
668          LS       0      86
669          UD     1.5

670          KK   GD.23
671          KM   From Wallace
672          BA   0.001
673          PB    1.71
674          LS       0      86
675          UD    1.41

676          KK       .
677          KM   Combine GD.21 - GD.23
678          HC       3

679          KK       V
680          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
681          RM       7    0.65    0.15

682          KK   GD.24
683          KM   From Wallace
684          BA    0.64
685          PB    1.55
686          LS       0      77
687          UD     1.2

688          KK       .
689          KM   Combine GD.21 - GD.24
690          HC       2

691          KK       V
692          KM   ROUTE WEST TO HWY 95
693          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
694          RM       7    0.65    0.15

695          KK   GD.18
696          KM   From Wallace
697          BA   0.001
698          PB    1.81
699          LS       0      89
700          UD    0.31

701          KK       V
702          RM       6    0.62    0.15

703          KK   GD.19
704          KM   From Wallace
705          BA   0.001
706          PB    1.70
707          LS       0      82
708          UD    1.24
1                                        HEC-1 INPUT                                        PAGE 18

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

709          KK       .
710          KM   Combine GD.18 & GD.19
711          HC       2

712          KK       V
713          KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
714          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
715          RM       9    0.88    0.15
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716          KK   GD.20
717          KM   From Wallace
718          BA    2.35
719          PB    1.56
720          LS       0      82
721          UD    2.51

722          KK       .
723          KM   Combine GD.18 - GD.31 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724          HC       4

725          KK  HWY.95
726          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727          DT   CRAIG
728          DI       0     465    2056   10000
729          DQ       0     465     465    8409

730          KK       V
731          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733          RM       1    0.07    0.15

734          KK   GD.15
735          KM   From Wallace
736          BA   0.001
737          PB    1.93
738          LS       0      88
739          UD    0.48

740          KK       V
741          RM       7    0.74    0.15

742          KK   GD.16
743          KM   From Wallace
744          BA   0.001
745          PB    1.70
746          LS       0      82
747          UD    1.63

748          KK       .
749          HC       2
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

750          KK       V
751          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752          RM      10    1.01    0.15

753          KK   GD.17
754          KM   From Wallace
755          BA    0.56
756          PB    1.56
757          LS       0      80
758          UD     2.0

759          KK       .
760          KM   Combine GD.15 - GD.17
761          HC       3

762          KK   HWY95
763          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764          DTALEXANDR
765          DI       0     155    1746   10000
766          DQ       0     155     155    8409

767          KK       V
768          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770          RM       1    0.11    0.15

771          KK   GD.12
772          KM   From Wallace
773          BA   0.001
774          PB    1.85
775          LS       0      89
776          UD     0.3

777          KK       V
778          RM       4    0.42    0.15

779          KK   GD.13
780          KM   From Wallace
781          BA   0.001
782          PB    1.78
783          LS       0      86
784          UD    1.10

785          KK       .
786          KM   Combine GD.12 & GD.13
787          HC       2

788          KK       V
789          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790          RM       4    0.43    0.15
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 791          KK       V
 792          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 793          RM      11    1.06    0.15

 794          KK  GD.14A
 795          KM   From Wallace
 796          BA    1.71
 797          PB    1.63
 798          LS       0      81
 799          UD    0.88

 800          KK       .
 801          KM   Combine GD.12, GD.13 & GD.14A
 802          HC       2

 803          KK       V
 804          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 805          RM       5    0.53    0.15

 806          KK  GD.14B
 807          KM   From Wallace
 808          BA    0.68
 809          PB    1.59
 810          LS       0      83
 811          UD    1.67

 812          KK       .
 813          KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
 814          HC       3

 815          KK   GN_IN
 816          KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
 817          HC       3

 818          KK  DET.GN
 819          KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
 820          KM   From VTN
 821          RS       1    STOR      -1
 822          SV       0      28      46     113     774     885    1163
 823          SE    2308    2311    2312    2314    2324  2325.5    2329
 824          SQ       0       0     126     251     519     539   35800

 825          KKR.G-UPS.
 826          KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
 827          RK    2000   0.005   0.013       0    CIRC       6       0

 828          KK       V
 829          KM   Route Gowan outflow along Gowan Outfall Channel
 830          RK    7000   0.009   0.015       0    TRAP      10       0
1                                        HEC-1 INPUT                                    PAGE 21
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 831          KK       .
 832          KM   Recall flow diverted at Craig Road
 833          DR   CRAIG

 834          KK       V
 835          KM   Route to Rancho
 836          RM       4    0.42    0.15

 837          KK       .
 838          KM   Recall flow diverted at Alexander
 839          DRALEXANDR

 840          KK       V
 841          KM   Route to Rancho
 842          RM       9    0.92    0.15

 843          KK       .
 844          KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
 845          KM   at Rancho
 846          HC       3

 847          KK       V
 848          KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
 849          KM   App. F)
 850          RK    8400   0.007   0.015       0    TRAP      10       0

 851          KK       V
 852          KM   Routing Cont'd
 853          RK    4000   0.005   0.015       0    TRAP      10       0

 854          KK       V
 855          KM   Routing Cont'd
 856          RK    4000   0.005   0.015       0    TRAP      10       0

 857          KK       .
 858          KM   Begin modeling of subareas on the east side of Rancho Road
 859          KM   Recall flow diverted at Centenial
 860          DRCENTNIAL

 861          KK       .
 862          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
 863          RM      20    2.03    0.15
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          864          KK   EPT.1
          865          BA    3.76
          866          PB    1.55
          867          LS       0      85
          868          UD    3.36
1                                        HEC-1 INPUT                                                    PAGE 22

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          869          KK       .
          870          KM   Combine EPT.1 & flow diverted at Centenial
          871          HC       2

          872          KK       V
          873          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          874          RM       8    0.76    0.15

          875          KK       .
          876          KM   Recall flow diverted at Painted Desert
          877          DRP.DESERT

          878          KK       V
          879          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          880          RM      20    2.03    0.15

          881          KK   EPT.3
          882          BA   4.391
          883          PB    1.55
          884          LS       0      88
          885          UD    3.67

          886          KK       .
          887          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
          888          HC       3

          889          KK   EPT.4
          890          BA   1.372
          891          PB    1.55
          892          LS       0      89
          893          UD     2.7

          894          KK       V
          895          RM       9    0.88    0.15

          896          KK       .
          897          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
          898          KM   Gowan Outfall Channel
          899          HC       2

          900          KK       .
          901          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
          902          KM   Alexander, Painted Desert & Centenial
          903          HC       2

          904          KK   EPT.5
          905          BA   3.005
          906          PB    1.55
          907          LS       0      87
          908          UD     4.7
1                                        HEC-1 INPUT                                                    PAGE 23

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          909          KK       .
          910          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
          911          KM   Alexander, Painted Desert & Centenial
          912          HC       2

          913          KK       V
          914          RK   10000    .013    .015       0    TRAP      10       0

          915          KK   EPT.2
          916          BA   1.492
          917          PB    1.55
          918          LS       0      85
          919          UD    2.51

          920          KK  LVWASH
          921          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
          922          HC       2
          923          KM   ********************************* END GOWAN MODEL ***********************************

          924          KKGOWANDIV
          925          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
          926          DRCULVERTS

          927          KK     301
          928          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
          929          RM      22    2.17    0.15

          930          KK     301
          931          KM   RUNOFF FROM SUBBASIN 301
          932          BA  18.616
          933          PB    1.44
          934          LS       0      85
          935          UD     4.3
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          936          KK WTRIBUS
          937          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
          938          HC       2

          939          KKWTRIBTOT
          940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
          941          HC       2

          942          KK     304
          943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
          944          RM       3    0.28    0.15

          945          KK    SNIC
          946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
          947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
          948          RK    3850   .0122   0.016        0    TRAP      20       2
1                                              HEC-1 INPUT                                          PAGE 24

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          949          KK     LBC
          950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
          951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
          952          RK    2800    .002   0.016        0    TRAP      80       2

          953          KK    310W
          954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
          955          BA      .8
          956          PB    1.44
          957          LS       0      87       0        0      87
          958          UK     150    .010      .3       38
          959          UK     300    .015     .25       62
          960          RK    1000   .0075     .02     .013    TRAP      51       0
          961          RK    2600   .0075     .02       .2    TRAP      80       0
          962          RK    8700   .0150     .02        0    TRAP     100       0

          963          KK    R310W
          964          KM   ROUTE RUNOFF FROM 310W TO 310E
          965          RK   10500    .015     .02        0    TRAP     100       0

          966          KK    310E
          967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
          968          BA   1.238
          969          PB    1.44
          970          LS       0      86       0        0      83
          971          UK     150     .01      .3       46
          972          UK     300    .015     .25       54
          973          RK    1000   .0075     .02     .019    TRAP      51       0
          974          RK    2000   .0075     .02      .31    TRAP      80       0
          975          RK   10500    .015     .02        0    TRAP     100       0

          976          KK    310E
          977          KM   COMBINE ROUTED 310W WITH 310E
          978          HC       2

          979          KK    R310E
          980          KM   ROUTE FROM 310E TO 311W
          981          RK    5300   .0132     .02        0    TRAP     100       0

          982          KK    311W
          983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
          984          BA     .96
          985          PB    1.44
          986          LS       0      85       0        0      83
          987          UK     150    .010      .3       60
          988          UK     300   .0132     .25       40
          989          RK     650   .0065     .02      .01    TRAP      51       0
          990          RK    2200   .0065     .02      .14    TRAP      80       0
          991          RK    5300   .0132     .02        0    TRAP     100       0
1                                              HEC-1 INPUT                                          PAGE 25

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

          992          KK    311W
          993          KM   COMBINE ROUTED 310E WITH 311W
          994          HC       2

          995          KK    R311W
          996          KM   ROUTE FROM 311W TO 311E
          997          RK    7500   .0132     .02        0    TRAP     100       0

          998          KK    311E
          999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311E
         1000          KM   CONVERT TO SCS RUNOFF
         1001          BA     .77
         1002          PB    1.44
         1003          LS       0    74.3
         1004          UD    0.49

         1005          KK    311E
         1006          KM   COMBINE ROUTED 311W WITH 311E
         1007          HC       2

         1008          KK    309W
         1009          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
         1010          BA     .81
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1011          PB    1.44
1012          LS       0      71       0       0      70
1013          UK     150     .01      .3      22
1014          UK     300   .0144     .25      78
1015          RK    1000    .007     .02    .013    TRAP      51       0
1016          RK    2600    .007     .02     .20    TRAP      80       0
1017          RK    8700   .0144     .02       0    TRAP     100       0

1018          KK   R309W
1019          KM   ROUTE FROM 309W TO 309E
1020          RK   21000   .0144     .02       0    TRAP     100       0

1021          KK    309E
1022          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1023          BA    1.19
1024          PB    1.44
1025          LS       0      87       0       0      80
1026          UK     150     .01      .3      52
1027          UK     300   .0144     .25      48
1028          RK    1000    .007     .02    .019    TRAP      51       0
1029          RK    2600    .007     .02     .30    TRAP      80       0
1030          RK   21000   .0144     .02       0    TRAP     100       0

1031          KK    309E
1032          KM   COMBINE ROUTED 309W WITH 309E
1033          HC       2
1                                      HEC-1 INPUT                                    PAGE 26

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1034          KK
1035          KM   COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1036          HC       2

1037          KK    FCP1
1038          KM   ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1039          KM   TO LAKE MEAD BLVD.
1040          RK     410   .0045     .016       0    CIRC       5       0

1041          KK    FCP2
1042          RK     740   .0048     .016       0    CIRC     5.5       0

1043          KK   FCBC1
1044          RK     800   .0056     .016       0    TRAP       8       0

1045          KK     FC1
1046          RK    1250   .0195     .016       0    TRAP       8       0

1047          KKFCBC2/FC2/FCBC3
1048          KM   COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1049          RK    1430     .03     .016       0    TRAP       7       0

1050          KK   307NW
1051          KM   RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1052          BA    1.33
1053          PB    1.44
1054          LS       0      85       0       0      87
1055          UK     150    .010       .3      32
1056          UK     300    .011      .25      68
1057          RK    1000   .0055     .02    .017    TRAP      51       0
1058          RK    2600   .0055     .02     .27    TRAP      80       0
1059          RK    6400    .011     .02       0    TRAP     100       0

1060          KK  R307NW
1061          KM   ROUTE FROM 307NW TO 307NE
1062          RK    4000    .011     .02       0    TRAP     100       0

1063          KK   307NE
1064          KM   RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1065          BA     .64
1066          PB    1.44
1067          LS       0      87       0       0      87
1068          UK     150    .010       .3      11
1069          UK     300    .011      .25      89
1070          RK    1000   .0055     .02    .013    TRAP      51       0
1071          RK    2600   .0055     .02     .21    TRAP      80       0
1072          RK    4000    .011     .02       0    TRAP     100       0

1073          KK   307NE
1074          KM   COMBINE ROUTED 307NW WITH 307NE
1075          HC       2
1                                      HEC-1 INPUT                                    PAGE 27

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1076          KK
1077          KM   COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1078          HC       2

1079          KK       V
1080          KM   ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1081          RM       4    0.37    0.15

1082          KK   307SW
1083          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1084          KM   CONVERT TO SCS RUNOFF
1085          BA     1.1
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1086          PB    1.44
1087          LS       0    63.5
1088          UD    0.30

1089          KK  R307SW
1090          KM   ROUTE FROM 307SW TO 307SE
1091          RK    7300    .011     .02       0    TRAP     100       0

1092          KK   307SE
1093          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1094          BA    1.58
1095          PB    1.44
1096          LS       0      85       0       0      87
1097          UK     150     .01       .3      40
1098          UK     300    .011      .25      60
1099          RK    1000   .0055     .02     .01    TRAP      51       0
1100          RK    2200   .0055     .02     .17    TRAP      80       0
1101          RK    7300    .011     .02       0    TRAP     100       0

1102          KK   307SE
1103          KM   COMBINE ROUTED 307SW WITH 307SE
1104          HC       2

1105          KK       .
1106          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1107          HC       2

1108          KK       V
1109          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1110          RM       2    0.18    0.15

1111          KK    308W
1112          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1113          BA     .81
1114          PB    1.44
1115          LS       0      71       0       0      70
1116          UK     150     .01       .3      19
1117          UK     300   .0134      .25      81
1118          RK    1000    .006     .02    .017    TRAP      51       0
1119          RK    2600    .006     .02     .27    TRAP      80       0
1120          RK    8700   .0134     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                    PAGE 28

              LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1121          KK   R308W
1122          KM   ROUTE FROM 308W TO 308E
1123          RK    6500   .0134     .02       0    TRAP     100       0

1124          KK    308E
1125          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1126          BA     .72
1127          PB    1.44
1128          LS       0      85       0       0      87
1129          UK     150     .01       .3      59
1130          UK     300   .0134      .25      41
1131          RK    1000    .006     .02    .015    TRAP      51       0
1132          RK    2600    .006     .02     .24    TRAP      80       0
1133          RK    6500   .0134     .02       0    TRAP     100       0

1134          KK    308E
1135          KM   COMBINE ROUTED 308W WITH 308E
1136          HC       2

1137          KK       .
1138          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1139          HC       2

1140          KKR307/308
1141          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1142          RK    6100   .0132     .02       0    TRAP     100       0

1143          KK    312W
1144          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1145          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1146          BA     .77
1147          PB    1.44
1148          LS       0      81       0       0      80
1149          UK     150    .010       .3      20
1150          UK     300   .0132      .25      80
1151          RK    1000   .0065     .02    .012    TRAP      51       0
1152          RK    2600   .0065     .02    .175    TRAP      80       0
1153          RK    6100   .0132     .02       0    TRAP     100       0

1154          KK    312W
1155          KM   COMBINE ROUTED 307 & 308 WITH 312W
1156          HC       2

1157          KK   R312W
1158          KM   ROUTE FROM 312W TO 312E
1159          RK    6100   .0132     .02       0    TRAP     100       0

1160          KK    312E
1161          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1162          BA       .7
1163          PB    1.44
1164          LS       0      79       0       0      76
1165          UK     150    .010       .3      50
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          1166          UK     300    .0132      .25       50
1                                        HEC-1 INPUT                                                    PAGE 29

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          1167          RK     500    .0065      .02     .012    TRAP       51        0
          1168          RK    2600    .0065      .02     .175    TRAP       80        0
          1169          RK    6100    .0132      .02        0    TRAP      100        0

          1170          KK    312E
          1171          KM   COMBINE ROUTED 312W WITH 312E
          1172          HC       2

          1173          KK     306
          1174          KM   RUNOFF FROM SUBBASIN 306
          1175          BA   5.073
          1176          PB    1.44
          1177          LS       0       84
          1178          UD    3.02

          1179          KK       .
          1180          KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
          1181          HC       3

          1182          KK     FC3
          1183          KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
          1184          KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
          1185          RK     900    .0012     .016        0    TRAP       10      1.5

          1186          KK FC4/FC5
          1187          RK     600  0.0012   0.016        0    TRAP       24      1.5

          1188          KK     FC6
          1189          RK    5150    .0011     .016        0    TRAP       16      1.5

          1190          KK     FC7
          1191          RK    2400    .0010     .016        0    TRAP       20      1.5

          1192          KKFCBC4/FC8
          1193          KM   COMBINE FCBC4 & FC8 ROUTING STEPS
          1194          RK    3475    .0012     .016        0    TRAP       20      1.5

          1195          KK     302
          1196          KM   RUNOFF SUBBASIN 302
          1197          BA  12.113
          1198          PB    1.44
          1199          LS       0       86
          1200          UD     3.1

          1201          KK     303
          1202          KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
          1203          RM       8    0.83    0.15

          1204          KK     303
          1205          KM   RUNOFF FROM 303
          1206          BA  10.217
          1207          PB    1.44
          1208          LS       0       84
          1209          UD    4.24
1                                        HEC-1 INPUT                                                    PAGE 30

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          1210          KK       .
          1211          KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
          1212          HC       2

          1213          KK     304
          1214          KM   RUNOFF FROM SUBBASIN 304
          1215          BA   2.903
          1216          PB    1.44
          1217          LS       0       86
          1218          UD    1.98

          1219          KK     305
          1220          KM   RUNOFF FROM SUBBASIN 305
          1221          BA   3.298
          1222          PB    1.44
          1223          LS       0       87
          1224          UD    1.49

          1225          KK       .
          1226          KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
          1227          HC       2

          1228          KKRRBRIDGE
          1229          DRRRCHANNL

          1230          KKDUMMY_AREA
          1231          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
          1232          BA   0.001
          1233          PB    2.00
          1234          LS       0       80
          1235          UD    1.00

          1236          KKDUMMY_COMBINE
          1237          KM   Combine dummy subarea with recalled RRCHANNEL diversion
          1238          HC       2
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          1239          KKRRCHANNL
          1240          RK    4900   .0041     .03       0    TRAP      40       2

          1241          KK    I-15
          1242          DR   KCHAR

          1243          KKDUMMY_AREA
          1244          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1245          BA   0.001
          1246          PB    2.00
          1247          LS       0      80
          1248          UD    1.00
1                                                  HEC-1 INPUT                                                  PAGE 31

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          1249          KKDUMMY_COMBINE
          1250          KM   Combine dummy subarea with recalled KCHAR diversion
          1251          HC       2

          1252          KK ACHANNL
          1253          KM   COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1254          HC       5

          1255          KK AC1/AC2
          1256          KM   COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1257          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1258          RK    2350  0.0074   0.035       0    TRAP      30       2

          1259          KK     AC3
          1260          RK    1600   .0065    .030       0    TRAP      52     1.5

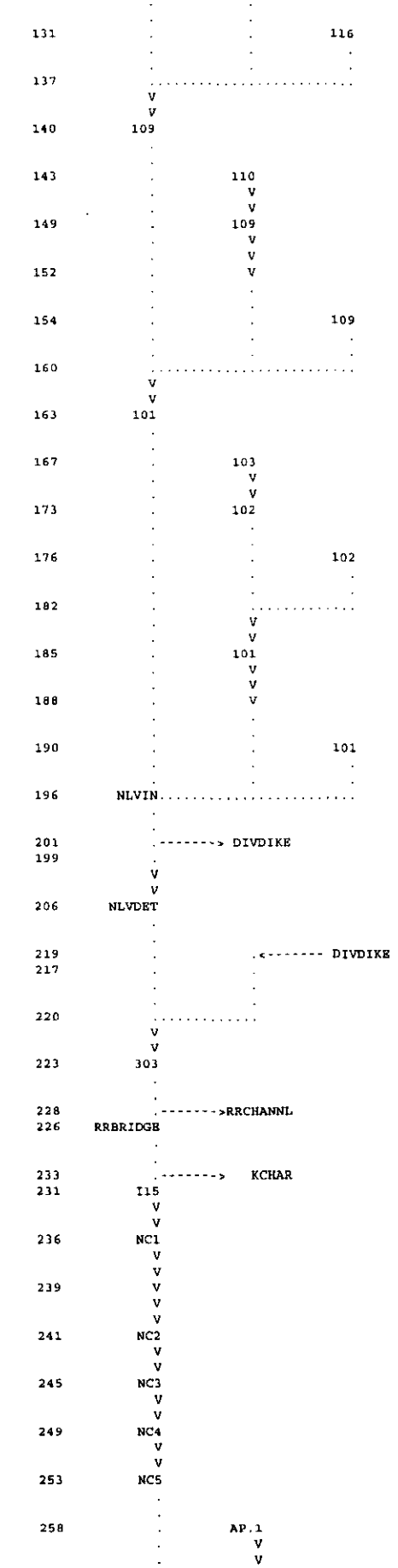
          1261          KK     AC4
          1262          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1263          RK    1650   .0053    .030       0    TRAP      70     1.5

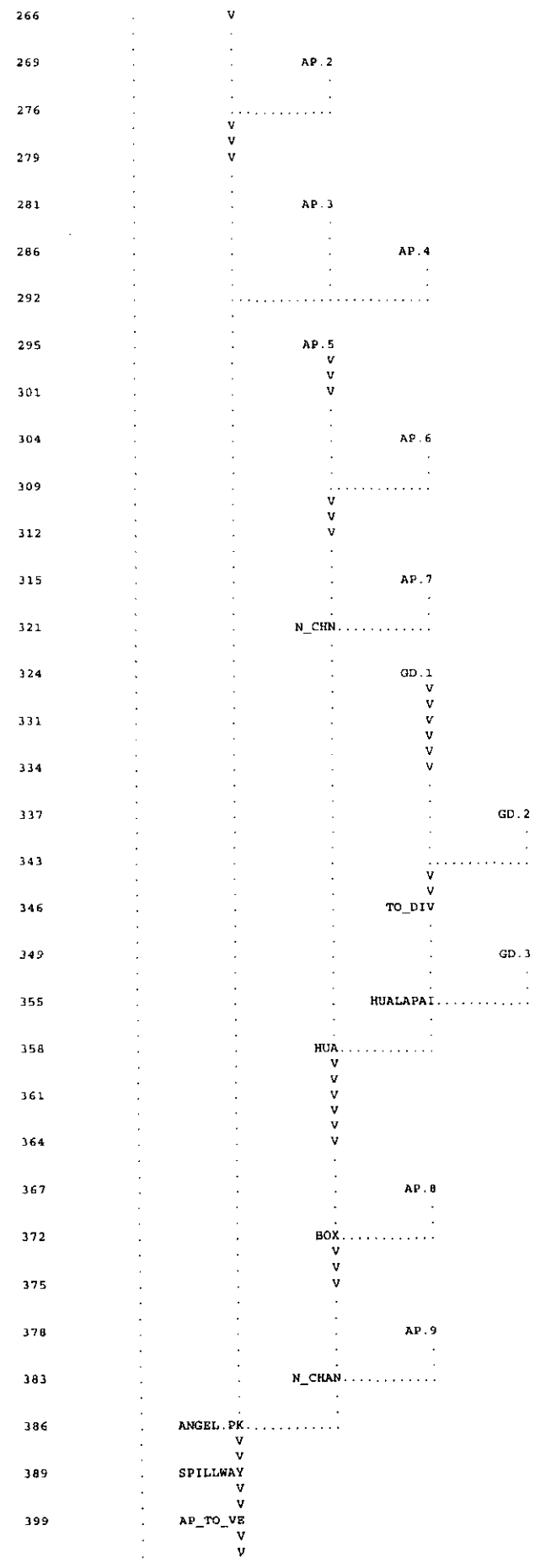
          1264          KK NCHANNL
          1265          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1266          HC       2
                        * Truncate this run at NCHANNL
          1267          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK

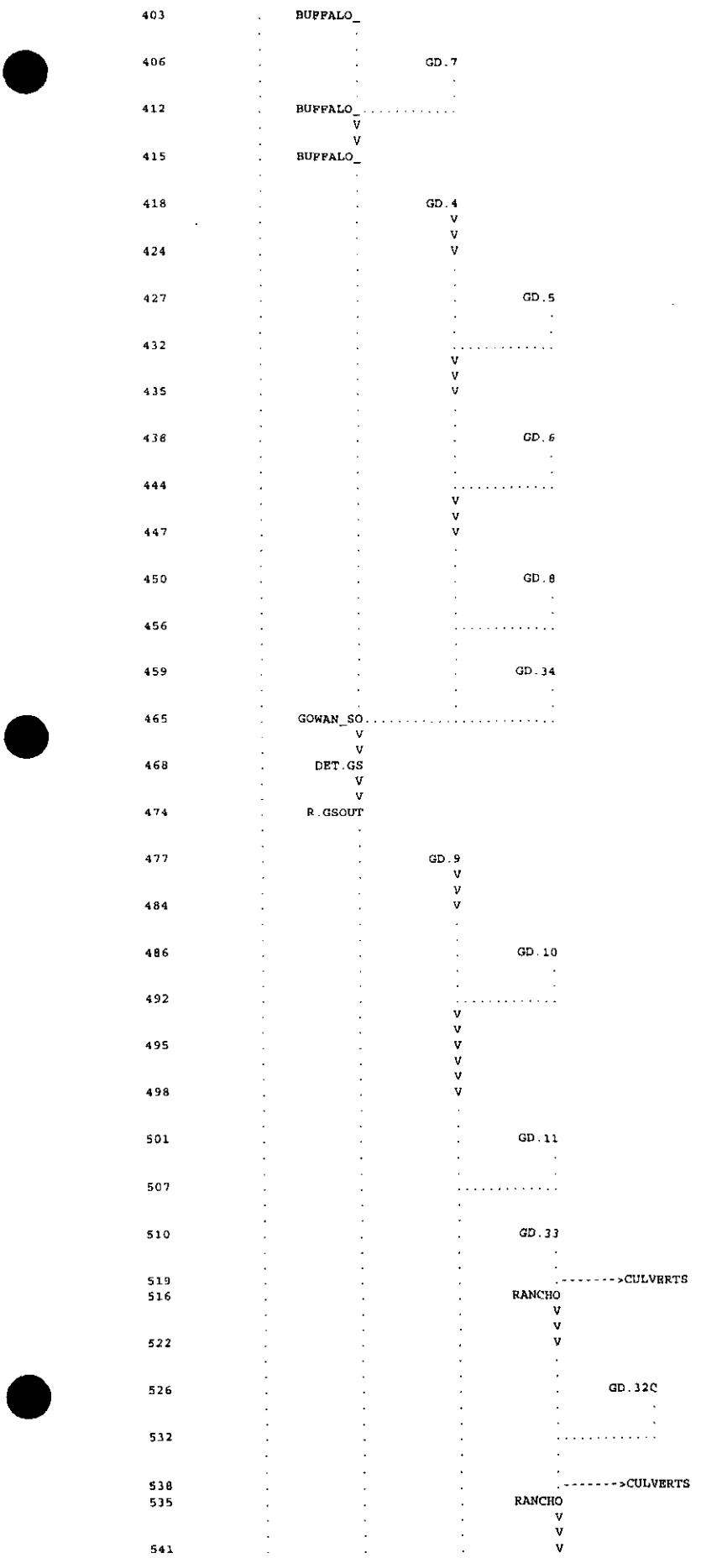
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  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

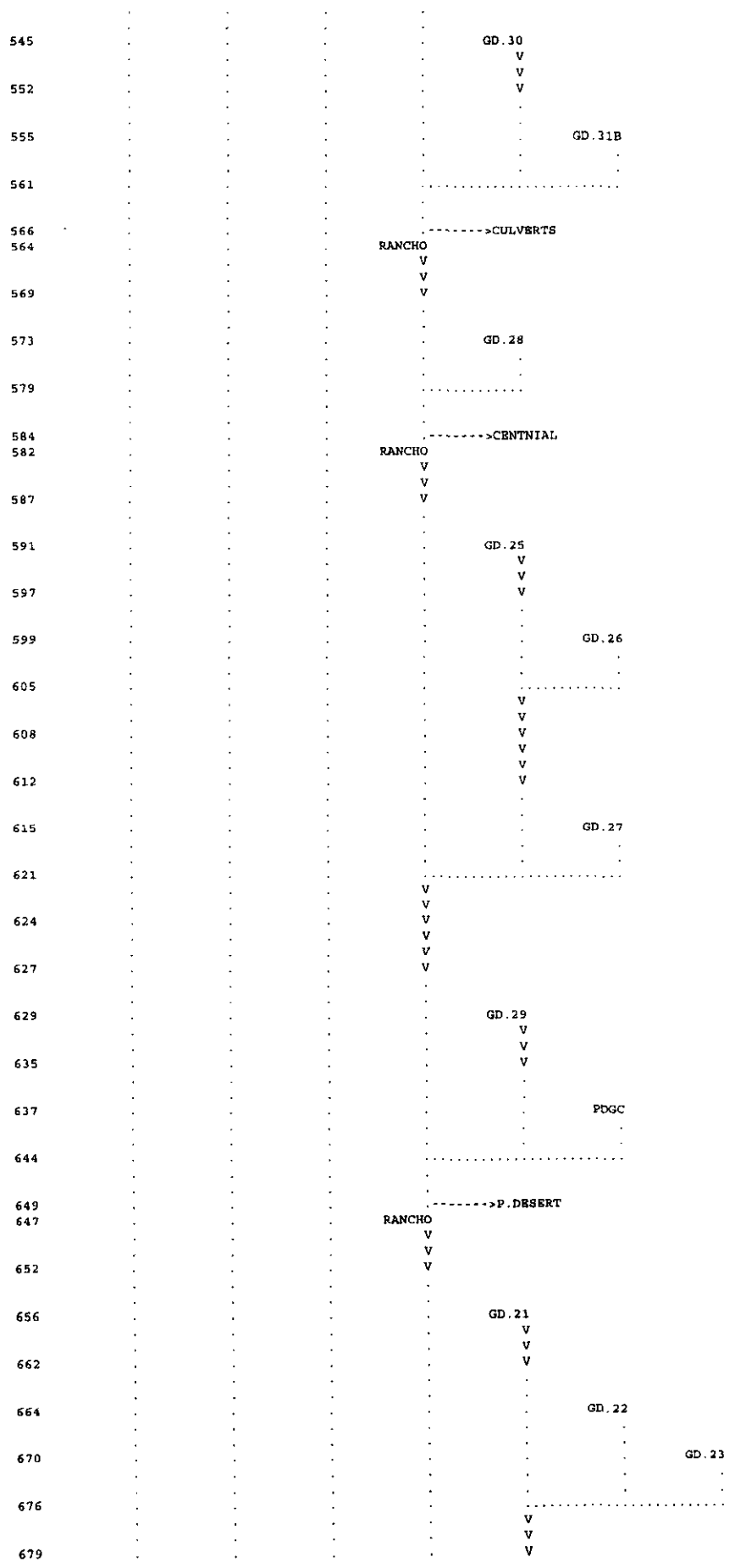
   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

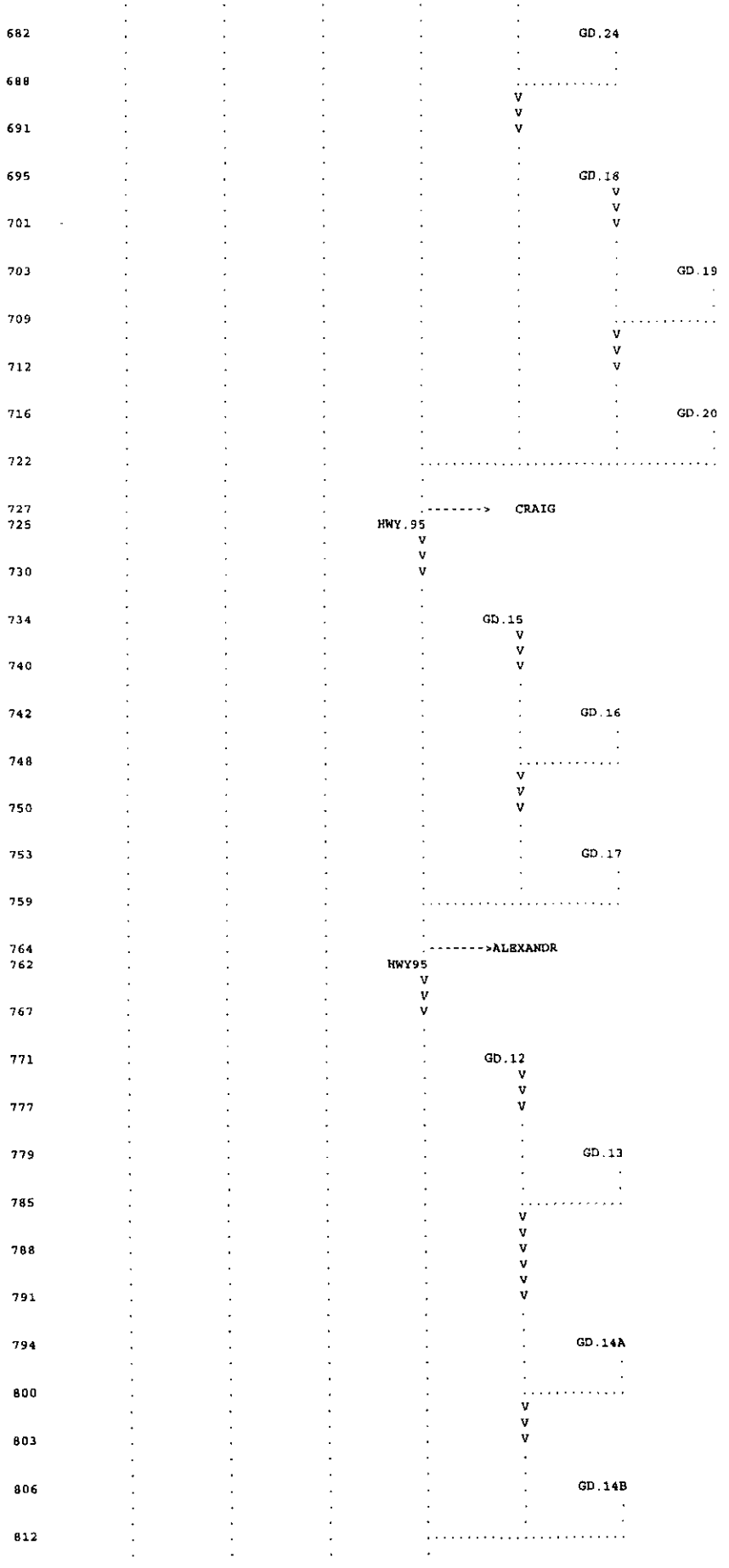
    53         112
                 .
                 .
    67           .          119
                 .            .
                 .            .
    73           ..............
                 V
                 V
    76         120
                 V
                 V
    79       125UDB
                 V
                 V
    82         117
                 .
                 .
    85           .          118
                 .            V
                 .            V
    91           .          117
                 .            V
                 .            V
    94           .            V
                 .            V
                 .            V
    96           .            V
                 .            .
                 .            .
    98           .            .          117
                 .            .            .
                 .            .            .
   104           ..........................
                 V
                 V
   107       ULWDB
                 V
                 V
   117         116
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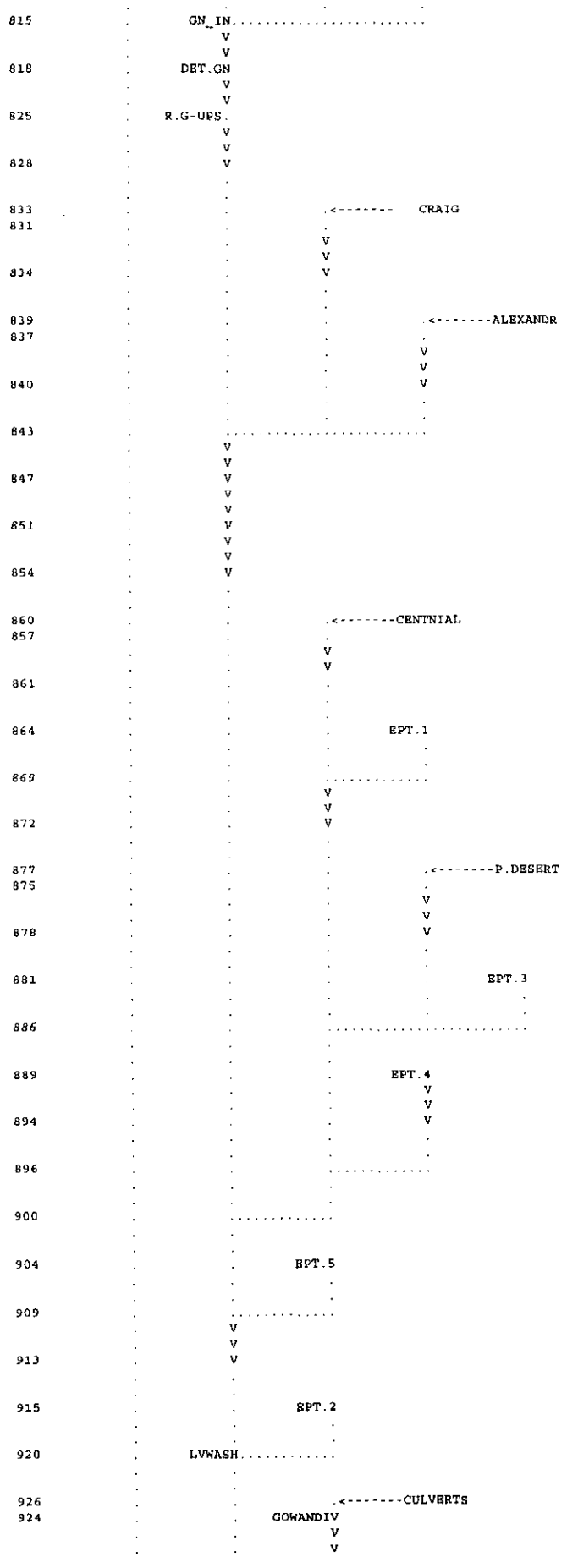

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NLVIN
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DIVDIKE
199
206
NLVDET
219
DIVDIKE
217
220
223
303
228
RRCHANNL
226
RRBRIDGE
233
KCHAR
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I15
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NC1
239
241
NC2
245
NC3
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NC4
253
NC5
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AP.1

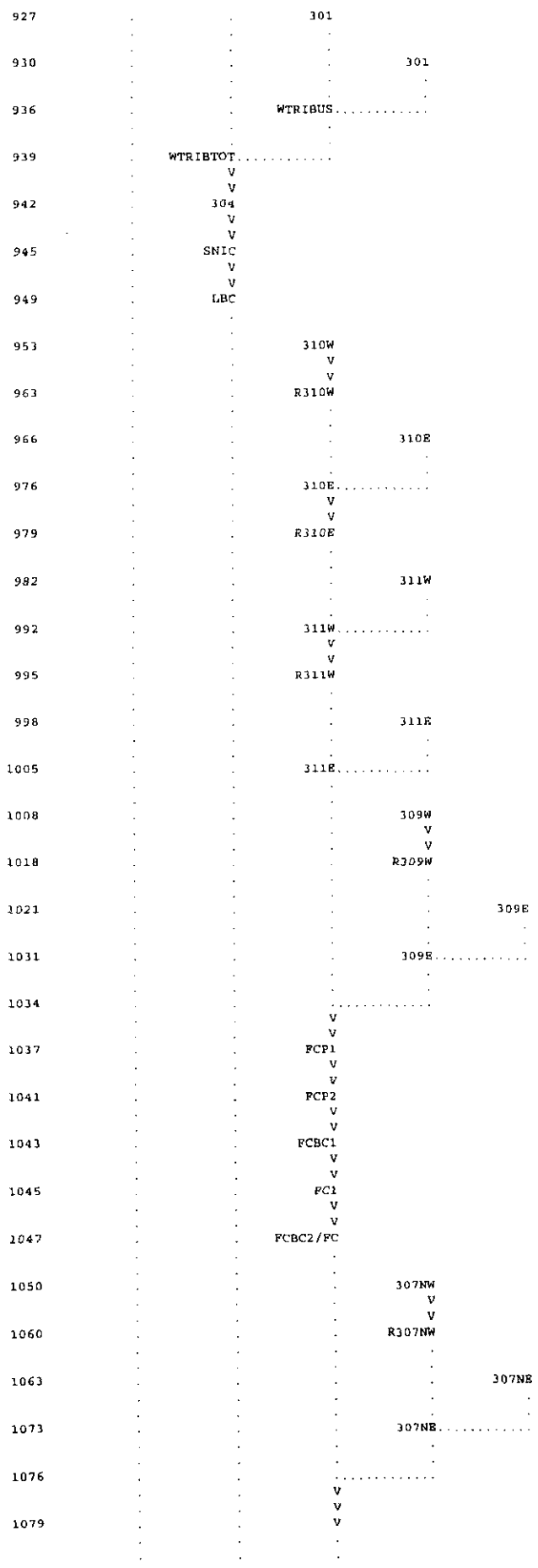

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AP.2
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AP.3
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AP.4
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AP.5
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AP.6
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312
315
AP.7
321
N_CHN
324
GD.1
331
334
337
GD.2
343
346
TO_DIV
349
GD.3
355
HUALAPAI
358
HUA
361
364
367
AP.8
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AP.9
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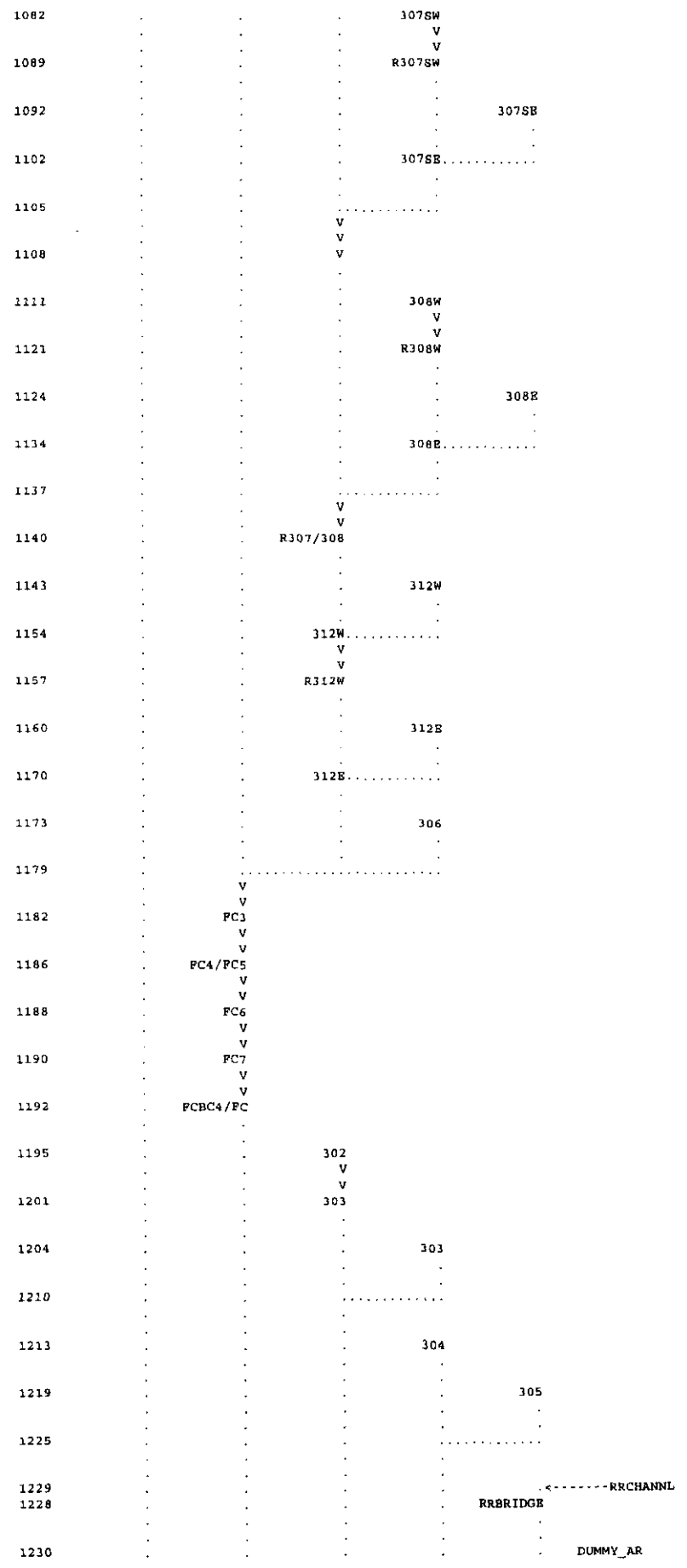

BUFFALO_
GD.7
BUFFALO_
BUFFALO_
GD.4
GD.5
GD.6
GD.8
GD.34
GOWAN_SO
DET.GS
R.GSOUT
GD.9
GD.10
GD.11
GD.33
CULVERTS
RANCHO
GD.32C
CULVERTS
RANCHO

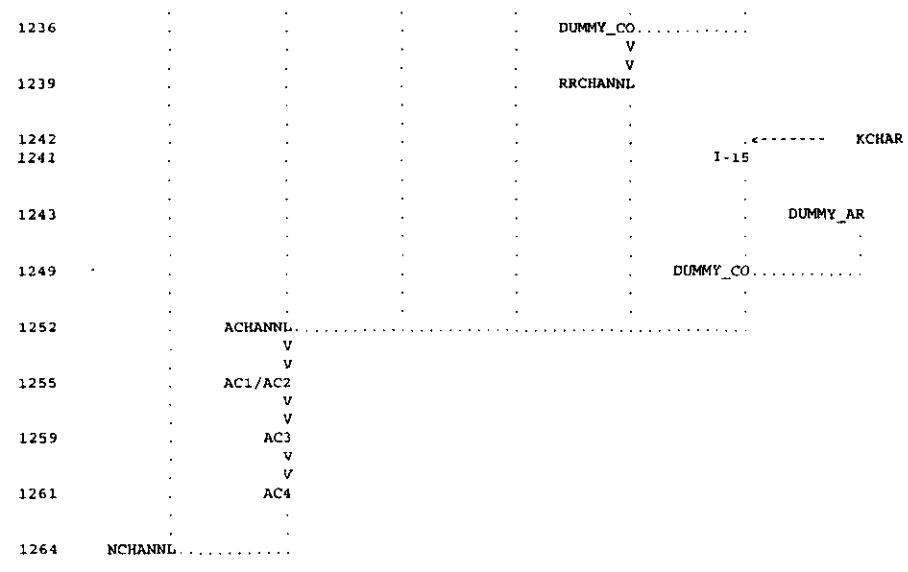

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GD.30
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GD.31B
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GD.28
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582
RANCHO
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587
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GD.25
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GD.26
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612
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GD.27
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627
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GD.29
635
637
PDGC
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649
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RANCHO
>P.DESERT
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GD.21
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GD.22
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GD.23
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682
GD.24
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GD.18
701
703
GD.19
709
712
716
GD.20
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727
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CRAIG
HWY.95
730
734
GD.15
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GD.16
748
750
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GD.17
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764
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ALEXANDR
HWY95
767
771
GD.12
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779
GD.13
785
788
791
794
GD.14A
800
803
806
GD.14B
812


815
GN_IN
818
DET.GN
825
R.G-UPS
828
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CRAIG
831
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839
ALEXANDR
837
840
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847
851
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CENTNIAL
857
861
864
EPT.1
869
872
877
P.DESERT
875
878
881
EPT.3
886
889
EPT.4
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896
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904
EPT.5
909
913
915
EPT.2
920
LVWASH
926
CULVERTS
924
GOWANDIV


927
301
930
301
936
WTRIBUS
939
WTRIBTOT
942
304
945
SNIC
949
LBC
953
310W
963
R310W
966
310E
976
310E
979
R310E
982
311W
992
311W
995
R311W
998
311E
1005
311E
1008
309W
1018
R309W
1021
309E
1031
309E
1034
1037
FCP1
1041
FCP2
1043
FCBC1
1045
FC1
1047
FCBC2/FC
1050
307NW
1060
R307NW
1063
307NE
1073
307NE
1076
1079


1082
307SW
1089
R307SW
1092
307SE
1102
307SE
1105
1108
1111
308W
1121
R308W
1124
308E
1134
308E
1137
1140
R307/308
1143
312W
1154
312W
1157
R312W
1160
312E
1170
312E
1173
306
1179
1182
FC3
1186
FC4/FC5
1188
FC6
1190
FC7
1192
FCBC4/FC
1195
302
1201
303
1204
303
1210
1213
304
1219
305
1225
1229
RRCHANNL
1228
RRBRIDGE
1230
DUMMY_AR



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *          FEBRUARY  1991               *
 *           VERSION 4.0.1 (LOCAL)       *
 *                                       *
 *  RUN DATE  05/10/96  TIME  16:18:56   *
 *                                       *
 *****************************************
```

```
 *****************************************
 *                                       *
 *    U.S. ARMY CORPS OF ENGINEERS       *
 *    HYDROLOGIC ENGINEERING CENTER      *
 *          609 SECOND STREET            *
 *       DAVIS, CALIFORNIA 95616         *
 *           (916) 551-1748              *
 *                                       *
 *****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 50-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 50-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (RAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
 50 IO          OUTPUT CONTROL VARIABLES
                     IPRNT         5  PRINT CONTROL
                     IPLOT         0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE
```

```
IT          HYDROGRAPH TIME DATA
                 NMIN            6  MINUTES IN COMPUTATION INTERVAL
                IDATE       1    0  STARTING DATE
                ITIME         0000  STARTING TIME
                   NQ          200  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE       1    0  ENDING DATE
               NDTIME          1954  ENDING TIME
               ICENT             19  CENTURY MARK

             COMPUTATION INTERVAL     0.10 HOURS
                  TOTAL TIME BASE    19.90 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

JP          MULTI-PLAN OPTION
                 NPLAN            1  NUMBER OF PLANS

JR          MULTI-RATIO OPTION
              RATIOS OF PRECIPITATION
            1.06      0.95      0.85

    *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1

    *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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    *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

    *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2
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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.06	RATIO 2 0.95	RATIO 3 0.85
HYDROGRAPH AT							
+	112	5.33	1	FLOW	1253.	990.	764.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	119	2.74	1	FLOW	811.	643.	499.
				TIME	3.70	3.70	3.80
2 COMBINED AT							
+		8.07	1	FLOW	2032.	1605.	1238.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	120	8.07	1	FLOW	1909.	1510.	1166.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	125UDB	8.07	1	FLOW	1712.	1357.	1052.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	117	8.07	1	FLOW	1607.	1272.	983.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT							
+	118	5.08	1	FLOW	1558.	1240.	965.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	117	5.08	1	FLOW	1387.	1108.	867.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	5.08	1	FLOW	1285.	1022.	795.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	5.08	1	FLOW	1164.	926.	721.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT							
+	117	7.37	1	FLOW	512.	387.	284.
				TIME	5.90	5.90	6.00

3 COMBINED AT							
+	.	20.52	1	FLOW	2581.	2056.	1612.
				TIME	5.30	5.40	5.50
ROUTED TO							
+	ULWDB	20.52	1	FLOW	2031.	1749.	1411.
				TIME	6.10	6.00	6.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2347.76	2345.41	2343.69
				TIME	6.10	6.00	6.00
ROUTED TO							
+	116	20.52	1	FLOW	2021.	1741.	1397.
				TIME	6.60	6.50	6.50
HYDROGRAPH AT							
+	111	4.08	1	FLOW	1233.	980.	762.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	116	4.08	1	FLOW	1153.	916.	712.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	4.08	1	FLOW	1035.	825.	645.
				TIME	3.90	4.00	4.00
HYDROGRAPH AT							
+	116	5.19	1	FLOW	294.	218.	156.
				TIME	5.60	5.70	5.80
3 COMBINED AT							
+	.	29.79	1	FLOW	2399.	1982.	1572.
				TIME	5.40	6.20	6.30
ROUTED TO							
+	109	29.79	1	FLOW	2343.	1971.	1559.
				TIME	5.90	6.60	6.70
HYDROGRAPH AT							
+	110	2.94	1	FLOW	945.	763.	604.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	109	2.94	1	FLOW	896.	723.	573.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	2.94	1	FLOW	818.	660.	523.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	245.	183.	132.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	.	36.91	1	FLOW	2685.	2151.	1682.
				TIME	5.80	5.80	5.80
ROUTED TO							
+	101	36.91	1	FLOW	2639.	2138.	1665.
				TIME	6.40	6.60	6.50
HYDROGRAPH AT							
+	103	6.20	1	FLOW	1833.	1468.	1151.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	102	6.20	1	FLOW	1730.	1383.	1083.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	1756.	1371.	1043.
				TIME	3.80	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	3485.	2754.	2125.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	101	14.65	1	FLOW	3340.	2636.	2031.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	3110.	2466.	1912.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	101	9.08	1	FLOW	455.	332.	234.
				TIME	5.80	5.80	5.90
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	4374.	3484.	2726.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10

HYDROGRAPH AT							
+	.	60.65	1	FLOW	4374.	3484.	2726.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	1792.	1566.	1335.
				TIME	8.60	8.30	8.20
			** PEAK STAGES IN FEET **				
			1	STAGE	16.06	12.92	10.29
				TIME	8.60	8.30	8.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
.				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	1792.	1566.	1335.
				TIME	8.60	8.30	8.20
ROUTED TO							
+	303	60.65	1	FLOW	1789.	1561.	1332.
				TIME	9.90	9.60	9.40
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	1789.	1561.	1332.
				TIME	9.90	9.60	9.40
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	1431.	1249.	1065.
				TIME	9.90	9.60	9.40
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.60	9.40
ROUTED TO							
+	NC1	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.60	9.40
ROUTED TO							
+	V	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC2	60.65	1	FLOW	358.	312.	266.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC3	60.65	1	FLOW	358.	312.	266.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC4	60.65	1	FLOW	358.	312.	266.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC5	60.65	1	FLOW	358.	312.	266.
				TIME	10.10	9.80	9.60
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	253.	206.	166.
				TIME	3.70	3.80	3.80
2 COMBINED AT							
+	.	0.85	1	FLOW	253.	206.	166.
				TIME	3.70	3.80	3.80
ROUTED TO							
+	V	0.85	1	FLOW	200.	164.	132.
				TIME	4.90	4.90	4.90
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	487.	407.	336.
				TIME	6.30	6.30	6.30
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
3 COMBINED AT							
+	.	4.47	1	FLOW	610.	510.	422.
				TIME	6.10	6.10	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	0.	0.	0.
				TIME	3.80	3.80	3.80

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
	.			TIME	5.20	5.20	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	264.	216.	173.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	264.	216.	173.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.60	4.60
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	1.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	295.	243.	197.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	295.	243.	197.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUA	1.82	1	FLOW	512.	419.	338.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	1.82	1	FLOW	508.	414.	333.
				TIME	3.90	3.90	4.00
ROUTED TO							
+	V	1.82	1	FLOW	502.	412.	333.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	AP.8	0.93	1	FLOW	247.	205.	168.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	BOX	2.75	1	FLOW	746.	615.	499.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	2.75	1	FLOW	746.	611.	494.
				TIME	4.10	4.10	4.20
HYDROGRAPH AT							
+	AP.9	0.68	1	FLOW	153.	127.	105.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	N_CHAN	3.43	1	FLOW	895.	734.	598.
				TIME	4.10	4.10	4.20
2 COMBINED AT							
+	ANGEL.PK	7.91	1	FLOW	1153.	963.	799.
				TIME	5.30	5.30	5.40
ROUTED TO							
+	SPILLWAY	7.91	1	FLOW	64.	62.	60.
				TIME	10.20	10.00	9.80

** PEAK STAGES IN FEET **

1	STAGE	2610.57	2609.29	2608.06
	TIME	10.30	10.10	9.90

ROUTED TO							
+	AP_TO_VE	7.91	1	FLOW	64.	62.	60.
				TIME	10.30	10.10	9.90
ROUTED TO							
+	BUFFALO_	7.91	1	FLOW	64.	62.	60.
				TIME	10.30	10.10	9.90
HYDROGRAPH AT							
+	GD.7	1.13	1	FLOW	196.	163.	135.
				TIME	5.10	5.20	5.30
2 COMBINED AT							
+	BUFFALO_	9.04	1	FLOW	251.	216.	186.
				TIME	5.20	5.30	5.40
ROUTED TO							
+	BUFFALO_	9.04	1	FLOW	250.	216.	186.
				TIME	5.40	5.40	5.50
HYDROGRAPH AT							
+	GD.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.5	3.31	1	FLOW	514.	422.	343.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	.	3.31	1	FLOW	514.	422.	343.
				TIME	5.30	5.30	5.40
ROUTED TO							
+	V	3.31	1	FLOW	510.	419.	340.
				TIME	5.70	5.70	5.80
HYDROGRAPH AT							
+	GD.6	1.60	1	FLOW	251.	201.	159.
				TIME	4.40	4.50	4.50
2 COMBINED AT							
+	.	4.91	1	FLOW	719.	590.	477.
				TIME	5.50	5.50	5.50
ROUTED TO							
+	V	4.91	1	FLOW	719.	589.	477.
				TIME	5.50	5.50	5.60
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	200.	159.	125.
				TIME	4.70	4.70	5.00
2 COMBINED AT							
+	.	6.44	1	FLOW	905.	742.	599.
				TIME	5.50	5.50	5.50
HYDROGRAPH AT							
+	GD.34	3.84	1	FLOW	401.	321.	252.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	GOWAN_SO	19.32	1	FLOW	1547.	1270.	1031.
				TIME	5.50	5.50	5.60
ROUTED TO							
+	DET.GS	19.32	1	FLOW	389.	365.	345.
				TIME	7.90	7.80	7.60
			** PEAK STAGES IN FEET **				
			1	STAGE	2344.61	2342.81	2341.30
				TIME	7.90	7.80	7.60
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	389.	365.	345.
				TIME	7.90	7.80	7.70
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.90	4.90	4.90

ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	297.	240.	190.
				TIME	6.40	6.50	6.50
2 COMBINED AT							
+	.	3.17	1	FLOW	298.	240.	190.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.10	7.10
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.10	7.10
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	105.	84.	67.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.90	7.90	7.80
HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
3 COMBINED AT							
+	.	1.03	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	64.	50.	39.
				TIME	4.50	5.40	5.40
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.50	5.40
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	6.30	6.30	6.40
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	73.	55.	40.
				TIME	5.80	5.80	5.90
3 COMBINED AT							
+	.	2.16	1	FLOW	74.	55.	40.
				TIME	5.80	5.80	5.90
ROUTED TO							
+	V	2.16	1	FLOW	73.	55.	40.
				TIME	5.90	6.00	6.00
ROUTED TO							
+	V	2.16	1	FLOW	73.	55.	40.
				TIME	6.00	6.10	6.20
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	47.	35.	25.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	0.76	1	FLOW	47.	35.	25.
				TIME	6.10	6.20	6.30
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	45.	35.	26.
				TIME	5.40	5.50	5.50
3 COMBINED AT							
+	.	3.45	1	FLOW	159.	119.	87.
				TIME	5.90	6.00	6.10
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	159.	119.	87.
				TIME	5.90	6.00	6.10
HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.00	5.00	5.00
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.50	5.40
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.20	5.40
3 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	5.00	5.00	5.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	42.	32.	23.
				TIME	5.50	5.60	5.60
2 COMBINED AT							
+	.	0.64	1	FLOW	43.	32.	24.
				TIME	5.50	5.60	5.60
ROUTED TO							
+	V	0.64	1	FLOW	42.	32.	23.
				TIME	6.10	6.20	6.30

HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.30	5.20
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	166.	130.	99.
				TIME	6.60	6.60	6.70
4 COMBINED AT							
+	.	6.45	1	FLOW	206.	160.	121.
				TIME	6.40	6.50	6.50
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	206.	160.	121.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.60	5.60	5.60
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0	0.
				TIME	5.70	5.70	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	39.	30.	22.
				TIME	6.10	6.20	6.20
3 COMBINED AT							
+	.	7.01	1	FLOW	39.	30.	23.
				TIME	6.10	6.20	6.20
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	39.	30.	23.
				TIME	6.10	6.20	6.20
HYDROGRAPH AT							
+	HWY9S	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	0.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	196.	149.	115.
				TIME	4.40	4.40	5.40
2 COMBINED AT							
+	.	1.71	1	FLOW	196.	149.	116.
				TIME	4.40	4.40	5.40
ROUTED TO							
+	V	1.71	1	FLOW	188.	144.	112.
				TIME	5.00	5.80	5.80
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	69.	55.	43.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	.	9.40	1	FLOW	249.	198.	155.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	884.	763.	660.
				TIME	6.10	6.10	6.10
ROUTED TO							
+	DET.GN	31.90	1	FLOW	310.	292.	275.
				TIME	15.70	13.70	12.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2316.21	2315.52	2314.91
				TIME	15.70	13.70	12.00
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	310.	292.	275.
				TIME	15.70	13.70	12.10
ROUTED TO							
+	V	31.90	1	FLOW	310.	292.	275.
				TIME	15.80	13.80	12.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	206.	160.	121.
				TIME	6.40	6.50	6.50
ROUTED TO							
+	V	0.00	1	FLOW	204.	158.	120.
				TIME	6.90	6.90	7.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	39.	30.	23.
				TIME	6.10	6.20	6.20
ROUTED TO							
+	V	0.00	1	FLOW	38.	29.	22.
				TIME	7.00	7.10	7.10
3 COMBINED AT							
+	.	31.90	1	FLOW	512.	448.	394.
				TIME	7.00	7.10	7.10
ROUTED TO							
+	V	31.90	1	FLOW	512.	448.	394.
				TIME	7.10	7.10	7.20
ROUTED TO							
+	V	31.90	1	FLOW	512.	448.	394.
				TIME	7.10	7.20	7.20
ROUTED TO							
+	V	31.90	1	FLOW	512.	448.	394.
				TIME	7.10	7.20	7.30
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.70	6.70
ROUTED TO							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	8.50	8.50	8.70
HYDROGRAPH AT							
+	EPT.1	3.76	1	FLOW	264.	212.	167.
				TIME	7.30	7.30	7.40
2 COMBINED AT							
+	.	3.76	1	FLOW	264.	212.	167.
				TIME	7.30	7.30	7.40
ROUTED TO							
+	V	3.76	1	FLOW	262.	210.	166.
				TIME	8.10	8.10	8.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	159.	119.	87.
				TIME	5.90	6.00	6.10

ROUTED TO							
+	V	0.00	1	FLOW	151.	112.	81.
				TIME	7.90	8.00	8.10
HYDROGRAPH AT							
+	EPT.3	4.39	1	FLOW	358.	294.	239.
				TIME	7.50	7.50	7.60
3 COMBINED AT							
+	.	8.15	1	FLOW	764.	611.	480.
				TIME	7.80	7.90	7.90
HYDROGRAPH AT							
+	EPT.4	1.37	1	FLOW	151.	126.	103.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	1.37	1	FLOW	150.	124.	102.
				TIME	7.50	7.50	7.50
2 COMBINED AT							
+	.	9.52	1	FLOW	910.	732.	579.
				TIME	7.80	7.80	7.90
2 COMBINED AT							
+	.	41.42	1	FLOW	1404.	1165.	963.
				TIME	7.60	7.70	7.70
HYDROGRAPH AT							
+	EPT.5	3.01	1	FLOW	185.	150.	121.
				TIME	8.60	8.60	8.60
2 COMBINED AT							
+	.	44.42	1	FLOW	1575.	1305.	1075.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	V	44.42	1	FLOW	1575.	1305.	1075.
				TIME	7.70	7.80	7.80
HYDROGRAPH AT							
+	EPT.2	1.49	1	FLOW	131.	105.	83.
				TIME	6.50	6.50	6.60
2 COMBINED AT							
+	LVWASH	45.92	1	FLOW	1673.	1383.	1136.
				TIME	7.60	7.70	7.70
HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.10	7.10
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.30	9.30	9.50
HYDROGRAPH AT							
+	301	18.62	1	FLOW	918.	728.	567.
				TIME	8.20	8.20	8.30
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	918.	728.	567.
				TIME	8.20	8.20	8.30
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	2564.	2091.	1688.
				TIME	7.80	7.90	7.90
ROUTED TO							
+	304	64.53	1	FLOW	2558.	2086.	1685.
				TIME	8.10	8.20	8.20
ROUTED TO							
+	SNIC	64.53	1	FLOW	2558.	2086.	1684.
				TIME	8.10	8.20	8.20
ROUTED TO							
+	LBC	64.53	1	FLOW	2557.	2086.	1684.
				TIME	8.20	8.20	8.30
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	118.	87.	68.
				TIME	4.40	4.60	5.20
ROUTED TO							
+	R310W	0.80	1	FLOW	117.	86.	68.
				TIME	4.80	5.10	5.70
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	134.	106.	83.
				TIME	4.50	5.30	5.40
2 COMBINED AT							
+	310E	2.04	1	FLOW	244.	191.	150.
				TIME	4.80	5.20	5.40
ROUTED TO							
+	R310E	2.04	1	FLOW	242.	191.	149.
				TIME	4.90	5.30	5.60

HYDROGRAPH AT							
+	311W	0.96	1	FLOW	108.	83.	65.
				TIME	4.40	5.20	5.30
2 COMBINED AT							
+	311W	3.00	1	FLOW	339.	274.	211.
				TIME	5.00	5.30	5.50
ROUTED TO							
+	R311W	3.00	1	FLOW	339.	273.	209.
				TIME	5.10	5.40	5.70
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	47.	34.	24.
				TIME	5.10	5.10	5.10
2 COMBINED AT							
+	311E	3.77	1	FLOW	386.	300.	219.
				TIME	5.10	5.40	5.70
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	14.	7.	2.
				TIME	6.90	7.90	9.60
ROUTED TO							
+	R309W	0.81	1	FLOW	14.	6.	2.
				TIME	8.90	10.60	13.70
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	116.	88.	64.
				TIME	5.40	5.60	5.90
2 COMBINED AT							
+	309E	2.00	1	FLOW	116.	88.	64.
				TIME	5.40	5.60	5.90
2 COMBINED AT							
+	.	5.77	1	FLOW	497.	383.	279.
				TIME	5.20	5.40	5.70
ROUTED TO							
+	FCP1	5.77	1	FLOW	497.	383.	279.
				TIME	5.20	5.40	5.80
ROUTED TO							
+	FCP2	5.77	1	FLOW	496.	382.	279.
				TIME	5.20	5.40	5.80
ROUTED TO							
+	FCBC1	5.77	1	FLOW	496.	382.	279.
				TIME	5.20	5.50	5.80
ROUTED TO							
+	FC1	5.77	1	FLOW	495.	382.	279.
				TIME	5.20	5.50	5.80
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	495.	382.	279.
				TIME	5.30	5.50	5.80
HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	184.	135.	110.
				TIME	4.40	5.20	5.20
ROUTED TO							
+	R307NW	1.33	1	FLOW	184.	135.	110.
				TIME	4.50	5.30	5.30
HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	91.	68.	56.
				TIME	4.40	5.10	5.20
2 COMBINED AT							
+	307NE	1.97	1	FLOW	274.	203.	165.
				TIME	4.50	5.20	5.30
2 COMBINED AT							
+	.	7.74	1	FLOW	736.	577.	419.
				TIME	5.20	5.40	5.70
ROUTED TO							
+	V	7.74	1	FLOW	720.	559.	407.
				TIME	5.60	5.80	6.10
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	19.	7.	1.
				TIME	5.00	5.10	5.30
ROUTED TO							
+	R307SW	1.10	1	FLOW	19.	7.	1.
				TIME	5.60	6.10	8.10
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	212.	158.	128.
				TIME	4.50	5.20	5.30
2 COMBINED AT							
+	307SE	2.68	1	FLOW	212.	158.	128.
				TIME	4.50	5.20	5.30

2 COMBINED AT							
+	.	10.42	1	FLOW	902.	683.	495.
				TIME	5.60	5.80	6.00
ROUTED TO							
+	V	10.42	1	FLOW	890.	675.	491.
				TIME	5.80	6.00	6.20
HYDROGRAPH AT							
+	308W	0.81	1	FLOW	14.	6.	2.
				TIME	6.90	7.90	9.60
ROUTED TO							
+	R308W	0.81	1	FLOW	14.	6.	2.
				TIME	7.50	8.70	10.90
HYDROGRAPH AT							
+	308E	0.72	1	FLOW	97.	70.	56.
				TIME	4.40	4.70	5.30
2 COMBINED AT							
+	308E	1.53	1	FLOW	97.	70.	56.
				TIME	4.40	4.70	5.30
2 COMBINED AT							
+	.	11.95	1	FLOW	953.	726.	527.
				TIME	5.80	5.90	6.20
ROUTED TO							
+	R307/308	11.95	1	FLOW	953.	725.	527.
				TIME	5.80	6.00	6.30
HYDROGRAPH AT							
+	312W	0.77	1	FLOW	61.	44.	30.
				TIME	5.40	5.60	5.90
2 COMBINED AT							
+	312W	12.72	1	FLOW	1005.	763.	553.
				TIME	5.80	6.00	6.30
ROUTED TO							
+	R312W	12.72	1	FLOW	1003.	762.	552.
				TIME	5.90	6.10	6.40
HYDROGRAPH AT							
+	312E	0.70	1	FLOW	43.	29.	18.
				TIME	5.50	5.70	6.00
2 COMBINED AT							
+	312E	13.42	1	FLOW	1039.	787.	568.
				TIME	5.90	6.10	6.40
HYDROGRAPH AT							
+	306	5.07	1	FLOW	309.	243.	187.
				TIME	7.00	7.10	7.10
3 COMBINED AT							
+	.	83.02	1	FLOW	3163.	2590.	2105.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	FC3	83.02	1	FLOW	3162.	2590.	2104.
				TIME	7.70	7.70	7.70
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	3162.	2590.	2104.
				TIME	7.70	7.70	7.70
ROUTED TO							
+	FC6	83.02	1	FLOW	3162.	2589.	2104.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	FC7	83.02	1	FLOW	3161.	2589.	2103.
				TIME	7.80	7.80	7.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	3161.	2588.	2103.
				TIME	7.80	7.80	7.90
HYDROGRAPH AT							
+	302	12.11	1	FLOW	848.	681.	538.
				TIME	7.00	7.10	7.10
ROUTED TO							
+	303	12.11	1	FLOW	841.	675.	533.
				TIME	7.90	7.90	8.00
HYDROGRAPH AT							
+	303	10.22	1	FLOW	469.	368.	283.
				TIME	8.20	8.20	8.30
2 COMBINED AT							
+	.	22.33	1	FLOW	1306.	1040.	814.
				TIME	8.00	8.00	8.10
HYDROGRAPH AT							
+	304	2.90	1	FLOW	276.	223.	177.
				TIME	6.00	6.00	6.10

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 HYDROGRAPH AT
+                    305       3.30     1   FLOW          385.      314.      252.
                                            TIME         5.50      5.50      5.50

   2 COMBINED AT
+                      .       6.20     1   FLOW          647.      524.      419.
                                            TIME         5.60      5.70      5.70

 HYDROGRAPH AT
+                RRBRIDGE      0.00     1   FLOW            0.        0.        0.
                                            TIME         0.10      0.10      0.10

 HYDROGRAPH AT
+                DUMMY_AR      0.00     1   FLOW            0.        0.        0.
                                            TIME         4.50      4.50      5.30

   2 COMBINED AT
+                DUMMY_CO      0.00     1   FLOW            0.        0.        0.
                                            TIME         4.50      4.50      5.30

 ROUTED TO
+                RRCHANNL      0.00     1   FLOW            0.        0.        0.
                                            TIME         7.70      8.00      9.20

 HYDROGRAPH AT
+                    I-15      0.00     1   FLOW         1431.     1249.     1065.
                                            TIME         9.90      9.60      9.40

 HYDROGRAPH AT
+                DUMMY_AR      0.00     1   FLOW            0.        0.        0.
                                            TIME         4.50      4.50      5.30

   2 COMBINED AT
+                DUMMY_CO      0.00     1   FLOW         1431.     1249.     1065.
                                            TIME         9.90      9.60      9.40

   5 COMBINED AT
+                 ACHANNL    111.56     1   FLOW         5982.     4931.     4008.
                                            TIME         7.80      7.90      8.00

 ROUTED TO
+                AC1/AC2     111.56     1   FLOW         5980.     4931.     4007.
                                            TIME         7.80      7.90      8.00

 ROUTED TO
+                     AC3    111.56     1   FLOW         5980.     4930.     4007.
                                            TIME         7.90      7.90      8.10

 ROUTED TO
+                     AC4    111.56     1   FLOW         5979.     4930.     4007.
                                            TIME         7.90      7.90      8.10

   2 COMBINED AT
+                NCHANNL     172.20     1   FLOW         6304.     5211.     4246.
                                            TIME         7.90      8.00      8.10
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                            PEAK

                                  (MIN)      (CFS)      (MIN)      (IN)     (MIN)      (CFS)      (MIN)      (IN)

        FOR PLAN = 1  RATIO= 1.06
             NC1  MANE            0.33     357.72     594.13      0.08      6.00     357.72     594.00      0.08

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2741E+03 EXCESS=0.0000E+00 OUTFLOW=0.2740E+03 BASIN STORAGE=0.6701E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.95
             NC1  MANE            0.41     312.25     576.71      0.07      6.00     312.25     576.00      0.07

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2127E+03 EXCESS=0.0000E+00 OUTFLOW=0.2126E+03 BASIN STORAGE=0.5263E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.85
             NC1  MANE            0.46     266.37     564.91      0.05      6.00     266.36     564.00      0.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1613E+03 EXCESS=0.0000E+00 OUTFLOW=0.1612E+03 BASIN STORAGE=0.5041E-01 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 1.06
                V  MANE            1.40     357.72     596.55      0.08      6.00     357.71     594.00      0.08

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2740E+03 EXCESS=0.0000E+00 OUTFLOW=0.2736E+03 BASIN STORAGE=0.3853E+00 PERCENT ERROR=   0.0

        FOR PLAN = 1  RATIO= 0.95
                V  MANE            1.37     312.24     578.89      0.07      6.00     312.21     582.00      0.07

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2127E+03 EXCESS=0.0000E+00 OUTFLOW=0.2124E+03 BASIN STORAGE=0.3004E+00 PERCENT ERROR=   0.0
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FOR PLAN = 1 RATIO= 0.85

V	MANE	1.53	266.36	568.23	0.05	6.00	266.35	570.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1612E+03 EXCESS=0.0000E+00 OUTFLOW=0.1610E+03 BASIN STORAGE=0.2885E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	0.86	357.71	595.75	0.08	6.00	357.69	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2736E+03 EXCESS=0.0000E+00 OUTFLOW=0.2734E+03 BASIN STORAGE=0.2111E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	0.90	312.21	582.95	0.07	6.00	312.20	582.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2123E+03 EXCESS=0.0000E+00 OUTFLOW=0.2121E+03 BASIN STORAGE=0.1608E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	0.93	266.35	572.20	0.05	6.00	266.33	570.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1609E+03 EXCESS=0.0000E+00 OUTFLOW=0.1607E+03 BASIN STORAGE=0.1541E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	2.63	357.68	600.76	0.08	6.00	357.68	600.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2733E+03 EXCESS=0.0000E+00 OUTFLOW=0.2726E+03 BASIN STORAGE=0.7072E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	2.62	312.18	585.86	0.07	6.00	312.18	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2121E+03 EXCESS=0.0000E+00 OUTFLOW=0.2116E+03 BASIN STORAGE=0.5236E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	2.73	266.33	575.35	0.05	6.00	266.33	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1607E+03 EXCESS=0.0000E+00 OUTFLOW=0.1602E+03 BASIN STORAGE=0.5005E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	0.74	357.68	601.51	0.08	6.00	357.65	600.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2725E+03 EXCESS=0.0000E+00 OUTFLOW=0.2723E+03 BASIN STORAGE=0.2039E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	0.82	312.17	589.56	0.07	6.00	312.16	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2115E+03 EXCESS=0.0000E+00 OUTFLOW=0.2114E+03 BASIN STORAGE=0.1475E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	0.90	266.32	577.73	0.05	6.00	266.30	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1601E+03 EXCESS=0.0000E+00 OUTFLOW=0.1600E+03 BASIN STORAGE=0.1410E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC5	MANE	0.46	357.65	601.29	0.08	6.00	357.64	606.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2723E+03 EXCESS=0.0000E+00 OUTFLOW=0.2722E+03 BASIN STORAGE=0.1144E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC5	MANE	0.51	312.16	588.77	0.07	6.00	312.15	588.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2114E+03 EXCESS=0.0000E+00 OUTFLOW=0.2113E+03 BASIN STORAGE=0.8214E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC5	MANE	0.46	266.30	577.01	0.05	6.00	266.28	576.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1600E+03 EXCESS=0.0000E+00 OUTFLOW=0.1599E+03 BASIN STORAGE=0.7842E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.62	508.60	234.06	0.80	6.00	508.41	234.00	0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7790E+02 EXCESS=0.0000E+00 OUTFLOW=0.7809E+02 BASIN STORAGE=0.7355E-02 PERCENT ERROR= -0.2

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.92    415.70    234.56      0.66      6.00    414.18    234.00        0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6374E+02 EXCESS=0.0000E+00 OUTFLOW=0.6387E+02 BASIN STORAGE=0.6331E-02 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.28    335.03    238.87      0.53      6.00    333.47    240.00        0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5149E+02 EXCESS=0.0000E+00 OUTFLOW=0.5164E+02 BASIN STORAGE=0.7890E-02 PERCENT ERROR=  -0.3

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          3.54    506.53    242.59      0.80      6.00    502.45    246.00        0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7807E+02 EXCESS=0.0000E+00 OUTFLOW=0.7810E+02 BASIN STORAGE=0.7938E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.92    413.18    243.94      0.66      6.00    411.93    246.00        0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6386E+02 EXCESS=0.0000E+00 OUTFLOW=0.6392E+02 BASIN STORAGE=0.7131E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.12    332.98    247.47      0.53      6.00    332.55    246.00        0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5164E+02 EXCESS=0.0000E+00 OUTFLOW=0.5165E+02 BASIN STORAGE=0.6992E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.70    746.08    247.09      0.81      6.00    746.06    246.00        0.81

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1190E+03 EXCESS=0.0000E+00 OUTFLOW=0.1190E+03 BASIN STORAGE=0.1142E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.79    613.45    248.25      0.67      6.00    611.31    246.00        0.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9774E+02 EXCESS=0.0000E+00 OUTFLOW=0.9777E+02 BASIN STORAGE=0.1170E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          2.02    498.52    249.95      0.54      6.00    493.90    252.00        0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7934E+02 EXCESS=0.0000E+00 OUTFLOW=0.7934E+02 BASIN STORAGE=0.1080E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          AP_TO_VE  MANE          1.81     64.22    621.50      0.22      6.00     64.22    618.00        0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9192E+02 EXCESS=0.0000E+00 OUTFLOW=0.9168E+02 BASIN STORAGE=0.3005E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          AP_TO_VE  MANE          1.81     61.88    609.88      0.21      6.00     61.88    612.00        0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8841E+02 EXCESS=0.0000E+00 OUTFLOW=0.8812E+02 BASIN STORAGE=0.2924E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          AP_TO_VE  MANE          1.81     59.60    596.97      0.20      6.00     59.59    600.00        0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8496E+02 EXCESS=0.0000E+00 OUTFLOW=0.8466E+02 BASIN STORAGE=0.2836E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          1.34     64.22    622.14      0.22      6.00     64.22    624.00        0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9154E+02 EXCESS=0.0000E+00 OUTFLOW=0.9130E+02 BASIN STORAGE=0.2921E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          1.34     61.88    613.40      0.21      6.00     61.88    612.00        0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8805E+02 EXCESS=0.0000E+00 OUTFLOW=0.8785E+02 BASIN STORAGE=0.2859E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          1.30     59.59    602.46      0.20      6.00     59.59    600.00        0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8461E+02 EXCESS=0.0000E+00 OUTFLOW=0.8435E+02 BASIN STORAGE=0.2844E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
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          BUFFALO_  MANE          4.06    250.53    319.15      0.29      6.00    250.46    324.00         0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1409E+03 EXCESS=0.0000E+00 OUTFLOW=0.1397E+03 BASIN STORAGE=0.1598E+01 PERCENT ERROR=  -0.3

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          4.39    216.38    327.57      0.27      6.00    216.26    324.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1288E+03 EXCESS=0.0000E+00 OUTFLOW=0.1278E+03 BASIN STORAGE=0.1552E+01 PERCENT ERROR=  -0.4

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          4.60    186.12    331.59      0.24      6.00    186.11    330.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1179E+03 EXCESS=0.0000E+00 OUTFLOW=0.1168E+03 BASIN STORAGE=0.1504E+01 PERCENT ERROR=  -0.3

          FOR PLAN = 1  RATIO= 1.06
                 V  MANE          1.32    718.64    331.91      0.69      6.00    718.57    330.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1809E+03 EXCESS=0.0000E+00 OUTFLOW=0.1809E+03 BASIN STORAGE=0.2554E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                 V  MANE          1.45    589.75    332.49      0.56      6.00    589.13    330.00         0.56

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1467E+03 EXCESS=0.0000E+00 OUTFLOW=0.1468E+03 BASIN STORAGE=0.2545E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                 V  MANE          1.62    476.87    334.21      0.45      6.00    476.53    336.00         0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1173E+03 EXCESS=0.0000E+00 OUTFLOW=0.1173E+03 BASIN STORAGE=0.3538E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
           R.GSOUT  MANE          1.02    389.05    475.79      0.42      6.00    389.04    474.00         0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4288E+03 EXCESS=0.0000E+00 OUTFLOW=0.4283E+03 BASIN STORAGE=0.5425E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
           R.GSOUT  MANE          1.01    365.15    468.87      0.36      6.00    365.15    468.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3719E+03 EXCESS=0.0000E+00 OUTFLOW=0.3716E+03 BASIN STORAGE=0.4367E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
           R.GSOUT  MANE          1.02    345.26    458.78      0.31      6.00    345.25    462.00         0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3180E+03 EXCESS=0.0000E+00 OUTFLOW=0.3176E+03 BASIN STORAGE=0.3639E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                 V  MANE          3.40     73.46    353.24      0.16      6.00     73.44    354.00         0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1805E+02 EXCESS=0.0000E+00 OUTFLOW=0.1806E+02 BASIN STORAGE=0.1035E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                 V  MANE          3.68     55.16    355.14      0.12      6.00     55.10    360.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1339E+02 EXCESS=0.0000E+00 OUTFLOW=0.1339E+02 BASIN STORAGE=0.7761E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                 V  MANE          4.17     40.21    361.49      0.08      6.00     40.16    360.00         0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9613E+01 EXCESS=0.0000E+00 OUTFLOW=0.9616E+01 BASIN STORAGE=0.9280E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                 V  MANE          3.89     73.44    361.78      0.16      6.00     73.33    360.00         0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1806E+02 EXCESS=0.0000E+00 OUTFLOW=0.1806E+02 BASIN STORAGE=0.1173E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                 V  MANE          4.20     55.09    368.56      0.12      6.00     55.08    366.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1339E+02 EXCESS=0.0000E+00 OUTFLOW=0.1339E+02 BASIN STORAGE=0.1071E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                 V  MANE          4.64     40.13    371.51      0.08      6.00     40.12    372.00         0.08
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9616E+01 EXCESS=0.0000E+00 OUTFLOW=0.9614E+01 BASIN STORAGE=0.1040E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	5.43	46.63	363.90	0.27	6.00	46.54	366.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1099E+02 EXCESS=0.0000E+00 OUTFLOW=0.1099E+02 BASIN STORAGE=0.8857E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	5.93	34.59	368.67	0.20	6.00	34.51	372.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8037E+01 EXCESS=0.0000E+00 OUTFLOW=0.8040E+01 BASIN STORAGE=0.8187E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	6.00	24.87	375.68	0.14	6.00	24.82	378.00	0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5670E+01 EXCESS=0.0000E+00 OUTFLOW=0.5674E+01 BASIN STORAGE=0.9979E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

R.G-UPS.	MANE	0.76	310.12	943.26	0.22	6.00	310.12	942.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3762E+03 EXCESS=0.0000E+00 OUTFLOW=0.3755E+03 BASIN STORAGE=0.5936E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.G-UPS.	MANE	0.76	291.84	823.60	0.21	6.00	291.84	822.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3514E+03 EXCESS=0.0000E+00 OUTFLOW=0.3508E+03 BASIN STORAGE=0.5619E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.G-UPS.	MANE	0.75	275.36	726.50	0.19	6.00	275.36	726.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3275E+03 EXCESS=0.0000E+00 OUTFLOW=0.3270E+03 BASIN STORAGE=0.5328E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.69	310.12	945.54	0.22	6.00	310.11	948.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3755E+03 EXCESS=0.0000E+00 OUTFLOW=0.3739E+03 BASIN STORAGE=0.2105E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.70	291.84	826.71	0.21	6.00	291.84	828.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3507E+03 EXCESS=0.0000E+00 OUTFLOW=0.3493E+03 BASIN STORAGE=0.2021E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.67	275.36	729.08	0.19	6.00	275.36	726.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3269E+03 EXCESS=0.0000E+00 OUTFLOW=0.3254E+03 BASIN STORAGE=0.1961E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.72	512.15	422.83	0.26	6.00	512.01	426.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4480E+03 EXCESS=0.0000E+00 OUTFLOW=0.4459E+03 BASIN STORAGE=0.2827E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.82	447.87	428.86	0.24	6.00	447.81	426.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4061E+03 EXCESS=0.0000E+00 OUTFLOW=0.4040E+03 BASIN STORAGE=0.2676E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.95	394.04	430.32	0.22	6.00	393.98	432.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3680E+03 EXCESS=0.0000E+00 OUTFLOW=0.3660E+03 BASIN STORAGE=0.2539E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	0.95	511.98	427.86	0.26	6.00	511.94	426.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4452E+03 EXCESS=0.0000E+00 OUTFLOW=0.4437E+03 BASIN STORAGE=0.1488E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.00	447.80	428.11	0.24	6.00	447.61	432.00	0.24

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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4034E+03 EXCESS=0.0000E+00 OUTFLOW=0.4023E+03 BASIN STORAGE=0.1410E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.08    393.93    434.50      0.21      6.00    393.83    432.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3655E+03 EXCESS=0.0000E+00 OUTFLOW=0.3644E+03 BASIN STORAGE=0.1338E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          0.88    511.92    427.58      0.26      6.00    511.76    426.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4437E+03 EXCESS=0.0000E+00 OUTFLOW=0.4422E+03 BASIN STORAGE=0.1492E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.07    447.60    432.20      0.24      6.00    447.60    432.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4020E+03 EXCESS=0.0000E+00 OUTFLOW=0.4010E+03 BASIN STORAGE=0.1411E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.03    393.80    434.77      0.21      6.00    393.69    438.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3642E+03 EXCESS=0.0000E+00 OUTFLOW=0.3632E+03 BASIN STORAGE=0.1340E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.17   1574.81    464.11      0.38      6.00   1574.58    462.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9060E+03 EXCESS=0.0000E+00 OUTFLOW=0.9036E+03 BASIN STORAGE=0.2863E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.19   1305.19    465.20      0.33      6.00   1304.89    468.00         0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7744E+03 EXCESS=0.0000E+00 OUTFLOW=0.7723E+03 BASIN STORAGE=0.2527E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.31   1075.33    469.77      0.28      6.00   1075.05    468.00         0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6597E+03 EXCESS=0.0000E+00 OUTFLOW=0.6576E+03 BASIN STORAGE=0.2552E+01 PERCENT ERROR= -0.1

          FOR PLAN = 1  RATIO= 1.06
             SNIC  MANE          0.71   2558.27    487.66      0.41      6.00   2557.81    486.00         0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1401E+04 EXCESS=0.0000E+00 OUTFLOW=0.1399E+04 BASIN STORAGE=0.1679E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
             SNIC  MANE          0.80   2086.07    492.37      0.34      6.00   2086.07    492.00         0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1165E+04 EXCESS=0.0000E+00 OUTFLOW=0.1163E+04 BASIN STORAGE=0.1571E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.85
             SNIC  MANE          0.89   1684.66    494.09      0.28      6.00   1684.26    492.00         0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9616E+03 EXCESS=0.0000E+00 OUTFLOW=0.9600E+03 BASIN STORAGE=0.1473E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 1.06
              LBC  MANE          1.18   2557.76    488.36      0.41      6.00   2556.79    492.00         0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1399E+04 EXCESS=0.0000E+00 OUTFLOW=0.1396E+04 BASIN STORAGE=0.3356E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.95
              LBC  MANE          1.36   2085.89    494.72      0.34      6.00   2085.60    492.00         0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1163E+04 EXCESS=0.0000E+00 OUTFLOW=0.1160E+04 BASIN STORAGE=0.3156E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 0.85
              LBC  MANE          1.32   1684.24    494.60      0.28      6.00   1683.91    498.00         0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9600E+03 EXCESS=0.0000E+00 OUTFLOW=0.9569E+03 BASIN STORAGE=0.2969E+01 PERCENT ERROR=  0.0

          FOR PLAN = 1  RATIO= 1.06
             310W  MANE          5.47    101.24    272.83      0.48      6.00    100.62    270.00         0.48
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2108E+02 OUTFLOW=0.2063E+02 BASIN STORAGE=0.1656E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

310W	MANE	6.00	117.82	263.32	0.54	6.00	117.70	264.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2362E+02 OUTFLOW=0.2314E+02 BASIN STORAGE=0.1589E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.95

310W	MANE	5.63	87.27	279.19	0.44	6.00	86.74	276.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1902E+02 OUTFLOW=0.1859E+02 BASIN STORAGE=0.1611E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.85

310W	MANE	6.00	67.96	312.95	0.34	6.00	67.90	312.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1509E+02 OUTFLOW=0.1470E+02 BASIN STORAGE=0.1608E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

R310W	MANE	6.00	116.54	289.82	0.54	6.00	116.50	288.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2314E+02 EXCESS=0.0000E+00 OUTFLOW=0.2313E+02 BASIN STORAGE=0.1834E+00 PERCENT ERROR= -0.8

FOR PLAN = 1 RATIO= 0.95

R310W	MANE	6.00	86.69	300.70	0.44	6.00	86.32	306.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1858E+02 EXCESS=0.0000E+00 OUTFLOW=0.1875E+02 BASIN STORAGE=0.1942E+00 PERCENT ERROR= -2.0

FOR PLAN = 1 RATIO= 0.85

R310W	MANE	6.00	67.83	337.64	0.34	6.00	67.75	342.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1469E+02 EXCESS=0.0000E+00 OUTFLOW=0.1456E+02 BASIN STORAGE=0.1868E+00 PERCENT ERROR= -0.4

FOR PLAN = 1 RATIO= 1.06

310E	MANE	6.00	118.08	311.88	0.39	6.00	118.08	312.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2605E+02 OUTFLOW=0.2548E+02 BASIN STORAGE=0.2051E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

310E	MANE	5.81	134.46	267.83	0.44	6.00	134.45	270.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2953E+02 OUTFLOW=0.2896E+02 BASIN STORAGE=0.1997E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.95

310E	MANE	6.00	106.69	313.63	0.34	6.00	106.39	318.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2325E+02 OUTFLOW=0.2272E+02 BASIN STORAGE=0.1924E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.85

310E	MANE	5.74	83.30	319.26	0.26	6.00	83.26	324.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1796E+02 OUTFLOW=0.1749E+02 BASIN STORAGE=0.2016E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	3.46	242.93	296.71	0.48	6.00	241.76	294.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5204E+02 EXCESS=0.0000E+00 OUTFLOW=0.5188E+02 BASIN STORAGE=0.1411E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	3.92	191.06	317.37	0.38	6.00	191.01	318.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4146E+02 EXCESS=0.0000E+00 OUTFLOW=0.4135E+02 BASIN STORAGE=0.1375E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	4.17	149.43	334.95	0.29	6.00	149.31	336.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3204E+02 EXCESS=0.0000E+00 OUTFLOW=0.3186E+02 BASIN STORAGE=0.1393E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	4.58	91.47	314.37	0.38	6.00	91.41	312.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1979E+02 OUTFLOW=0.1941E+02 BASIN STORAGE=0.1185E+00 PERCENT ERROR= 1.3

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          FOR PLAN = 1  RATIO= 1.06
              311W  MANE          4.27    108.03    261.15      0.43      6.00    107.75    264.00         0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2247E+02 OUTFLOW=0.2206E+02 BASIN STORAGE=0.1217E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.95
              311W  MANE          4.73     83.10    312.87      0.34      6.00     82.96    312.00         0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1764E+02 OUTFLOW=0.1726E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR=   1.5

          FOR PLAN = 1  RATIO= 0.85
              311W  MANE          5.25     64.92    316.63      0.26      6.00     64.87    318.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1359E+02 OUTFLOW=0.1324E+02 BASIN STORAGE=0.1227E+00 PERCENT ERROR=   1.6

          FOR PLAN = 1  RATIO= 1.06
              R311W  MANE         4.27    339.22    309.36      0.46      6.00    338.90    306.00         0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7393E+02 EXCESS=0.0000E+00 OUTFLOW=0.7365E+02 BASIN STORAGE=0.2477E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              R311W  MANE         4.74    273.32    323.31      0.36      6.00    273.28    324.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5857E+02 EXCESS=0.0000E+00 OUTFLOW=0.5825E+02 BASIN STORAGE=0.2529E+00 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.85
              R311W  MANE         5.19    209.18    344.47      0.28      6.00    208.62    342.00         0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4509E+02 EXCESS=0.0000E+00 OUTFLOW=0.4481E+02 BASIN STORAGE=0.2447E+00 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 1.06
              309W  MANE          5.89      9.54    443.99      0.07      6.00      9.54    444.00         0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3135E+01 OUTFLOW=0.2869E+01 BASIN STORAGE=0.1679E+00 PERCENT ERROR=   3.1

          FOR PLAN = 1  RATIO= 1.06
              309W  MANE          6.00     14.00    416.91      0.09      6.00     13.96    414.00         0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4044E+01 OUTFLOW=0.3776E+01 BASIN STORAGE=0.1638E+00 PERCENT ERROR=   2.6

          FOR PLAN = 1  RATIO= 0.95
              309W  MANE          6.00      6.50    475.09      0.05      6.00      6.50    474.00         0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2456E+01 OUTFLOW=0.2202E+01 BASIN STORAGE=0.1618E+00 PERCENT ERROR=   3.7

          FOR PLAN = 1  RATIO= 0.85
              309W  MANE          6.00      2.42    574.14      0.03      6.00      2.42    576.00         0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1325E+01 OUTFLOW=0.1082E+01 BASIN STORAGE=0.1620E+00 PERCENT ERROR=   6.1

          FOR PLAN = 1  RATIO= 1.06
              R309W  MANE         6.00     13.88    537.35      0.10      6.00     13.85    534.00         0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3764E+01 EXCESS=0.0000E+00 OUTFLOW=0.4175E+01 BASIN STORAGE=0.5567E+00 PERCENT ERROR= -25.7

          FOR PLAN = 1  RATIO= 0.95
              R309W  MANE         6.00      6.47    640.46      0.05      6.00      6.47    636.00         0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2194E+01 EXCESS=0.0000E+00 OUTFLOW=0.2249E+01 BASIN STORAGE=0.5571E+00 PERCENT ERROR= -27.9

          FOR PLAN = 1  RATIO= 0.85
              R309W  MANE         6.00      2.41    821.76      0.02      6.00      2.41    822.00         0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1080E+01 EXCESS=0.0000E+00 OUTFLOW=0.8650E+00 BASIN STORAGE=0.5530E+00 PERCENT ERROR= -31.3

          FOR PLAN = 1  RATIO= 1.06
              309E  MANE          6.00    100.79    330.66      0.37      6.00    100.79    330.00         0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2413E+02 OUTFLOW=0.2339E+02 BASIN STORAGE=0.4085E+00 PERCENT ERROR=   1.4
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FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	116.00	322.39	0.42	6.00	115.75	324.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2737E+02 OUTFLOW=0.2657E+02 BASIN STORAGE=0.4342E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	88.18	333.71	0.33	6.00	88.01	336.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2153E+02 OUTFLOW=0.2081E+02 BASIN STORAGE=0.4037E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	64.12	354.31	0.25	6.00	64.09	354.00	0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1663E+02 OUTFLOW=0.1594E+02 BASIN STORAGE=0.4230E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

FCP1	MANE	0.22	497.00	312.35	0.36	6.00	496.75	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.4300E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP1	MANE	0.23	383.22	324.57	0.28	6.00	382.82	324.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8578E+02 BASIN STORAGE=0.4258E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP1	MANE	0.21	279.45	342.57	0.21	6.00	279.42	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6443E+02 BASIN STORAGE=0.4180E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCP2	MANE	0.31	496.68	312.56	0.36	6.00	496.09	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.7489E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP2	MANE	0.31	382.77	324.82	0.28	6.00	381.87	324.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8578E+02 BASIN STORAGE=0.7415E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP2	MANE	0.43	279.35	348.09	0.21	6.00	279.34	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6443E+02 BASIN STORAGE=0.7270E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC1	MANE	0.32	496.01	312.65	0.36	6.00	495.61	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1736E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC1	MANE	0.23	381.86	324.62	0.28	6.00	381.71	330.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1724E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC1	MANE	0.36	279.21	348.16	0.21	6.00	279.17	348.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6444E+02 EXCESS=0.0000E+00 OUTFLOW=0.6442E+02 BASIN STORAGE=0.1701E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC1	MANE	0.22	495.59	312.46	0.36	6.00	495.03	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1874E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC1	MANE	0.24	381.68	330.21	0.28	6.00	381.67	330.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8579E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1863E-01 PERCENT ERROR= 0.0

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          FOR PLAN = 1  RATIO= 0.85
               FC1  MANE          0.22    279.11    348.34      0.21      6.00    278.94    348.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6443E+02 EXCESS=0.0000E+00 OUTFLOW=0.6441E+02 BASIN STORAGE=0.1835E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          FCBC2/FC  MANE          0.30    495.00    312.71      0.36      6.00    494.63    318.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1109E+03 EXCESS=0.0000E+00 OUTFLOW=0.1109E+03 BASIN STORAGE=0.1793E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          FCBC2/FC  MANE          0.21    381.62    330.30      0.28      6.00    381.59    330.00         0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8578E+02 EXCESS=0.0000E+00 OUTFLOW=0.8577E+02 BASIN STORAGE=0.1780E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          FCBC2/FC  MANE          0.37    278.81    348.40      0.21      6.00    278.65    348.00         0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6442E+02 EXCESS=0.0000E+00 OUTFLOW=0.6440E+02 BASIN STORAGE=0.1755E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          4.84    154.69    268.39      0.46      6.00    154.52    270.00         0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3324E+02 OUTFLOW=0.3254E+02 BASIN STORAGE=0.2234E+00 PERCENT ERROR=   1.4

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          4.39    184.10    261.95      0.52      6.00    184.01    264.00         0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3734E+02 OUTFLOW=0.3663E+02 BASIN STORAGE=0.2245E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.95
             307NW  MANE          4.98    135.29    309.10      0.41      6.00    134.96    312.00         0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2992E+02 OUTFLOW=0.2925E+02 BASIN STORAGE=0.2254E+00 PERCENT ERROR=   1.5

          FOR PLAN = 1  RATIO= 0.85
             307NW  MANE          5.46    110.14    311.02      0.32      6.00    110.13    312.00         0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2360E+02 OUTFLOW=0.2298E+02 BASIN STORAGE=0.2250E+00 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 1.06
            R307NW  MANE          3.09    183.95    270.21      0.52      6.00    183.77    270.00         0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3664E+02 EXCESS=0.0000E+00 OUTFLOW=0.3657E+02 BASIN STORAGE=0.7404E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
            R307NW  MANE          3.61    134.93    315.66      0.41      6.00    134.87    318.00         0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2926E+02 EXCESS=0.0000E+00 OUTFLOW=0.2916E+02 BASIN STORAGE=0.7173E-01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.85
            R307NW  MANE          3.80    109.90    321.96      0.32      6.00    109.79    318.00         0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2298E+02 EXCESS=0.0000E+00 OUTFLOW=0.2288E+02 BASIN STORAGE=0.7174E-01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          4.01     77.56    269.67      0.48      6.00     77.55    270.00         0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1687E+02 OUTFLOW=0.1652E+02 BASIN STORAGE=0.1108E+00 PERCENT ERROR=   1.4

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          3.61     91.51    263.04      0.54      6.00     91.43    264.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1890E+02 OUTFLOW=0.1855E+02 BASIN STORAGE=0.1088E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.95
             307NE  MANE          4.08     68.33    308.25      0.44      6.00     68.22    306.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+02 OUTFLOW=0.1490E+02 BASIN STORAGE=0.1118E+00 PERCENT ERROR=   1.4

          FOR PLAN = 1  RATIO= 0.85
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307NE	MANE	4.44	55.96	312.68	0.34	6.00	55.93	312.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1207E+02 OUTFLOW=0.1177E+02 BASIN STORAGE=0.1148E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

R307SW	MANE	5.92	18.83	333.83	0.03	6.00	18.73	336.00	0.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1360E+01 EXCESS=0.0000E+00 OUTFLOW=0.1601E+01 BASIN STORAGE=0.1008E-01 PERCENT ERROR= -18.5

FOR PLAN = 1 RATIO= 0.95

R307SW	MANE	5.25	6.92	360.39	0.01	6.00	6.84	366.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4690E+00 EXCESS=0.0000E+00 OUTFLOW=0.7175E+00 BASIN STORAGE=0.1034E-01 PERCENT ERROR= -55.2

FOR PLAN = 1 RATIO= 0.85

R307SW	MANE	5.03	0.56	481.28	0.00	6.00	0.56	486.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5576E-01 EXCESS=0.0000E+00 OUTFLOW=0.1211E+00 BASIN STORAGE=0.9268E-02 PERCENT ERROR=-133.8

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	5.17	178.98	274.32	0.45	6.00	178.46	276.00	0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3895E+02 OUTFLOW=0.3809E+02 BASIN STORAGE=0.2914E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.83	213.72	267.48	0.51	6.00	212.07	270.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4379E+02 OUTFLOW=0.4291E+02 BASIN STORAGE=0.2875E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

307SE	MANE	5.34	158.10	312.95	0.41	6.00	158.05	312.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3504E+02 OUTFLOW=0.3419E+02 BASIN STORAGE=0.2880E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 0.85

307SE	MANE	5.81	127.92	313.79	0.32	6.00	127.74	318.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2759E+02 OUTFLOW=0.2684E+02 BASIN STORAGE=0.2834E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	9.29	445.08	0.07	6.00	9.28	444.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3118E+01 OUTFLOW=0.2856E+01 BASIN STORAGE=0.1609E+00 PERCENT ERROR= 3.2

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	13.63	418.33	0.09	6.00	13.60	414.00	0.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4025E+01 OUTFLOW=0.3743E+01 BASIN STORAGE=0.1652E+00 PERCENT ERROR= 2.9

FOR PLAN = 1 RATIO= 0.95

308W	MANE	6.00	6.32	476.59	0.05	6.00	6.31	474.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2441E+01 OUTFLOW=0.2188E+01 BASIN STORAGE=0.1614E+00 PERCENT ERROR= 3.8

FOR PLAN = 1 RATIO= 0.85

308W	MANE	6.00	2.33	575.85	0.02	6.00	2.33	576.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1315E+01 OUTFLOW=0.1069E+01 BASIN STORAGE=0.1623E+00 PERCENT ERROR= 6.4

FOR PLAN = 1 RATIO= 1.06

R308W	MANE	5.76	13.57	452.28	0.08	6.00	13.54	450.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3739E+01 EXCESS=0.0000E+00 OUTFLOW=0.3614E+01 BASIN STORAGE=0.1217E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R308W	MANE	6.00	6.31	522.70	0.05	6.00	6.30	522.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2182E+01 EXCESS=0.0000E+00 OUTFLOW=0.2058E+01 BASIN STORAGE=0.1238E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R308W	MANE	6.00	2.33	653.76	0.02	6.00	2.33	654.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1068E+01 EXCESS=0.0000E+00 OUTFLOW=0.9388E+00 BASIN STORAGE=0.1263E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 1.06

308E	MANE	5.83	82.10	271.97	0.44	6.00	81.39	270.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1717E+02 OUTFLOW=0.1681E+02 BASIN STORAGE=0.1175E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

308E	MANE	5.44	98.07	265.34	0.49	6.00	97.31	264.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1933E+02 OUTFLOW=0.1895E+02 BASIN STORAGE=0.1268E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.95

308E	MANE	6.00	70.42	278.30	0.39	6.00	70.01	282.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1542E+02 OUTFLOW=0.1507E+02 BASIN STORAGE=0.1176E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

308E	MANE	5.24	56.49	316.21	0.31	6.00	56.35	318.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1209E+02 OUTFLOW=0.1178E+02 BASIN STORAGE=0.1194E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

R307/308	MANE	2.36	952.62	349.62	0.36	6.00	952.51	348.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2329E+03 EXCESS=0.0000E+00 OUTFLOW=0.2323E+03 BASIN STORAGE=0.4697E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R307/308	MANE	2.58	725.28	359.61	0.28	6.00	725.09	360.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1816E+03 EXCESS=0.0000E+00 OUTFLOW=0.1810E+03 BASIN STORAGE=0.4694E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R307/308	MANE	2.88	526.75	377.70	0.22	6.00	526.54	378.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1385E+03 EXCESS=0.0000E+00 OUTFLOW=0.1379E+03 BASIN STORAGE=0.4618E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.15	51.64	330.62	0.25	6.00	51.61	330.00	0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1077E+02 OUTFLOW=0.1042E+02 BASIN STORAGE=0.1469E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 1.06

312W	MANE	6.00	60.65	322.51	0.30	6.00	60.52	324.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1251E+02 OUTFLOW=0.1215E+02 BASIN STORAGE=0.1352E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

312W	MANE	5.54	43.89	336.41	0.22	6.00	43.87	336.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9394E+01 OUTFLOW=0.9058E+01 BASIN STORAGE=0.1423E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.85

312W	MANE	6.00	29.74	351.45	0.16	6.00	29.68	354.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6851E+01 OUTFLOW=0.6565E+01 BASIN STORAGE=0.1391E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 1.06

R312W	MANE	2.34	1003.70	353.42	0.36	6.00	1003.03	354.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2444E+03 EXCESS=0.0000E+00 OUTFLOW=0.2437E+03 BASIN STORAGE=0.5129E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R312W	MANE	2.56	762.62	364.40	0.28	6.00	761.71	366.00	0.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1901E+03 EXCESS=0.0000E+00 OUTFLOW=0.1895E+03 BASIN STORAGE=0.5009E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	2.97	552.58	383.56	0.21	6.00	552.21	384.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+03 EXCESS=0.0000E+00 OUTFLOW=0.1438E+03 BASIN STORAGE=0.5021E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

312E	MANE	6.00	34.67	337.10	0.19	6.00	34.66	336.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7394E+01 OUTFLOW=0.7157E+01 BASIN STORAGE=0.1026E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 1.06

312E	MANE	5.57	42.51	329.92	0.23	6.00	42.50	330.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8744E+01 OUTFLOW=0.8490E+01 BASIN STORAGE=0.9853E-01 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

312E	MANE	5.20	28.70	342.65	0.16	6.00	28.70	342.00	0.16

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6335E+01 OUTFLOW=0.6111E+01 BASIN STORAGE=0.1047E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 0.85

312E	MANE	6.00	17.84	360.89	0.11	6.00	17.82	360.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4417E+01 OUTFLOW=0.4219E+01 BASIN STORAGE=0.9429E-01 PERCENT ERROR= 2.3

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.31	3162.70	456.62	0.40	6.00	3162.44	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1764E+04 EXCESS=0.0000E+00 OUTFLOW=0.1763E+04 BASIN STORAGE=0.7455E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.34	2590.05	462.56	0.33	6.00	2589.98	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1446E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.6974E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.47	2104.77	463.08	0.27	6.00	2104.48	462.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1175E+04 EXCESS=0.0000E+00 OUTFLOW=0.1174E+04 BASIN STORAGE=0.6529E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.25	3162.42	462.19	0.40	6.00	3162.41	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1763E+04 EXCESS=0.0000E+00 OUTFLOW=0.1762E+04 BASIN STORAGE=0.5867E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.25	2589.94	462.27	0.33	6.00	2589.88	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1445E+04 EXCESS=0.0000E+00 OUTFLOW=0.1445E+04 BASIN STORAGE=0.5507E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.29	2104.46	462.70	0.27	6.00	2104.20	462.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1174E+04 EXCESS=0.0000E+00 OUTFLOW=0.1174E+04 BASIN STORAGE=0.5174E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	1.86	3162.19	463.95	0.40	6.00	3161.95	462.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1763E+04 EXCESS=0.0000E+00 OUTFLOW=0.1757E+04 BASIN STORAGE=0.4756E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	1.95	2589.54	464.75	0.33	6.00	2588.81	462.00	0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1445E+04 EXCESS=0.0000E+00 OUTFLOW=0.1440E+04 BASIN STORAGE=0.4458E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	2.04	2104.19	466.75	0.26	6.00	2104.16	468.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1174E+04 EXCESS=0.0000E+00 OUTFLOW=0.1170E+04 BASIN STORAGE=0.4176E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	0.91	3161.88	463.80	0.40	6.00	3160.64	468.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1757E+04 EXCESS=0.0000E+00 OUTFLOW=0.1755E+04 BASIN STORAGE=0.2399E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	1.01	2588.80	464.88	0.32	6.00	2588.78	468.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1440E+04 EXCESS=0.0000E+00 OUTFLOW=0.1437E+04 BASIN STORAGE=0.2253E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	1.08	2104.05	470.41	0.26	6.00	2103.35	468.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1169E+04 EXCESS=0.0000E+00 OUTFLOW=0.1167E+04 BASIN STORAGE=0.2114E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC4/FC	MANE	1.23	3160.63	467.96	0.40	6.00	3160.63	468.00	0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1754E+04 EXCESS=0.0000E+00 OUTFLOW=0.1752E+04 BASIN STORAGE=0.3279E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC4/FC	MANE	1.30	2588.67	470.44	0.32	6.00	2588.24	468.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1437E+04 EXCESS=0.0000E+00 OUTFLOW=0.1435E+04 BASIN STORAGE=0.3077E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC4/FC	MANE	1.39	2103.32	471.81	0.26	6.00	2103.27	474.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1167E+04 EXCESS=0.0000E+00 OUTFLOW=0.1164E+04 BASIN STORAGE=0.2890E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

RRCHANNL	MANE	5.97	0.16	463.63	0.87	6.00	0.16	462.00	0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95

RRCHANNL	MANE	5.97	0.12	484.09	0.71	6.00	0.12	486.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85

RRCHANNL	MANE	6.00	0.09	550.79	0.57	6.00	0.09	552.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06

AC1/AC2	MANE	0.64	5981.58	469.65	0.60	6.00	5980.28	468.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3585E+04 EXCESS=0.0000E+00 OUTFLOW=0.3582E+04 BASIN STORAGE=0.2871E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC1/AC2	MANE	0.72	4930.90	475.06	0.48	6.00	4930.72	474.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2871E+04 EXCESS=0.0000E+00 OUTFLOW=0.2869E+04 BASIN STORAGE=0.2585E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC1/AC2	MANE	0.75	4008.34	481.77	0.38	6.00	4007.30	480.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2266E+04 EXCESS=0.0000E+00 OUTFLOW=0.2264E+04 BASIN STORAGE=0.2435E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC3	MANE	0.54	5980.20	469.33	0.60	6.00	5979.56	474.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3582E+04 EXCESS=0.0000E+00 OUTFLOW=0.3581E+04 BASIN STORAGE=0.2140E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC3	MANE	0.46	4930.59	474.68	0.48	6.00	4930.26	474.00	0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2869E+04 EXCESS=0.0000E+00 OUTFLOW=0.2867E+04 BASIN STORAGE=0.1930E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC3	MANE	0.51	4007.28	481.34	0.38	6.00	4007.13	486.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2264E+04 EXCESS=0.0000E+00 OUTFLOW=0.2262E+04 BASIN STORAGE=0.1823E+01 PERCENT ERROR= 0.0

```
          FOR PLAN = 1  RATIO= 1.06
               AC4  MANE          0.61   5979.47    474.18       0.60       6.00   5979.45    474.00         0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3580E+04 EXCESS=0.0000E+00 OUTFLOW=0.3578E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               AC4  MANE          0.63   4930.14    475.22       0.48       6.00   4929.53    474.00         0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2867E+04 EXCESS=0.0000E+00 OUTFLOW=0.2865E+04 BASIN STORAGE=0.2350E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               AC4  MANE          0.71   4007.00    486.89       0.38       6.00   4006.96    486.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2262E+04 EXCESS=0.0000E+00 OUTFLOW=0.2260E+04 BASIN STORAGE=0.2222E+01 PERCENT ERROR=   0.0



*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:20:51   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID          PEMA FLOOD INSURANCE STUDY, 1996
              2     ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID          LOWER CENTRAL VALLEY 100-YEAR STORM
              4     ID
              5     ID          Current (05/96) model based on a HEC-1 model prepared by James M
              6     ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
              7     ID          Study Hydrology Report dated 9/91.  Two modifications were made
              8     ID          to the source model.  First, Upper Las Vegas Detention Basin storage
              9     ID          and outflow characteristics were revised to reflect the as-built
             10     ID          configuration described by construction drawings dated 5/91 and HEC-1
             11     ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
             12     ID          relationship for the North Las Vegas Detention Basin was revised
             13     ID          to reflect the current three-pipe outlet condition (two of the five
             14     ID          pipes were blocked following construction of the upper basin) and the
             15     ID          hydraulic control created by the 4-foot high barrier wall located
             16     ID          upstream from the pipe inlets.
             17     ID
             18     ID          Remaining comments are from the original model dated 1/91.
             19     ID
             20     ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
             21     ID          Northern Las Vegas Wash - FIS FLOWS
             22     ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
             23     ID
             24     ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
             25     ID          Lower Central Valley 100-Year Storm, Existing Conditions
             26     ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
             27     ID          (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAMB.DAT)
             28     ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
             29     ID
             30     ID          All routing steps immediately d/s of a diversion converted to
             31     ID          Muskingum routing to avoid zero flow, 8/90
             32     ID
             33     ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
             34     ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
             35     ID          Channel and Hualapai Diversion included, 8/90
             36     ID
             37     ID          This data file models DARF's at certain locations where FIS flows are
             38     ID          required.  The original B&V data file used a factor of 0.62; ratios
             39     ID          of this factor are used in the JR card to model DA's at the points
             40     ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
             41     ID
             42     ID           PT OF                AREA          DARF      DARF/0.62      RATIO
             43     ID          INTEREST             (SQ MI)
             44     ID
             45     ID     RRBRIDGE, NCS, & 304    60.7 - 64.5      0.66        1.06          1
             46     ID          ACHANNL              111.6          0.59        0.95          2
             47     ID          NCHANNL              172.2          0.53        0.85          3
             48     ID
*** FREE ***
             49     IT       6       0       0     200
             50     IO       5       0       0
             51     IN       5       0       0
             52     JR    PREC    1.06    0.95    0.85
```



```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             53     KK     112
             54     KM   RUNOFF FROM SUBBASIN 112
```

```
55          BA   5.333
56          PB    2.01
57          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
58          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
59          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
60          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
61          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
62          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
63          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
64          PC    .997    .999    1.00
65          LS       0      82
66          UD    .462

67          KK     119
68          KM   RUNOFF FROM SUBBASIN 119
69          BA   2.739
70          PB    2.09
71          LS       0      82
72          UD    .346

73          KK       .
74          KM   COMBINE SUBBASINS 112 & 119
75          HC       2

76          KK     120
77          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
78          RM       3    0.27    0.15

79          KK  125UDB
80          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
81          RM       5    0.53    0.15

82          KK     117
83          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
84          RM       4    0.43    0.15

85          KK     118
86          KM   RUNOFF FROM SUBBASIN 118
87          BA   5.079
88          PB    1.83
89          LS       0      84
90          UD    .233

91          KK     117
92          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
93          RM       1    0.13    0.15
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

94          KK       V
95          RM       3    0.25    0.15

96          KK       V
97          RM       4    0.37    0.15

98          KK     117
99          KM   RUNOFF FROM SUBBASIN 117
100         BA   7.366
101         PB    1.66
102         LS       0      78
103         UD   1.699

104         KK       .
105         KM   COMBINE SUBBASINS 112, 117, 118, & 119
106         HC       3

107         KK   ULWDB
            *  *** lines from 1/91 model removed 5/96
            * KM      UPPER LAS VEGAS WASH DETENTION BASIN
            * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
            * RS 1 STOR -1
            * SV 0 40 75 110 250 500 920 1550 1700 1860
            * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
            * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
            * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
            * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
            * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
108         KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
109         KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
110         RS       1    STOR      -1
111         SV       0      12      80     170     320     560    1000    1610    1800    1980
112         SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
113         SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
114         SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
115         SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
116         SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

117         KK     116
118         KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
119         RM       5    0.50    0.15

120         KK     111
121         KM   RUNOFF FROM SUBBASIN 111
122         BA    4.08
123         PB    1.92
124         LS       0      84
125         UD    .239
```

1 HEC-1 INPUT PAGE 4

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  126     KK    116
  127     KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
  128     RM       1    0.10    0.15

  129     KK       V
  130     RM       2    0.21    0.15

  131     KK    116
  132     KM   RUNOFF FROM SUBBASIN 116
  133     BA   5.189
  134     PB    1.66
  135     LS       0      78
  136     UD   1.418

  137     KK       .
  138     KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
  139     HC       3

  140     KK    109
  141     KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
  142     RM       4    0.42    0.15

  143     KK    110
  144     KM   RUNOFF FROM SUBBASIN 110
  145     BA   2.945
  146     PB    1.83
  147     LS       0      86
  148     UD    .237

  149     KK    109
  150     KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
  151     RM       1    0.09    0.15

  152     KK       V
  153     RM       2    0.19    0.15

  154     KK    109
  155     KM   RUNOFF FROM SUBBASIN 109
  156     BA   4.183
  157     PB    1.66
  158     LS       0      78
  159     UD   1.281

  160     KK       .
  161     KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  162     HC       3

  163     KK    101
  164     KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
  165     KM   THRU SUBBASIN 101
  166     RM       5    0.54    0.15
```

1 HEC-1 INPUT PAGE 5

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  167     KK    103
  168     KM   RUNOFF FROM SUBBASIN 103
  169     BA   6.195
  170     PB    2.01
  171     LS       0      84
  172     UD    .324

  173     KK    102
  174     KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
  175     RM       1    0.11    0.15

  176     KK    102
  177     KM   RUNOFF FROM SUBBASIN 102
  178     BA   8.455
  179     PB    1.83
  180     LS       0      83
  181     UD    .369

  182     KK       .
  183     KM   COMBINE SUBBASINS 102 & 103
  184     HC       2

  185     KK    101
  186     KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
  187     RM       1    0.11    0.15

  188     KK       V
  189     RM       2    0.22    0.15

  190     KK    101
  191     KM   RUNOFF FROM SUBBASIN 101
  192     BA   9.082
  193     PB    1.66
  194     LS       0      77
  195     UD   1.505

  196     KK   NLVIN
  197     KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
```

```
198          HC       3

199          KK       .
200          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
201          DT DIVDIKE
202          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
203          DI   17775   20135   23000
204          DQ       0       0       0       0       0     410    1225    2435    3565    5135
205          DQ    6775    8635   11000

206          KK  NLVDET
207          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
208          KM    117, 118, & 119 THRU NLV DETENTION BASIN
209          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
210          RS       1    STOR      -1
211          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                        HEC-1 INPUT                                        PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

212          SV    1650    1825    1920    2000    2110    2200    2310    2430
213          SE       0       2       4       6      10      14      21      24      26      27
214          SE      28      30      31      32      33      34      35      36
             *  *** lines from 1/91 model removed 5/96
             * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
             * SQ 4180 5968 7095 8334 9676 11101 12630 14294
215          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
216          SQ    3050    4630    5710    7090    8610   10140   11670   13200

217          KK       .
218          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
219          DR DIVDIKE

220          KK       .
221          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
222          HC       2

223          KK     303
224          KM   ROUTE OUTFLOW THRU SUBBASIN 303
225          RM      13    1.28    0.15

226          KKRRBRIDGE
227          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
228          DTRRCHANNL
229          DI       0    6000   20000
230          DQ       0       0   13500

231          KK     I15
232          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
233          DT   KCHAR
234          DI       0    1000   10000
235          DQ       0     800    8000

236          KK     NC1
237          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
238          RK     700  0.0058   0.016       0    TRAP      10       2

239          KK       V
240          RK    2000  0.0100   0.035       0    TRAP      30       2

241          KK     NC2
242          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
243          KM   TO GOWAN AVE.
244          RK    1300   .0056    .030       0    TRAP      12       2

245          KK     NC3
246          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
247          KM   TO CHEYENNE AVE.
248          RK    2600   .0021    .030       0    TRAP      20     2.5
1                                        HEC-1 INPUT                                        PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

249          KK     NC4
250          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
251          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
252          RK    1300    .003    .016       0    TRAP      18       2

253          KK     NC5
254          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
255          KM   TO "A" CHANNEL (LINED CHANNEL)
256          RK     500    .001    .016       0    TRAP      18       2
257          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

258          KK    AP.1
259          KM       Begin subareas tributary to Gowan-South Detention Basin
260          KM       Begin subareas tributary to Angel Park Detention Basin
261          KM       From Wallace Angel Park Model
262          BA   0.001
263          PB     2.1
264          LS       0      89
265          UD    0.62

266          KK       V
267          KM   Route AP.1
268          RM       7    0.67    0.15

269          KK    AP.2
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```
          270          KM   One-third of subbasin AP.2
          271          KM   From Wallace Angel Park Model
          272          BA   0.853
          273          PB     2.0
          274          LS       0       87
          275          UD   0.363

          276          KK        .
          277          KM   Combine AP.1 & AP.2
          278          HC        2

          279          KK        V
          280          RM       11     1.06     0.15

          281          KK    AP.3
          282          BA    3.62
          283          PB     1.9
          284          LS       0       89
          285          UD    2.41

          286          KK    AP.4
          287          KM   From Wallace Angel Park Model
          288          BA   0.001
          289          PB     1.8
          290          LS       0       89
          291          UD    1.03
1                                        HEC-1 INPUT                                                    PAGE  8

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          292          KK        .
          293          KM   Combine AP.1, AP.2, AP.3, AP.4
          294          HC        3

          295          KK    AP.5
          296          KM   From Wallace Angel Park Model
          297          BA   0.001
          298          PB     2.1
          299          LS       0       89
          300          UD    0.39

          301          KK        V
          302          KM   Route AP.5
          303          RM        8     0.82     0.15

          304          KK    AP.6
          305          BA   0.001
          306          PB     2.1
          307          LS       0       88
          308          UD    0.75

          309          KK        .
          310          KM   Combine AP.5 & AP.6
          311          HC        2

          312          KK        V
          313          KM   Route AP.5 & AP.6
          314          RM        7     0.66     0.15

          315          KK    AP.7
          316          KM      One-half of subbasin AP.7
          317          BA    1.02
          318          PB     1.9
          319          LS       0       86
          320          UD    0.59

          321          KK   N_CHN
          322          KM   COMBINE NORTH CHANNEL FLOWS
          323          HC        2

          324          KK    GD.1
          325          KM   Begin subareas tributary to Hualapai Diversion
          326          KM   From VTN (PB & CN from B&V-La Madre)
          327          BA   0.001
          328          PB     2.2
          329          LS       0       87
          330          UD    0.62

          331          KK        V
          332          KM   Route GD.1
          333          RM        2     0.24     0.15
1                                        HEC-1 INPUT                                                    PAGE  9

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          334          KK        V
          335          KM   Routing Cont'd
          336          RM        3     0.27     0.15

          337          KK    GD.2
          338          KM   From VTN
          339          BA   0.001
          340          PB     2.0
          341          LS       0       89
          342          UD    0.83

          343          KK        .
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          344          KM   Combine GD.1 & GD.2
          345          HC       2

          346          KK  TO_DIV
          347          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
          348          RM       3    0.34    0.15

          349          KK    GD.3(=AP.12)
          350          KM   From VTN
          351          BA    0.80
          352          PB     1.9
          353          LS       0      87
          354          UD    0.32

          355          KKHUALAPAI
          356          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
          357          HC       2

          358          KK     HUA& NO.CH
          359          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
          360          HC       2

          361          KK       V
          362          KM   Route Combined Flows
          363          RK    5500    .023     .04       0    TRAP     100       2

          364          KK       V
          365          KM   Routing Cont'd
          366          RK    4500    .004     .03       0    TRAP      30       4

          367          KK    AP.8
          368          BA    0.93
          369          PB     1.9
          370          LS       0      89
          371          UD    0.62

          372          KK     BOX
          373          KM   SUMMERLIN PARKWAY CULVERT
          374          HC       2
1                                        HEC-1 INPUT                                                PAGE 10

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          375          KK       V
          376          KM   ROUTE TO ANGEL PARK DETENTION BASIN
          377          RK    3000    .027     .04       0    TRAP     100       2

          378          KK    AP.9
          379          BA    0.68
          380          PB     1.8
          381          LS       0      89
          382          UD     .83

          383          KK  N_CHAN
          384          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
          385          HC       2

          386          KKANGEL.PK
          387          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
          388          HC       2

          389          KKSPILLWAY
          390          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
          391          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
          392          RS       1    STOR      -1
          393          SV       0       3      22      45      80     125     190     270     369     492
          394          SV     630     780     942    1115    1209
          395          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
          396          SE    2616    2618    2620    2622    2623
          397          SL  2592.5    3.14     0.6     0.5
          398          SS  2619.1    1275     3.2     1.5

          399          KKAP_TO_VEGAS/PIONEER
          400          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
          401          KM   From VTN
          402          RK    7500    0.03   0.012       0    CIRC       5       0

          403          KKBUFFALO_1
          404          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
          405          RK    1500    0.02    0.03       0    TRAP      20       4

          406          KK    GD.7
          407          KM   INTERSECTION OF LAKE MEAD & BUFFALO
          408          BA    1.13
          409          PB     1.8
          410          LS       0      89
          411          UD    1.38

          412          KKBUFFALO_1
          413          KM   Combine GD.7 W/ Buffalo Channel
          414          HC       2
1                                        HEC-1 INPUT                                                PAGE 11

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          415          KKBUFFALO_2
          416          KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
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 417          RK    5000   0.005   0.025       0    TRAP      30       4

 418          KK    GD.4
 419          KM    From B&V-La Madre
 420          BA    0.001
 421          PB      2.0
 422          LS        0       88
 423          UD    0.62

 424          KK        V
 425          KM    ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
 426          RM        7    0.74    0.15

 427          KK    GD.5
 428          BA    3.31
 429          PB     1.9
 430          LS        0       86
 431          UD    1.38

 432          KK        .
 433          KM    Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
 434          HC        2

 435          KK        V
 436          KM    ROUTE NORTH ALONG RAMPART
 437          RM        4    0.43    0.15

 438          KK    GD.6
 439          KM    DEL WEBB-SUN CITY SUMMERLIN
 440          BA      1.6
 441          PB      1.8
 442          LS        0       86
 443          UD      .96

 444          KK        .
 445          KM    Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
 446          HC        2

 447          KK        V
 448          KM    ROUTE TO BUFFALO along Cheyenne Channel
 449          RK     5500    .015    .015       0    TRAP      20       2

 450          KK    GD.8
 451          KM    R.A. HOMES-DESERT SHORES
 452          BA     1.53
 453          PB      1.7
 454          LS        0       85
 455          UD     1.11
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 456          KK        .
 457          KM    INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
 458          HC        2

 459          KK    GD.34
 460          KM    AREA BETWEEN BUFFALO AND OK GRAGSON HWY
 461          BA     3.84
 462          PB      1.7
 463          LS        0       84
 464          UD     1.72

 465          KKGOWAN_SOUTH
 466          KM    TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
 467          HC        3

 468          KK  DET.GS
 469          KM    Gowan-South Detention Basin data from VTN
 470          RS        1    STOR      -1
 471          SV        0     9.8     113     435     454     680
 472          SE     2326    2330    2340  2349.6    2350    2354
 473          SQ        0     112     328     455     459   30700

 474          KK R.GSOUT
 475          KM    ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
 476          RK     3200   0.007   0.012       0    CIRC       5       0

 477          KK    GD.9
 478          KM    Begin subareas tributary to Gowan-North Detention Basin
 479          KM    From B&V-LaMadre
 480          BA    0.001
 481          PB      2.1
 482          LS        0       89
 483          UD     0.30

 484          KK        V
 485          RM        5    0.52    0.15

 486          KK    GD.10
 487          KM    From B&V-LaMadre
 488          BA    0.001
 489          PB      1.9
 490          LS        0       88
 491          UD     0.90

 492          KK        .
 493          KM    Combine GD.9 & GD.10
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494          HC       2

495          KK       V
496          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
497          RM       6    0.61    0.15
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


498          KK       V
499          KM   Routing Cont'd
500          RM       7    0.74    0.15

501          KK   GD.11
502          KM   From B&V-LaMadre
503          BA    3.17
504          PB     1.8
505          LS       0      85
506          UD    2.44

507          KK       .
508          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
509          HC       2

510          KK   GD.33
511          KM   From Wallace EPT.H1
512          BA   0.001
513          PB     1.9
514          LS       0      89
515          UD     3.5

516          KK  RANCHO
517          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
518          KM   From Wallace
519          DTCULVERTS
520          DI       0    1545    3129    4000    8000
521          DQ       0    1545    1545    2416    6416

522          KK       V
523          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
524          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
525          RM       2    0.15    0.15

526          KK  GD.32C
527          KM   One-half of subbasin GD.32C
528          BA   0.365
529          PB     1.9
530          LS       0      86
531          UD    0.27

532          KK       .
533          KM   Combine GD.32 & GD.33
534          HC       2

535          KK  RANCHO
536          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
537          KM   From Wallace
538          DTCULVERTS
539          DI       0     900    2484    4000    8000
540          DQ       0     900     900    2416    6416
1                                        HEC-1 INPUT                                        PAGE 14

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


541          KK       V
542          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
543          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
544          RM       1    0.14    0.15

545          KK   GD.30
546          KM   From Wallace
547          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
548          BA   0.001
549          PB    2.23
550          LS       0      80
551          UD    2.69

552          KK       V
553          KM   ROUTE WEST TO RANCHO (HWY 95)
554          RM      12    1.23    0.15

555          KK  GD.31B
556          KM   One-half of subbasin GD.31B
557          BA   0.665
558          PB     1.9
559          LS       0      81
560          UD    0.97

561          KK       .
562          KM   Combine GD.30 - GD.33
563          HC       3

564          KK  RANCHO
565          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
566          DTCULVERTS
567          DI       0     520    1809    4000    8000
568          DQ       0     520     520    2631    6631
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569          KK       V
570          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
571          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
572          RM       1    0.14    0.15

573          KK   GD.28
574          KM   From Wallace
575          BA   0.001
576          PB     1.8
577          LS       0      77
578          UD    2.52

579          KK       .
580          KM   Combine GD.28 & GD.30 - GD.33
581          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

582          KK  RANCHO
583          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
584          DTCENTNIAL
585          DI       0    1040    5456    8000
586          DQ       0    1040    1040    3585

587          KK       V
588          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
589          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
590          RM       1    0.07    0.15

591          KK   GD.25
592          KM   From Wallace
593          BA   0.001
594          PB     2.0
595          LS       0      89
596          UD    1.09

597          KK       V
598          RM       7    0.69    0.15

599          KK   GD.26
600          KM   From Wallace
601          BA   0.001
602          PB     1.9
603          LS       0      78
604          UD    1.23

605          KK       .
606          KM   Combine GD.25 & GD.26
607          HC       2

608          KK       V
609          KM   ROUTE WEST TO ANN ROAD AND HWY 95
610          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
611          RM       4    0.43    0.15

612          KK       V
613          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
614          RM       5    0.49    0.15

615          KK   GD.27
616          KM   From Wallace
617          BA    1.13
618          PB     1.8
619          LS       0      78
620          UD    1.61

621          KK       .
622          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
623          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

624          KK       V
625          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
626          RK    3000   0.009   0.025       0    TRAP      50       3

627          KK       V
628          RK    3000   0.004   0.022       0    TRAP      25       8

629          KK   GD.29
630          KM   From Wallace
631          BA    0.76
632          PB     1.8
633          LS       0      77
634          UD    1.49

635          KK       V
636          RK    8000    0.01   0.025       0    TRAP      20       8

637          KK    PDGC
638          KM   PAINTED DESERT GOLF COURSE
639          KM   From Wallace
640          BA    0.53
641          PB     1.7
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642          LS       0      80
643          UD     1.2

644          KK       .
645          KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
646          HC       3

647          KK  RANCHO
648          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
649          DTP.DESERT
650          DI       0     233    1318    8000
651          DQ       0     233     233    6915

652          KK       V
653          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
654          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
655          RM       1    0.14    0.15

656          KK   GD.21
657          KM   From Wallace
658          BA   0.001
659          PB     2.1
660          LS       0      89
661          UD    0.72

662          KK       V
663          RM       8    0.81    0.15
1                                        HEC-1 INPUT                                        PAGE 17

           LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

664          KK   GD.22
665          KM   From Wallace
666          BA   0.001
667          PB     2.0
668          LS       0      86
669          UD     1.5

670          KK   GD.23
671          KM   From Wallace
672          BA   0.001
673          PB     2.0
674          LS       0      86
675          UD    1.41

676          KK       .
677          KM   Combine GD.21 - GD.23
678          HC       3

679          KK       V
680          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
681          RM       7    0.65    0.15

682          KK   GD.24
683          KM   From Wallace
684          BA    0.64
685          PB     1.8
686          LS       0      77
687          UD     1.2

688          KK       .
689          KM   Combine GD.21 - GD.24
690          HC       2

691          KK       V
692          KM   ROUTE WEST TO HWY 95
693          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
694          RM       7    0.65    0.15

695          KK   GD.18
696          KM   From Wallace
697          BA   0.001
698          PB     2.1
699          LS       0      89
700          UD    0.31

701          KK       V
702          RM       6    0.62    0.15

703          KK   GD.19
704          KM   From Wallace
705          BA   0.001
706          PB     1.9
707          LS       0      82
708          UD    1.24
1                                        HEC-1 INPUT                                        PAGE 18

           LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

709          KK       .
710          KM   Combine GD.18 & GD.19
711          HC       2

712          KK       V
713          KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
714          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
715          RM       9    0.88    0.15
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716          KK   GD.20
717          KM   From Wallace
718          BA    2.35
719          PB     1.7
720          LS       0      82
721          UD    2.51

722          KK        .
723          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
724          HC        4

725          KK  HWY.95
726          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
727          DT   CRAIG
728          DI        0     465    2056   10000
729          DQ        0     465     465    8409

730          KK        V
731          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
732          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
733          RM        1    0.07    0.15

734          KK   GD.15
735          KM   From Wallace
736          BA   0.001
737          PB     2.1
738          LS       0      88
739          UD    0.48

740          KK        V
741          RM        7    0.74    0.15

742          KK   GD.16
743          KM   From Wallace
744          BA   0.001
745          PB     2.1
746          LS       0      82
747          UD    1.63

748          KK        .
749          HC        2
1                                        HEC-1 INPUT                                    PAGE 19

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

750          KK        V
751          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
752          RM       10    1.01    0.15

753          KK   GD.17
754          KM   From Wallace
755          BA    0.56
756          PB     1.9
757          LS       0      80
758          UD     2.0

759          KK        .
760          KM   Combine GD.15 - GD.17
761          HC        3

762          KK   HWY95
763          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
764          DTALEXANDR
765          DI        0     155    1746   10000
766          DQ        0     155     155    8409

767          KK        V
768          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
769          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
770          RM        1    0.11    0.15

771          KK   GD.12
772          KM   From Wallace
773          BA   0.001
774          PB     2.1
775          LS       0      89
776          UD     0.3

777          KK        V
778          RM        4    0.42    0.15

779          KK   GD.13
780          KM   From Wallace
781          BA   0.001
782          PB     2.0
783          LS       0      86
784          UD    1.10

785          KK        .
786          KM   Combine GD.12 & GD.13
787          HC        2

788          KK        V
789          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
790          RM        4    0.43    0.15
1                                        HEC-1 INPUT                                    PAGE 20
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  791         KK       V
  792         KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  793         RM      11    1.06     0.15

  794         KK  GD.14A
  795         KM   From Wallace
  796         BA    1.71
  797         PB     1.8
  798         LS       0       81
  799         UD    0.88

  800         KK       .
  801         KM   Combine GD.12, GD.13 & GD.14A
  802         HC       2

  803         KK       V
  804         KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  805         RM       5    0.53     0.15

  806         KK  GD.14B
  807         KM   From Wallace
  808         BA    0.68
  809         PB     1.7
  810         LS       0       83
  811         UD    1.67

  812         KK       .
  813         KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
  814         HC       3

  815         KK   GN_IN
  816         KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
  817         HC       3

  818         KK  DET.GN
  819         KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
  820         KM   From VTN
  821         RS       1    STOR       -1
  822         SV       0      28       46      113      774      885     1163
  823         SE    2308    2311     2312     2314     2324  2325.5     2329
  824         SQ       0       0      126      251      519      539    35800

  825         KKR.G-UPS.
  826         KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
  827         RK    2000   0.005   0.013        0    CIRC        6        0

  828         KK       V
  829         KM   Route Gowan outflow along Gowan Outfall Channel
  830         RK    7000   0.009   0.015        0    TRAP       10        0
1                                    HEC-1 INPUT                                    PAGE 21

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  831         KK       .
  832         KM   Recall flow diverted at Craig Road
  833         DR   CRAIG

  834         KK       V
  835         KM   Route to Rancho
  836         RM       4    0.42     0.15

  837         KK       .
  838         KM   Recall flow diverted at Alexander
  839         DRALEXANDR

  840         KK       V
  841         KM   Route to Rancho
  842         RM       9    0.92     0.15

  843         KK       .
  844         KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
  845         KM   at Rancho
  846         HC       3

  847         KK       V
  848         KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
  849         KM   App. F)
  850         RK    8400   0.007   0.015        0    TRAP       10        0

  851         KK       V
  852         KM   Routing Cont'd
  853         RK    4000   0.005   0.015        0    TRAP       10        0

  854         KK       V
  855         KM   Routing Cont'd
  856         RK    4000   0.005   0.015        0    TRAP       10        0

  857         KK       .
  858         KM   Begin modeling of subareas on the east side of Rancho Road
  859         KM   Recall flow diverted at Centenial
  860         DRCENTNIAL

  861         KK       .
  862         KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
  863         RM      20    2.03     0.15
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          864          KK   EPT.1
          865          BA    3.76
          866          PB     1.7
          867          LS       0      85
          868          UD    3.36
1                                        HEC-1 INPUT                                        PAGE 22

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          869          KK       .
          870          KM   Combine EPT.1 & flow diverted at Centenial
          871          HC       2

          872          KK       V
          873          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          874          RM       8    0.76    0.15

          875          KK       .
          876          KM   Recall flow diverted at Painted Desert
          877          DRP.DESERT

          878          KK       V
          879          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          880          RM      20    2.03    0.15

          881          KK   EPT.3
          882          BA   4.391
          883          PB     1.7
          884          LS       0      88
          885          UD    3.67

          886          KK       .
          887          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
          888          HC       3

          889          KK   EPT.4
          890          BA   1.372
          891          PB     1.7
          892          LS       0      89
          893          UD     2.7

          894          KK       V
          895          RM       9    0.88    0.15

          896          KK       .
          897          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
          898          KM   Gowan Outfall Channel
          899          HC       2

          900          KK       .
          901          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
          902          KM   Alexander, Painted Desert & Centenial
          903          HC       2

          904          KK   EPT.5
          905          BA   3.005
          906          PB     1.7
          907          LS       0      87
          908          UD     4.7
1                                        HEC-1 INPUT                                        PAGE 23

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          909          KK       .
          910          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
          911          KM   Alexander, Painted Desert & Centenial
          912          HC       2

          913          KK       V
          914          RK   10000     .013     .015        0     TRAP       10        0

          915          KK   EPT.2
          916          BA   1.492
          917          PB     1.7
          918          LS       0      85
          919          UD    2.51

          920          KK  LVWASH
          921          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
          922          HC       2
          923          KM   ************************** END GOWAN MODEL ********************************

          924          KKGOWANDIV
          925          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
          926          DRCULVERTS

          927          KK     301
          928          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
          929          RM      22    2.17    0.15

          930          KK     301
          931          KM   RUNOFF FROM SUBBASIN 301
          932          BA  18.616
          933          PB     1.9
          934          LS       0      85
          935          UD     4.3
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 936          KK WTRIBUS
 937          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
 938          HC       2

 939          KKWTRIBTOT
 940          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
 941          HC       2

 942          KK     304
 943          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
 944          RM       3    0.28    0.15

 945          KK    SNIC
 946          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
 947          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
 948          RK    3850   .0122   0.016        0    TRAP       20        2
1                                        HEC-1 INPUT                                        PAGE 24

    LINE     ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 949          KK     LBC
 950          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
 951          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
 952          RK    2800    .002   0.016        0    TRAP       80        2

 953          KK    310W
 954          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
 955          BA      .8
 956          PB    1.66
 957          LS       0      87        0        0      87
 958          UK     150    .010       .3       38
 959          UK     300    .015      .25       62
 960          RK    1000   .0075      .02     .013    TRAP       51        0
 961          RK    2600   .0075      .02       .2    TRAP       80        0
 962          RK    8700   .0150      .02        0    TRAP      100        0

 963          KK    R310W
 964          KM   ROUTE RUNOFF FROM 310W TO 310E
 965          RK   10500    .015      .02        0    TRAP      100        0

 966          KK    310E
 967          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
 968          BA   1.238
 969          PB    1.66
 970          LS       0      86        0        0      83
 971          UK     150     .01       .3       46
 972          UK     300    .015      .25       54
 973          RK    1000   .0075      .02     .019    TRAP       51        0
 974          RK    2000   .0075      .02      .31    TRAP       80        0
 975          RK   10500    .015      .02        0    TRAP      100        0

 976          KK    310E
 977          KM   COMBINE ROUTED 310W WITH 310E
 978          HC       2

 979          KK    R310E
 980          KM   ROUTE FROM 310E TO 311W
 981          RK    5300   .0132      .02        0    TRAP      100        0

 982          KK    311W
 983          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
 984          BA      .96
 985          PB    1.66
 986          LS       0      85        0        0      83
 987          UK     150    .010       .3       60
 988          UK     300   .0132      .25       40
 989          RK     650   .0065      .02      .01    TRAP       51        0
 990          RK    2200   .0065      .02      .14    TRAP       80        0
 991          RK    5300   .0132      .02        0    TRAP      100        0
1                                        HEC-1 INPUT                                        PAGE 25

    LINE     ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 992          KK    311W
 993          KM   COMBINE ROUTED 310E WITH 311W
 994          HC       2

 995          KK    R311W
 996          KM   ROUTE FROM 311W TO 311E
 997          RK    7500   .0132      .02        0    TRAP      100        0

 998          KK    311E
 999          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311
1000          BA      .77
1001          PB    1.66
1002          LS       0      75        0        0      72
1003          UK     150    .010       .3       75
1004          UK     300   .0132      .25       25
1005          RK     650   .0065      .02     .008    TRAP       51
1006          RK    2200   .0065      .02      .11    TRAP       80        0
1007          RK    7500   .0132      .02        0    TRAP      100        0

1008          KK    311E
1009          KM   COMBINE ROUTED 311W WITH 311E
1010          HC       2
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1011          KK    309W
1012          KM    RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1013          BA      .81
1014          PB    1.66
1015          LS       0      71       0       0      70
1016          UK     150     .01      .3      22
1017          UK     300   .0144     .25      78
1018          RK    1000    .007     .02    .013    TRAP      51       0
1019          RK    2600    .007     .02     .20    TRAP      80       0
1020          RK    8700   .0144     .02       0    TRAP     100       0

1021          KK   R309W
1022          KM   ROUTE FROM 309W TO 309E
1023          RK   21000   .0144     .02       0    TRAP     100       0

1024          KK    309E
1025          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1026          BA    1.19
1027          PB    1.66
1028          LS       0      87       0       0      80
1029          UK     150     .01      .3      52
1030          UK     300   .0144     .25      48
1031          RK    1000    .007     .02    .019    TRAP      51       0
1032          RK    2600    .007     .02     .30    TRAP      80       0
1033          RK   21000   .0144     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                    PAGE 26

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1034          KK    309E
1035          KM    COMBINE ROUTED 309W WITH 309E
1036          HC       2

1037          KK       .
1038          KM    COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1039          HC       2

1040          KK    FCP1
1041          KM    ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1042          KM    TO LAKE MEAD BLVD.
1043          RK     410   .0045    .016       0    CIRC       5       0

1044          KK    FCP2
1045          RK     740   .0048    .016       0    CIRC     5.5       0

1046          KK   FCBC1
1047          RK     800   .0056    .016       0    TRAP       8       0

1048          KK     FC1
1049          RK    1250   .0195    .016       0    TRAP       8       0

1050          KKFCBC2/FC2/FCBC3
1051          KM    COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1052          RK    1430     .03    .016       0    TRAP       7       0

1053          KK   307NW
1054          KM    RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1055          BA    1.33
1056          PB    1.66
1057          LS       0      85       0       0      87
1058          UK     150    .010      .3      32
1059          UK     300    .011     .25      68
1060          RK    1000   .0055     .02    .017    TRAP      51       0
1061          RK    2600   .0055     .02     .27    TRAP      80       0
1062          RK    6400    .011     .02       0    TRAP     100       0

1063          KK  R307NW
1064          KM    ROUTE FROM 307NW TO 307NE
1065          RK    4000    .011     .02       0    TRAP     100       0

1066          KK   307NE
1067          KM    RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1068          BA     .64
1069          PB    1.66
1070          LS       0      87       0       0      87
1071          UK     150    .010      .3      11
1072          UK     300    .011     .25      89
1073          RK    1000   .0055     .02    .013    TRAP      51       0
1074          RK    2600   .0055     .02     .21    TRAP      80       0
1075          RK    4000    .011     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                    PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1076          KK   307NE
1077          KM    COMBINE ROUTED 307NW WITH 307NE
1078          HC       2

1079          KK       .
1080          KM    COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1081          HC       2

1082          KK       V
1083          KM    ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1084          RM       4    0.37    0.15

1085          KK   307SW
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1086          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1087          BA     1.1
1088          PB    1.66
1089          LS       0      61       0       0      64
1090          UK     150    .010      .3      16
1091          UK     300    .011     .25      84
1092          RK    1000   .0055     .02     .01    TRAP      51
1093          RK    2200   .0055     .02     .16    TRAP      80
1094          RK    6100    .011     .02       0    TRAP     100       0

1095          KK  R307SW
1096          KM   ROUTE FROM 307SW TO 307SE
1097          RK    7300    .011     .02       0    TRAP     100       0

1098          KK   307SE
1099          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1100          BA    1.58
1101          PB    1.66
1102          LS       0      85       0       0      87
1103          UK     150     .01      .3      40
1104          UK     300    .011     .25      60
1105          RK    1000   .0055     .02     .01    TRAP      51       0
1106          RK    2200   .0055     .02     .17    TRAP      80       0
1107          RK    7300    .011     .02       0    TRAP     100       0

1108          KK   307SE
1109          KM   COMBINE ROUTED 307SW WITH 307SE
1110          HC       2

1111          KK       .
1112          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1113          HC       2

1114          KK       V
1115          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1116          RM       2    0.18    0.15
1              HEC-1 INPUT                                                PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


1117          KK    308W
1118          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1119          BA     .81
1120          PB    1.66
1121          LS       0      71       0       0      70
1122          UK     150     .01      .3      19
1123          UK     300   .0134     .25      81
1124          RK    1000    .006     .02    .017    TRAP      51       0
1125          RK    2600    .006     .02     .27    TRAP      80       0
1126          RK    8700   .0134     .02       0    TRAP     100       0

1127          KK   R308W
1128          KM   ROUTE FROM 308W TO 308E
1129          RK    6500   .0134     .02       0    TRAP     100       0

1130          KK    308E
1131          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1132          BA     .72
1133          PB    1.66
1134          LS       0      85       0       0      87
1135          UK     150     .01      .3      59
1136          UK     300   .0134     .25      41
1137          RK    1000    .006     .02    .015    TRAP      51       0
1138          RK    2600    .006     .02     .24    TRAP      80       0
1139          RK    6500   .0134     .02       0    TRAP     100       0

1140          KK    308E
1141          KM   COMBINE ROUTED 308W WITH 308E
1142          HC       2

1143          KK       .
1144          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1145          HC       2

1146          KKR307/308
1147          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1148          RK    6100   .0132     .02       0    TRAP     100       0

1149          KK    312W
1150          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1151          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1152          BA     .77
1153          PB    1.66
1154          LS       0      81       0       0      80
1155          UK     150    .010      .3      20
1156          UK     300   .0132     .25      80
1157          RK    1000   .0065     .02    .012    TRAP      51       0
1158          RK    2600   .0065     .02    .175    TRAP      80       0
1159          RK    6100   .0132     .02       0    TRAP     100       0
1              HEC-1 INPUT                                                PAGE 29

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


1160          KK    312W
1161          KM   COMBINE ROUTED 307 & 308 WITH 312W
1162          HC       2
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1163          KK   R312W
1164          KM   ROUTE FROM 312W TO 312E
1165          RK    6100   .0132     .02       0    TRAP     100       0

1166          KK    312E
1167          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1168          BA      .7
1169          PB    1.66
1170          LS       0       79        0        0       76
1171          UK     150     .010       .3       50
1172          UK     300     .0132     .25       50
1173          RK     500     .0065     .02     .012    TRAP       51       0
1174          RK    2600     .0065     .02     .175    TRAP       80       0
1175          RK    6100     .0132     .02        0    TRAP      100       0

1176          KK    312E
1177          KM   COMBINE ROUTED 312W WITH 312E
1178          HC       2

1179          KK     306
1180          KM   RUNOFF FROM SUBBASIN 306
1181          BA   5.073
1182          PB    1.66
1183          LS       0       84
1184          UD    3.02

1185          KK       .
1186          KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1187          HC       3

1188          KK     FC3
1189          KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1190          KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1191          RK     900    .0012     .016       0    TRAP       10      1.5

1192          KK FC4/FC5
1193          RK     600  0.0012    0.016       0    TRAP       24      1.5

1194          KK     FC6
1195          RK    5150    .0011     .016       0    TRAP       16      1.5

1196          KK     FC7
1197          RK    2400    .0010     .016       0    TRAP       20      1.5

1198          KKFCBC4/FC8
1199          KM   COMBINE FCBC4 & FC8 ROUTING STEPS
1200          RK    3475    .0011     .016       0    TRAP       20      1.5
1
                                        HEC-1 INPUT                                                    PAGE 30

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1201          KK     302
1202          KM   RUNOFF SUBBASIN 302
1203          BA  12.113
1204          PB    1.66
1205          LS       0       86
1206          UD     3.1

1207          KK     303
1208          KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
1209          RM       8    0.83    0.15

1210          KK     303
1211          KM   RUNOFF FROM 303
1212          BA  10.217
1213          PB    1.66
1214          LS       0       84
1215          UD    4.24

1216          KK       .
1217          KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1218          HC       2

1219          KK     304
1220          KM   RUNOFF FROM SUBBASIN 304
1221          BA   2.903
1222          PB    1.66
1223          LS       0       86
1224          UD    1.98

1225          KK     305
1226          KM   RUNOFF FROM SUBBASIN 305
1227          BA   3.298
1228          PB    1.66
1229          LS       0       87
1230          UD    1.49

1231          KK       .
1232          KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1233          HC       2

1234          KKRRBRIDGE
1235          DRRRCHANNL

1236          KKDUMMY_AREA
1237          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
1238          BA   0.001
1239          PB    2.00
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          1240          LS       0      80
          1241          UD    1.00
1                                                HEC-1 INPUT                                                PAGE 31

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          1242          KKDUMMY_COMBINE
          1243          KM    Combine dummy subarea with recalled RRCHANNEL diversion
          1244          HC       2

          1245          KKRRCHANNL
          1246          RK     4900    .0041     .03       0    TRAP      40       2

          1247          KK     I-15
          1248          DR    KCHAR

          1249          KKDUMMY_AREA
          1250          KM    Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1251          BA    0.001
          1252          PB     2.00
          1253          LS       0      80
          1254          UD    1.00

          1255          KKDUMMY_COMBINE
          1256          KM    Combine dummy subarea with recalled KCHAR diversion
          1257          HC       2

          1258          KK ACHANNL
          1259          KM    COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1260          HC       5

          1261          KK AC1/AC2
          1262          KM    COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1263          KM    ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1264          RK     2350  0.0074   0.035       0    TRAP      30       2

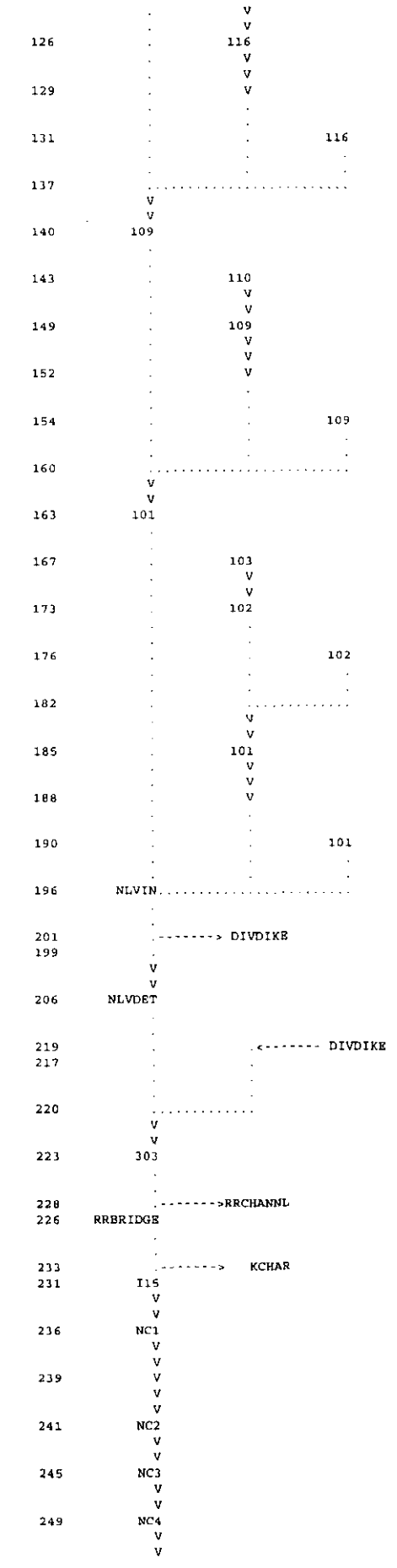
          1265          KK      AC3
          1266          RK     1600    .0065    .030       0    TRAP      52     1.5

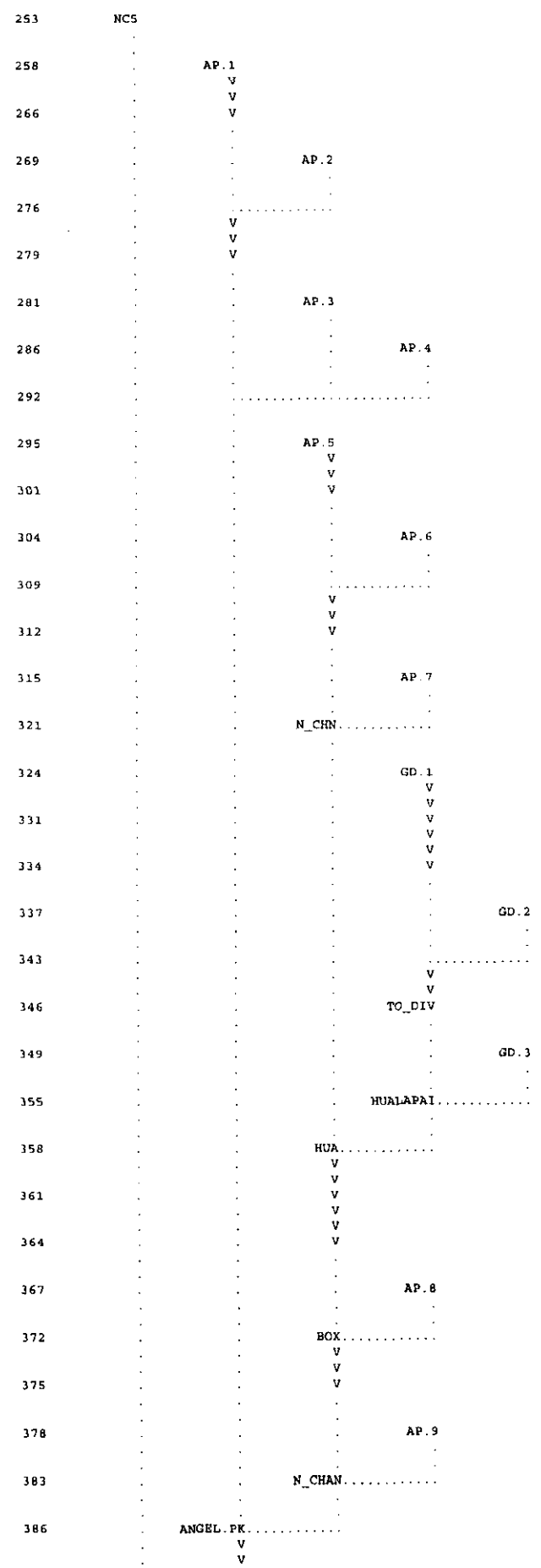
          1267          KK      AC4
          1268          KM    ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1269          RK     1650    .0053    .030       0    TRAP      70     1.5

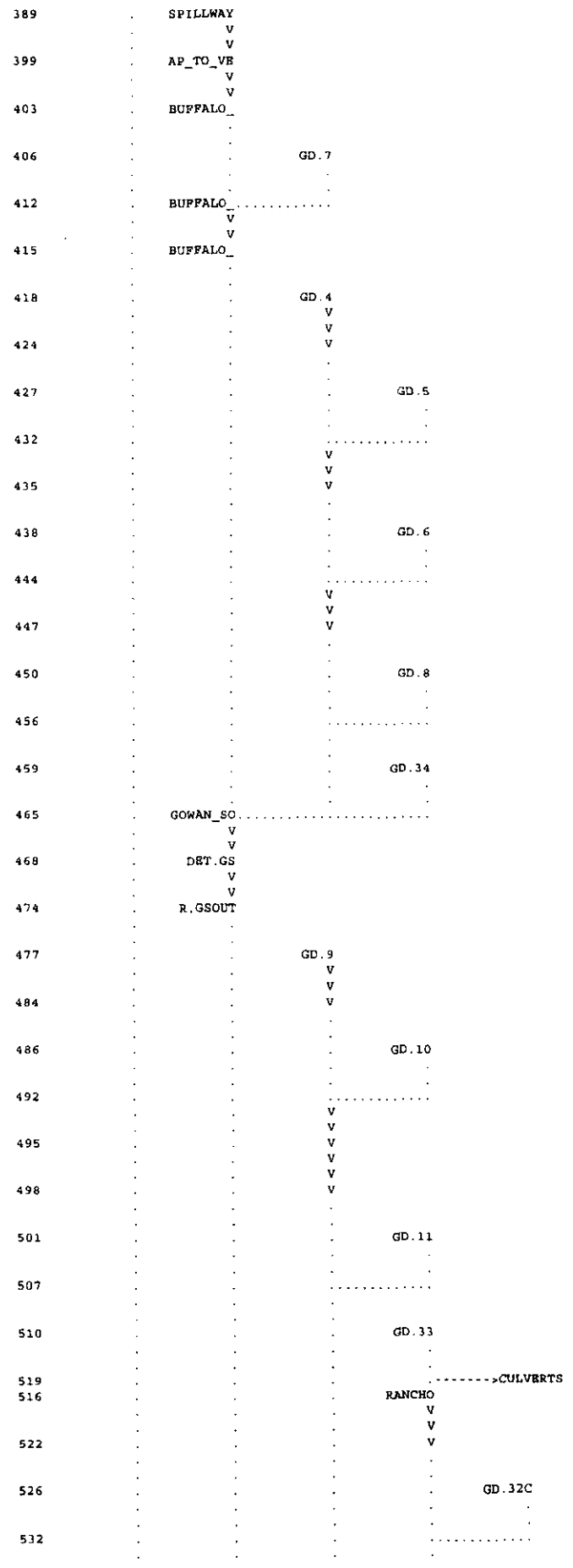
          1270          KK NCHANNL
          1271          KM    COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1272          HC       2
                        * Truncate this run at NCHANNL
          1273          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

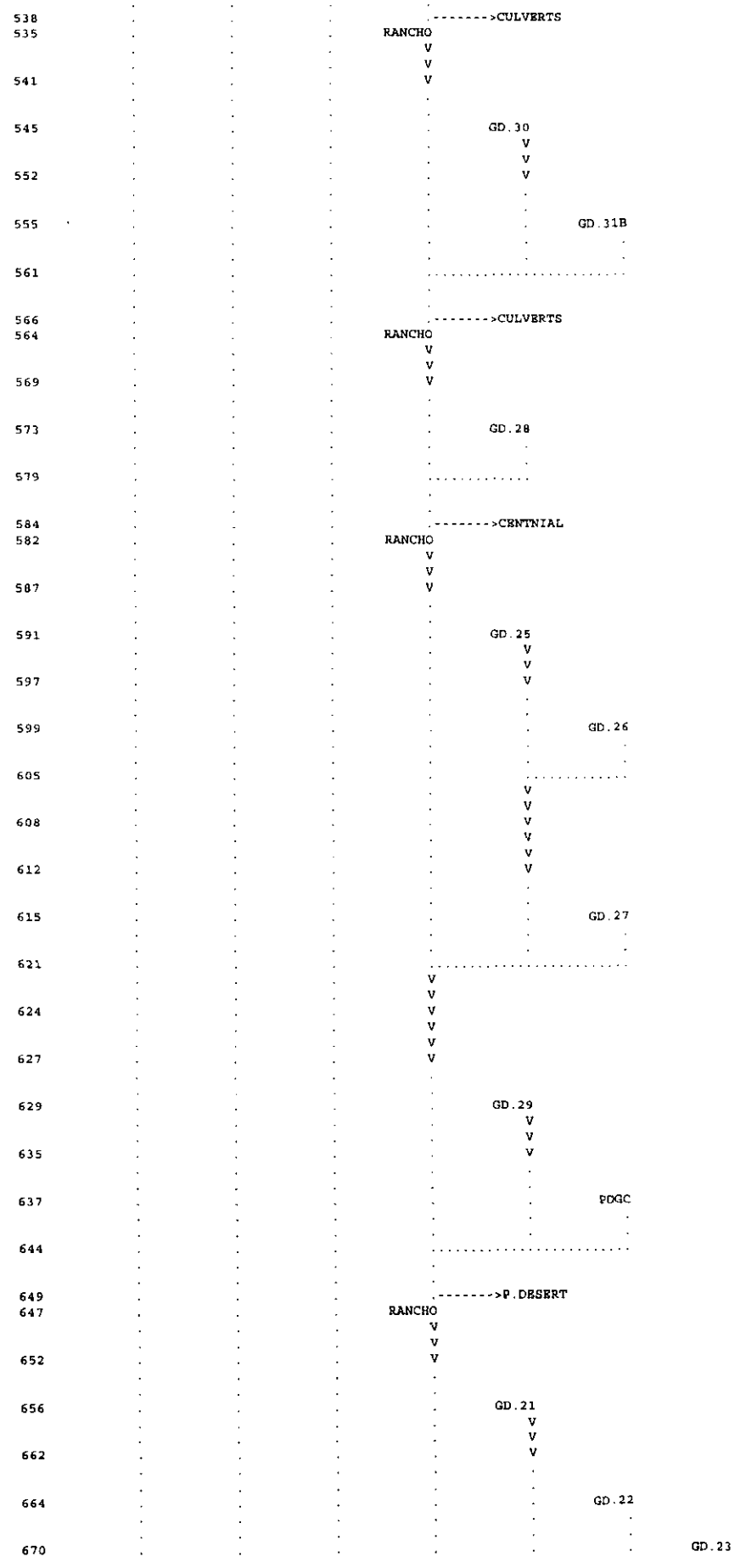
   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

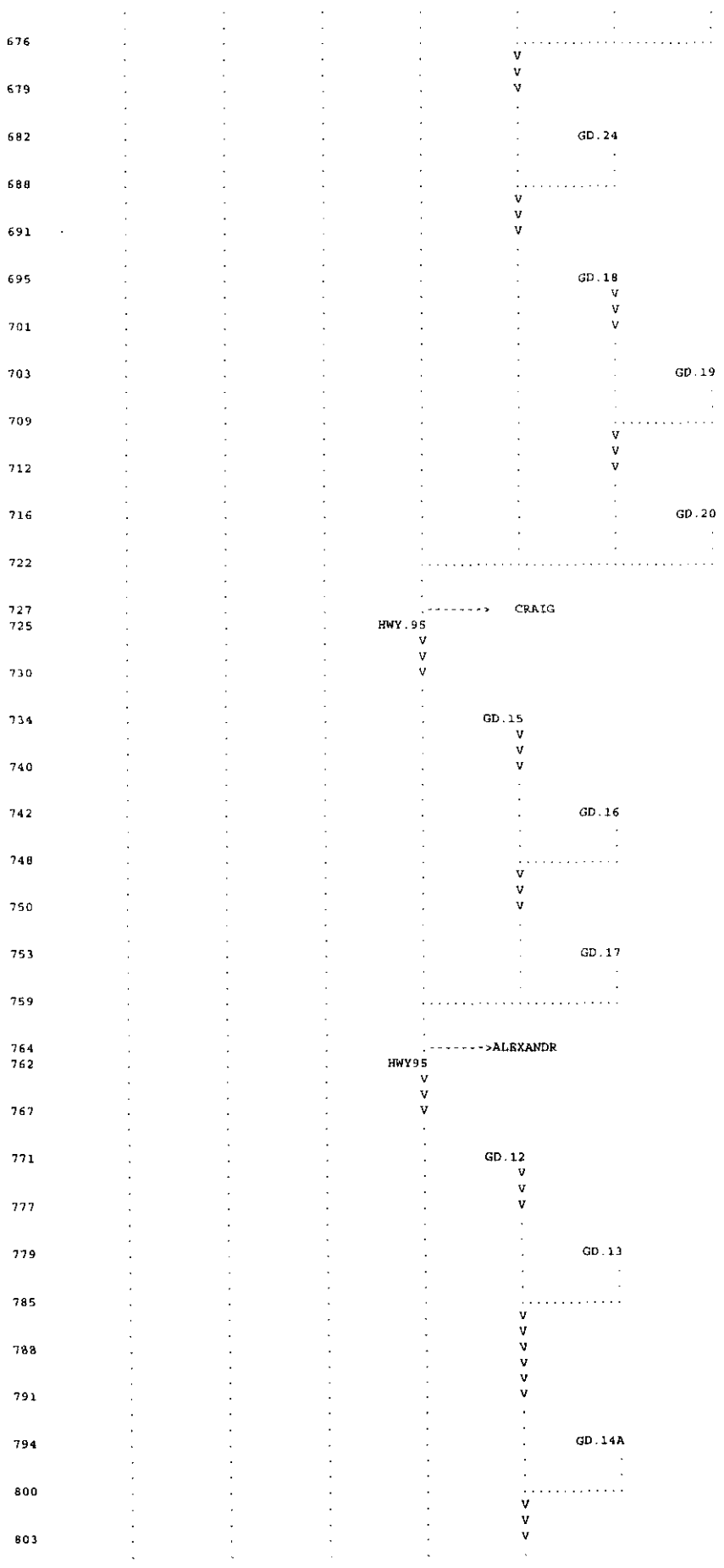
    53          112
                  .
                  .
    67            .          119
                  .            .
                  .            .
    73            ..............
                  V
                  V
    76          120
                  V
                  V
    79       125UDB
                  V
                  V
    82          117
                  .
                  .
    85            .          118
                  .            V
                  .            V
    91            .          117
                  .            V
                  .            V
    94            .            V
                  .            V
                  .            V
    96            .            V
                  .            .
                  .            .
    98            .            .          117
                  .            .            .
                  .            .            .
   104            ..........................
                  V
                  V
   107         ULWDB
                  V
                  V
   117          116
                  .
                  .
   120            .          111
```

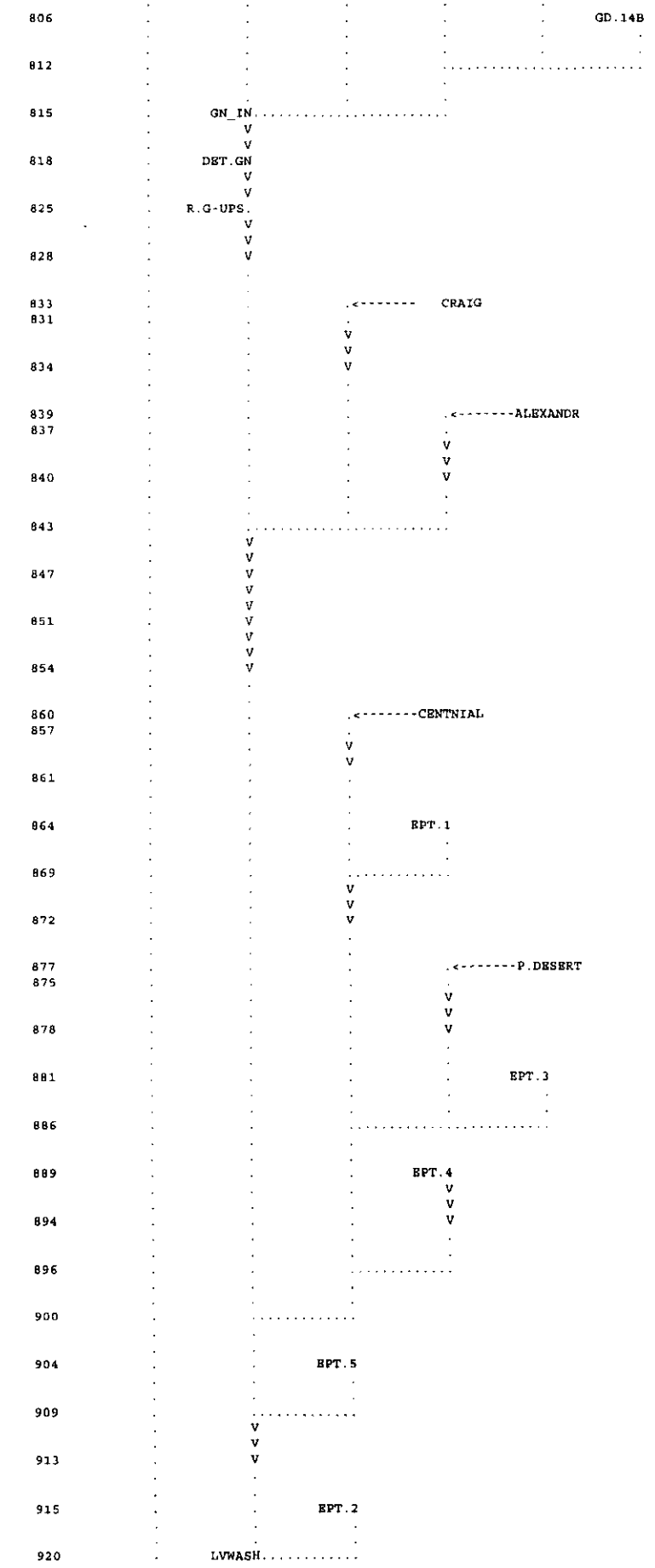

126
129
131
116
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143
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152
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101
167
103
173
102
176
102
182
185
101
188
190
101
196
NLVIN
201
DIVDIKE
199
206
NLVDET
219
DIVDIKE
217
220
223
303
228
226
RRBRIDGE
RRCHANNL
233
KCHAR
231
I1S
236
NC1
239
241
NC2
245
NC3
249
NC4

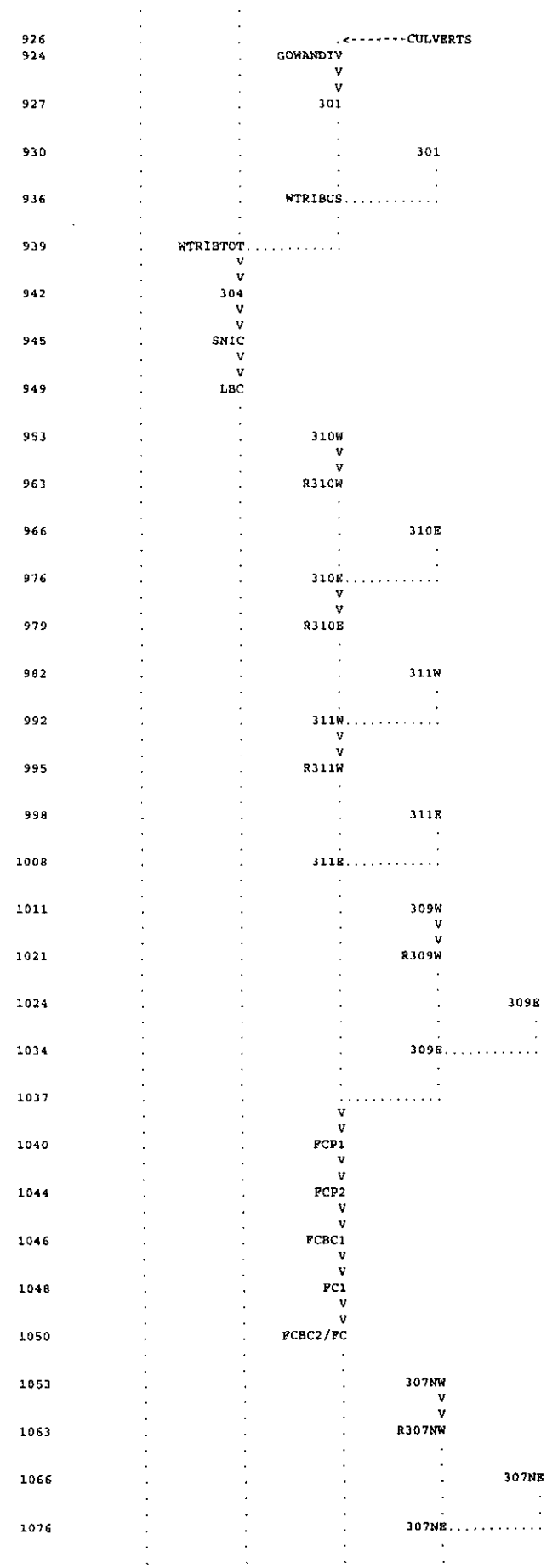

253
NCS
258
AP.1
266
269
AP.2
276
279
281
AP.3
286
AP.4
292
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AP.5
301
304
AP.6
309
312
315
AP.7
321
N_CHN
324
GD.1
331
334
337
GD.2
343
346
TO_DIV
349
GD.3
355
HUALAPAI
358
HUA
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367
AP.8
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BOX
375
378
AP.9
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N_CHAN
386
ANGEL.PK

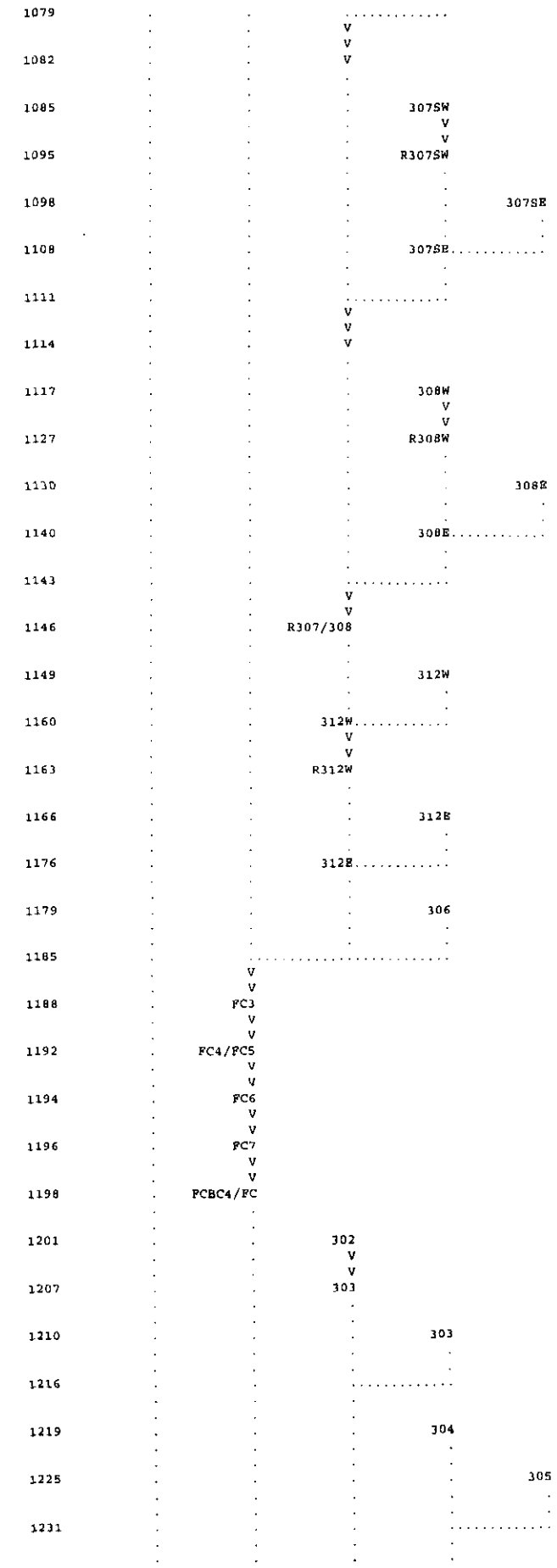

389
SPILLWAY
399
AP_TO_VE
403
BUFFALO_
406
GD.7
412
BUFFALO_
415
BUFFALO_
418
GD.4
424
427
GD.5
432
435
438
GD.6
444
447
450
GD.8
456
459
GD.34
465
GOWAN_SO
468
DET.GS
474
R.GSOUT
477
GD.9
484
486
GD.10
492
495
498
501
GD.11
507
510
GD.33
519
>CULVERTS
516
RANCHO
522
526
GD.32C
532

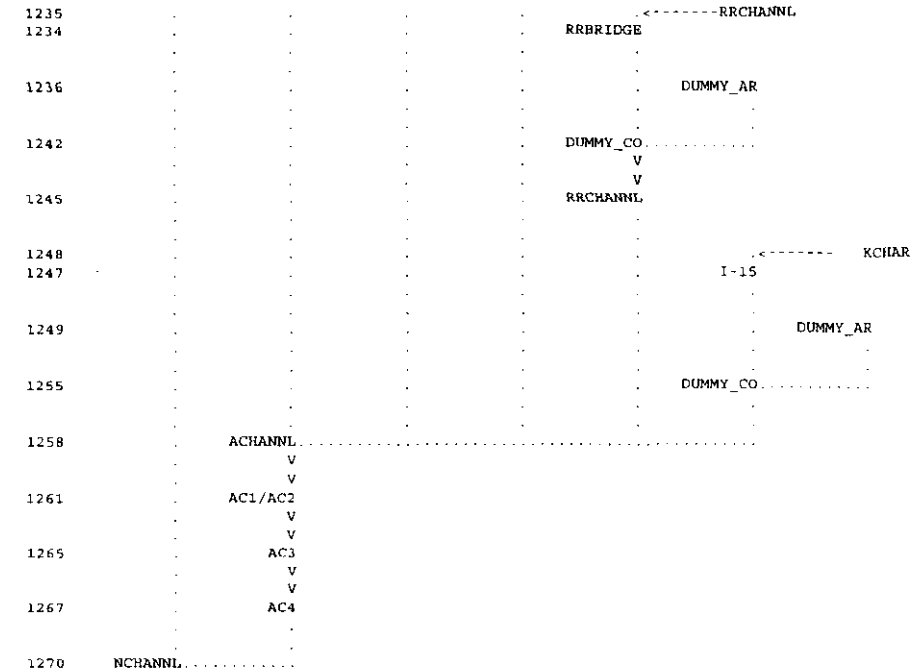

538
535
RANCHO
541
545
GD.30
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555
GD.31B
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566
564
RANCHO
569
573
GD.28
579
584
582
RANCHO
587
591
GD.25
597
599
GD.26
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612
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GD.27
621
624
627
629
GD.29
635
637
PDGC
644
649
647
RANCHO
652
656
GD.21
662
664
GD.22
670
GD.23
->CULVERTS
->CULVERTS
->CENTNIAL
->P.DESERT


676
679
682
GD.24
688
691
695
GD.18
701
703
GD.19
709
712
716
GD.20
722
727
CRAIG
725
HWY.95
730
734
GD.15
740
742
GD.16
748
750
753
GD.17
759
764
ALEXANDR
762
HWY95
767
771
GD.12
777
779
GD.13
785
788
791
794
GD.14A
800
803


806
GD.14B
812
815
GN_IN
818
DET.GN
825
R.G-UPS.
828
833
CRAIG
831
834
839
ALEXANDR
837
840
843
847
851
854
860
CENTNIAL
857
861
864
EPT.1
869
872
877
P.DESERT
875
878
881
EPT.3
886
889
EPT.4
894
896
900
904
EPT.5
909
913
915
EPT.2
920
LVWASH


926 .<-------CULVERTS
924 GOWANDIV
V
V
927 301
930 301
936 WTRIBUS
939 WTRIBTOT
V
V
942 304
V
V
945 SNIC
V
V
949 LBC
953 310W
V
V
963 R310W
966 310E
976 310E
V
V
979 R310E
982 311W
992 311W
V
V
995 R311W
998 311E
1008 311E
1011 309W
V
V
1021 R309W
1024 309E
1034 309E
1037
V
V
1040 FCP1
V
V
1044 FCP2
V
V
1046 FCBC1
V
V
1048 FC1
V
V
1050 FCBC2/FC
1053 307NW
V
V
1063 R307NW
1066 307NE
1076 307NE


1079
1082
1085
307SW
1095
R307SW
1098
307SE
1108
307SE
1111
1114
1117
308W
1127
R308W
1130
308E
1140
308E
1143
1146
R307/308
1149
312W
1160
312W
1163
R312W
1166
312E
1176
312E
1179
306
1185
1188
FC3
1192
FC4/FC5
1194
FC6
1196
FC7
1198
FCBC4/FC
1201
302
1207
303
1210
303
1216
1219
304
1225
305
1231



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:20:51   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Two modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 100-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAMB.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, 8/90

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NCS, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
 50 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE       1    0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ         200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE       1    0  ENDING DATE
                     NDTIME        1954  ENDING TIME
                      ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL    0.10 HOURS
                        TOTAL TIME BASE   19.90 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                  1.06      0.95      0.85

        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  2


        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


        *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION		
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3
					1.06	0.95	0.85
HYDROGRAPH AT							
+	112	5.33	1	FLOW	1466.	1172.	918.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	119	2.74	1	FLOW	932.	746.	586.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	8.07	1	FLOW	2363.	1888.	1477.
				TIME	3.80	3.80	3.80
ROUTED TO							

+	120	8.07	1	FLOW	2218.	1774.	1390.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	125UDB	8.07	1	FLOW	1987.	1593.	1251.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	117	8.07	1	FLOW	1868.	1494.	1171.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT							
+	118	5.08	1	FLOW	1822.	1466.	1157.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	117	5.08	1	FLOW	1625.	1307.	1036.
				TIME	3.70	3.80	3.80
ROUTED TO							
+	V	5.08	1	FLOW	1504.	1209.	953.
				TIME	*4.00*	*4.00*	*4.00*
ROUTED TO							
+	V	5.08	1	FLOW	1361.	1095.	865.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT							
+	117	7.37	1	FLOW	551.	419.	310.
				TIME	5.80	5.90	5.90
3 COMBINED AT							
+	.	20.52	1	FLOW	2948.	2358.	1865.
				TIME	5.20	5.30	5.40
ROUTED TO							
+	ULWDB	20.52	1	FLOW	2241.	1907.	1632.
				TIME	6.10	6.10	5.90
			** PEAK STAGES IN FEET **				
			1	STAGE	2349.51	2346.72	2344.69
				TIME	6.10	6.10	5.90
ROUTED TO							
+	116	20.52	1	FLOW	2230.	1898.	1615.
				TIME	6.60	6.60	6.40
HYDROGRAPH AT							
+	111	4.08	1	FLOW	1580.	1278.	1015.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	116	4.08	1	FLOW	1479.	1196.	949.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	4.08	1	FLOW	1330.	1074.	854.
				TIME	3.90	3.90	4.00
HYDROGRAPH AT							
+	116	5.19	1	FLOW	419.	320.	238.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	.	29.79	1	FLOW	2827.	2329.	1871.
				TIME	5.30	5.40	6.30
ROUTED TO							
+	109	29.79	1	FLOW	2733.	2279.	1859.
				TIME	5.80	5.90	6.60
HYDROGRAPH AT							
+	110	2.94	1	FLOW	1195.	979.	789.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	109	2.94	1	FLOW	1132.	927.	748.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	2.94	1	FLOW	1034.	847.	683.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	348.	266.	199.
				TIME	5.50	5.50	5.60
3 COMBINED AT							
+	.	36.91	1	FLOW	3230.	2644.	2095.
				TIME	5.70	5.80	5.70
ROUTED TO							
+	101	36.91	1	FLOW	3160.	2601.	2068.
				TIME	6.30	6.30	6.40
HYDROGRAPH AT							
+	103	6.20	1	FLOW	2309.	1877.	1500.
				TIME	3.70	3.70	3.70

ROUTED TO							
+	102	6.20	1	FLOW	2181.	1771.	1413.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	2291.	1827.	1427.
				TIME	3.80	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	4472.	3598.	2840.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	101	14.65	1	FLOW	4291.	3449.	2718.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	3995.	3209.	2541.
				TIME	4.10	4.20	4.20
HYDROGRAPH AT							
+	101	9.08	1	FLOW	661.	498.	364.
				TIME	5.70	5.70	5.80
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	5575.	4502.	3576.
				TIME	5.40	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	5575.	4502.	3576.
				TIME	5.40	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	2048.	1797.	1561.
				TIME	8.60	8.40	8.20
			** PEAK STAGES IN FEET **				
			1	STAGE	20.03	16.12	12.87
				TIME	8.60	8.40	8.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	2048.	1797.	1561.
				TIME	8.60	8.40	8.20
ROUTED TO							
+	303	60.65	1	FLOW	2044.	1793.	1557.
				TIME	9.90	9.70	9.50
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	2044.	1793.	1557.
				TIME	9.90	9.70	9.50
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
HYDROGRAPH AT							
+	I15	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC1	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	V	60.65	1	FLOW	409.	359.	311.
				TIME	9.90	9.70	9.50
ROUTED TO							
+	NC2	60.65	1	FLOW	409.	359.	311.
				TIME	10.00	9.80	9.50
ROUTED TO							
+	NC3	60.65	1	FLOW	409.	359.	311.
				TIME	10.00	9.80	9.60
ROUTED TO							
+	NC4	60.65	1	FLOW	409.	359.	311.
				TIME	10.10	9.90	9.60
ROUTED TO							
+	NC5	60.65	1	FLOW	409.	359.	311.
				TIME	10.10	9.90	9.70
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	354.	294.	240.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.85	1	FLOW	354.	294.	241.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.85	1	FLOW	279.	232.	190.
.				TIME	4.80	4.80	4.90
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	595.	502.	419.
				TIME	6.30	6.30	6.30
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.50	4.50
3 COMBINED AT							
+	.	4.47	1	FLOW	760.	642.	537.
				TIME	6.10	6.10	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	0.	0.	0.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.20	5.20	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	291.	239.	193.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	291.	239.	193.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	0.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.60
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	1.	1.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	326.	270.	221.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	326.	270.	221.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUA	1.82	1	FLOW	566.	466.	378.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	1.82	1	FLOW	562.	461.	372.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	1.82	1	FLOW	557.	456.	371.
				TIME	4.00	4.10	4.10

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 HYDROGRAPH AT
+                  AP.8       0.93     1   FLOW          309.      260.      215.
                                            TIME          4.00      4.00      4.00

   2 COMBINED AT
+                   BOX       2.75     1   FLOW          866.      713.      585.
                                            TIME          4.00      4.00      4.10

 ROUTED TO
+                     V       2.75     1   FLOW          861.      713.      580.
                                            TIME          4.10      4.10      4.10

 HYDROGRAPH AT
+                  AP.9       0.68     1   FLOW          177.      148.      122.
                                            TIME          4.20      4.30      4.30

   2 COMBINED AT
+                N_CHAN       3.43     1   FLOW         1033.      856.      698.
                                            TIME          4.10      4.10      4.20

   2 COMBINED AT
+              ANGEL.PK       7.91     1   FLOW         1382.     1165.      970.
                                            TIME          5.30      5.30      5.30

 ROUTED TO
+              SPILLWAY       7.91     1   FLOW           67.       64.       62.
                                            TIME         10.40     10.30     10.10

                                    ** PEAK STAGES IN FEET **
                                     1  STAGE       2612.01   2610.66   2609.36
                                            TIME         10.50     10.30     10.10

 ROUTED TO
+              AP_TO_VE       7.91     1   FLOW           67.       64.       62.
                                            TIME         10.50     10.30     10.10

 ROUTED TO
+              BUFFALO_       7.91     1   FLOW           67.       64.       62.
                                            TIME         10.50     10.40     10.20

 HYDROGRAPH AT
+                 GD.7       1.13     1   FLOW          225.      188.      157.
                                            TIME          5.00      5.10      5.20

   2 COMBINED AT
+              BUFFALO_       9.04     1   FLOW          281.      244.      210.
                                            TIME          5.10      5.20      5.30

 ROUTED TO
+              BUFFALO_       9.04     1   FLOW          281.      244.      210.
                                            TIME          5.30      5.40      5.50

 HYDROGRAPH AT
+                 GD.4       0.00     1   FLOW            0.        0.        0.
                                            TIME          4.00      4.00      4.00

 ROUTED TO
+                     V       0.00     1   FLOW            0.        0.        0.
                                            TIME          4.80      4.80      4.80

 HYDROGRAPH AT
+                 GD.5       3.31     1   FLOW          604.      500.      409.
                                            TIME          5.20      5.30      5.30

   2 COMBINED AT
+                     .       3.31     1   FLOW          604.      500.      409.
                                            TIME          5.20      5.30      5.30

 ROUTED TO
+                     V       3.31     1   FLOW          600.      496.      406.
                                            TIME          5.60      5.70      5.70

 HYDROGRAPH AT
+                 GD.6       1.60     1   FLOW          316.      258.      207.
                                            TIME          4.40      4.40      4.50

   2 COMBINED AT
+                     .       4.91     1   FLOW          858.      709.      580.
                                            TIME          5.40      5.50      5.50

 ROUTED TO
+                     V       4.91     1   FLOW          857.      709.      579.
                                            TIME          5.50      5.50      5.50

 HYDROGRAPH AT
+                 GD.8       1.53     1   FLOW          233.      188.      148.
                                            TIME          4.70      4.70      4.80

   2 COMBINED AT
+                     .       6.44     1   FLOW         1074.      886.      724.
                                            TIME          5.40      5.50      5.50

 HYDROGRAPH AT
+                GD.34       3.84     1   FLOW          468.      378.      300.
                                            TIME          5.70      5.80      5.80

   3 COMBINED AT
+              GOWAN_SO      19.32     1   FLOW         1811.     1498.     1224.
                                            TIME          5.50      5.50      5.60
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ROUTED TO							
+	DET.GS	19.32	1	FLOW	413.	385.	361.
				TIME	7.90	7.90	7.70
			** PEAK STAGES IN FEET **				
			1	STAGE	2346.39	2344.29	2342.52
				TIME	7.90	7.90	7.70
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	413.	385.	361.
				TIME	8.00	7.90	7.80
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.90	4.90	4.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	374.	306.	246.
				TIME	6.40	6.40	6.50
2 COMBINED AT							
+	.	3.17	1	FLOW	375.	306.	246.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	147.	122.	99.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	7.90	7.90
HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50
3 COMBINED AT							
+	.	1.03	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	102.	80.	61.
				TIME	4.50	4.50	4.50

HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.40	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	6.20	6.30	6.30
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	105.	81.	61.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	.	2.16	1	FLOW	105.	81.	61.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	2.16	1	FLOW	105.	81.	61.
				TIME	5.80	5.90	5.90
ROUTED TO							
+	V	2.16	1	FLOW	105.	81.	61.
				TIME	5.90	6.00	6.10
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	67.	52.	39.
				TIME	5.60	5.70	5.70
ROUTED TO							
+	V	0.76	1	FLOW	67.	52.	38.
				TIME	5.90	6.00	6.10
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	55.	43.	33.
				TIME	5.30	5.40	5.50
3 COMBINED AT							
+	.	3.45	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	3.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10

ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.90	5.00	5.00
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.40	5.30	5.30
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.30	5.30
3 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	5.00	5.00	5.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	60.	47.	35.
				TIME	5.50	5.50	5.60
2 COMBINED AT							
+	.	0.64	1	FLOW	61.	47.	36.
				TIME	5.50	5.50	5.60
ROUTED TO							
+	V	0.64	1	FLOW	60.	47.	35.
				TIME	6.00	6.10	6.20
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	4.30	4.40	4.40
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	199.	157.	122.
				TIME	6.50	6.60	6.60
4 COMBINED AT							
+	.	6.45	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	0.	0.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.50	5.50	5.60
2 COMBINED AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.80	5.80	5.80
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	60.	48.	37.
				TIME	6.10	6.10	6.10
3 COMBINED AT							
+	.	7.01	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10

DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	1.	0.	0.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.60	4.60	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	246.	191.	144.
				TIME	4.40	4.40	4.40
2 COMBINED AT							
+	.	1.71	1	FLOW	247.	191.	144.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	V	1.71	1	FLOW	236.	183.	140.
				TIME	5.00	5.00	5.80
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	79.	63.	50.
				TIME	5.70	5.70	5.80
3 COMBINED AT							
+	.	9.40	1	FLOW	304.	239.	190.
				TIME	5.00	5.70	5.80
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	1022.	881.	759.
				TIME	6.00	6.10	6.10
ROUTED TO							
+	DET.GN	31.90	1	FLOW	329.	309.	290.
				TIME	17.40	15.30	13.40
			** PEAK STAGES IN FEET **				
			1	STAGE	2316.91	2316.16	2315.47
				TIME	17.30	15.30	13.30
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	329.	309.	290.
				TIME	17.40	15.30	13.40
ROUTED TO							
+	V	31.90	1	FLOW	329.	309.	290.
				TIME	19.90	15.40	13.40
HYDROGRAPH AT							
+	.	0.00	1	FLOW	256.	202.	155.
				TIME	6.40	6.40	6.50
ROUTED TO							
+	V	0.00	1	FLOW	254.	200.	154.
				TIME	6.80	6.80	6.90
HYDROGRAPH AT							
+	.	0.00	1	FLOW	61.	48.	37.
				TIME	6.00	6.10	6.10
ROUTED TO							
+	V	0.00	1	FLOW	59.	47.	36.
				TIME	7.00	7.00	7.00
3 COMBINED AT							
+	.	31.90	1	FLOW	593.	516.	450.
				TIME	7.00	7.00	7.00
ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	450.
				TIME	7.00	7.10	7.10

ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	449.
				TIME	7.00	7.10	7.10
ROUTED TO							
+	V	31.90	1	FLOW	593.	515.	449.
				TIME	7.10	7.10	7.20
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	6.50	6.50	6.70
ROUTED TO							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	8.50	8.50	8.70
HYDROGRAPH AT							
+	EPT.1	3.76	1	FLOW	316.	256.	204.
				TIME	7.30	7.30	7.40
2 COMBINED AT							
+	.	3.76	1	FLOW	316.	256.	204.
				TIME	7.30	7.30	7.40
ROUTED TO							
+	V	3.76	1	FLOW	313.	254.	202.
				TIME	8.00	8.10	8.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	222.	171.	128.
				TIME	5.80	5.90	6.00
ROUTED TO							
+	V	0.00	1	FLOW	211.	162.	121.
				TIME	7.80	7.90	8.00
HYDROGRAPH AT							
+	EPT.3	4.39	1	FLOW	420.	348.	284.
				TIME	7.50	7.50	7.50
3 COMBINED AT							
+	.	8.15	1	FLOW	936.	756.	602.
				TIME	7.80	7.80	7.90
HYDROGRAPH AT							
+	EPT.4	1.37	1	FLOW	176.	147.	122.
				TIME	6.50	6.60	6.60
ROUTED TO							
+	V	1.37	1	FLOW	174.	145.	120.
				TIME	7.40	7.50	7.50
2 COMBINED AT							
+	.	9.52	1	FLOW	1106.	898.	719.
				TIME	7.70	7.80	7.80
2 COMBINED AT							
+	.	41.42	1	FLOW	1674.	1394.	1153.
				TIME	7.50	7.60	7.70
HYDROGRAPH AT							
+	EPT.5	3.01	1	FLOW	218.	179.	145.
				TIME	8.50	8.60	8.60
2 COMBINED AT							
+	.	44.42	1	FLOW	1875.	1559.	1287.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	V	44.42	1	FLOW	1874.	1559.	1287.
				TIME	7.70	7.70	7.80
HYDROGRAPH AT							
+	EPT.2	1.49	1	FLOW	156.	126.	101.
				TIME	6.50	6.50	6.50
2 COMBINED AT							
+	LVWASH	45.92	1	FLOW	1993.	1654.	1362.
				TIME	7.60	7.60	7.70
HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.10
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.40	9.30	9.30
HYDROGRAPH AT							
+	301	18.62	1	FLOW	1563.	1278.	1029.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	1564.	1278.	1029.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	3520.	2903.	2371.
				TIME	7.80	7.80	7.90

ROUTED TO							
+	304	64.53	1	FLOW	3513.	2897.	2366.
				TIME	8.10	8.10	8.20
ROUTED TO							
+	SNIC	64.53	1	FLOW	3513.	2897.	2366.
				TIME	8.10	8.10	8.20
ROUTED TO							
+	LBC	64.53	1	FLOW	3512.	2896.	2364.
				TIME	8.10	8.20	8.20
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	172.	129.	95.
				TIME	4.20	4.40	4.60
ROUTED TO							
+	R310W	0.80	1	FLOW	169.	125.	94.
				TIME	4.50	4.80	5.00
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	205.	148.	113.
				TIME	4.30	4.50	5.20
2 COMBINED AT							
+	310E	2.04	1	FLOW	356.	260.	204.
				TIME	4.50	4.80	5.10
ROUTED TO							
+	R310E	2.04	1	FLOW	354.	259.	204.
				TIME	4.60	4.90	5.20
HYDROGRAPH AT							
+	311W	0.96	1	FLOW	165.	120.	88.
				TIME	4.20	4.30	5.20
2 COMBINED AT							
+	311W	3.00	1	FLOW	483.	361.	292.
				TIME	4.60	4.90	5.20
ROUTED TO							
+	R311W	3.00	1	FLOW	475.	360.	291.
				TIME	4.70	5.10	5.40
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	51.	35.	21.
				TIME	5.50	5.80	6.20
2 COMBINED AT							
+	311E	3.77	1	FLOW	487.	378.	296.
				TIME	4.80	5.40	5.40
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	30.	17.	8.
				TIME	6.10	6.70	7.60
ROUTED TO							
+	R309W	0.81	1	FLOW	30.	17.	8.
				TIME	7.60	8.50	10.10
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	155.	124.	96.
				TIME	5.10	5.30	5.50
2 COMBINED AT							
+	309E	2.00	1	FLOW	155.	124.	96.
				TIME	5.10	5.30	5.50
2 COMBINED AT							
+	.	5.77	1	FLOW	636.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCP1	5.77	1	FLOW	635.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCP2	5.77	1	FLOW	634.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCBC1	5.77	1	FLOW	633.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FC1	5.77	1	FLOW	631.	502.	391.
				TIME	4.80	5.40	5.50
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	630.	501.	391.
				TIME	4.80	5.40	5.50
HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	272.	201.	146.
				TIME	4.20	4.40	4.60
ROUTED TO							
+	R307NW	1.33	1	FLOW	270.	200.	146.
				TIME	4.30	4.50	4.70

HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	134.	100.	73.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	307NE	1.97	1	FLOW	402.	299.	218.
				TIME	4.30	4.40	4.70
2 COMBINED AT							
+	.	7.74	1	FLOW	930.	751.	594.
				TIME	4.80	5.30	5.40
ROUTED TO							
+	V	7.74	1	FLOW	918.	741.	580.
				TIME	5.50	5.70	5.80
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	9.	3.	1.
				TIME	7.80	9.60	13.70
ROUTED TO							
+	R307SW	1.10	1	FLOW	9.	3.	1.
				TIME	8.60	10.90	16.10
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	312.	235.	169.
				TIME	4.30	4.40	4.60
2 COMBINED AT							
+	307SE	2.68	1	FLOW	312.	235.	169.
				TIME	4.30	4.40	4.60
2 COMBINED AT							
+	.	10.42	1	FLOW	1150.	910.	709.
				TIME	5.30	5.60	5.70
ROUTED TO							
+	V	10.42	1	FLOW	1143.	905.	703.
				TIME	5.50	5.70	5.90
HYDROGRAPH AT							
+	308W	0.81	1	FLOW	30.	17.	8.
				TIME	6.10	6.70	7.60
ROUTED TO							
+	R308W	0.81	1	FLOW	30.	17.	8.
				TIME	6.50	7.20	8.30
HYDROGRAPH AT							
+	308E	0.72	1	FLOW	144.	107.	77.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	308E	1.53	1	FLOW	144.	107.	77.
				TIME	4.20	4.40	4.60
2 COMBINED AT							
+	.	11.95	1	FLOW	1242.	976.	756.
				TIME	5.40	5.70	5.90
ROUTED TO							
+	R307/308	11.95	1	FLOW	1241.	974.	755.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	312W	0.77	1	FLOW	83.	66.	48.
				TIME	5.20	5.30	5.50
2 COMBINED AT							
+	312W	12.72	1	FLOW	1319.	1031.	796.
				TIME	5.50	5.70	6.00
ROUTED TO							
+	R312W	12.72	1	FLOW	1317.	1031.	795.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	312E	0.70	1	FLOW	63.	47.	32.
				TIME	5.30	5.40	5.60
2 COMBINED AT							
+	312E	13.42	1	FLOW	1377.	1072.	824.
				TIME	5.50	5.80	6.00
HYDROGRAPH AT							
+	306	5.07	1	FLOW	412.	330.	260.
				TIME	7.00	7.00	7.10
3 COMBINED AT							
+	.	83.02	1	FLOW	4256.	3532.	2891.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	FC3	83.02	1	FLOW	4256.	3532.	2890.
				TIME	7.60	7.70	7.70
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	4256.	3532.	2890.
				TIME	7.70	7.70	7.70

ROUTED TO							
+	FC6	83.02	1	FLOW	4255.	3530.	2890.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	FC7	83.02	1	FLOW	4254.	3530.	2889.
				TIME	7.70	7.80	7.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	4253.	3529.	2888.
				TIME	7.80	7.80	7.90
HYDROGRAPH AT							
+	302	12.11	1	FLOW	1109.	904.	726.
				TIME	7.00	7.00	7.10
ROUTED TO							
+	303	12.11	1	FLOW	1098.	895.	719.
				TIME	7.90	7.90	7.90
HYDROGRAPH AT							
+	303	10.22	1	FLOW	629.	503.	395.
				TIME	8.10	8.20	8.20
2 COMBINED AT							
+	.	22.33	1	FLOW	1722.	1394.	1111.
				TIME	7.90	8.00	8.00
HYDROGRAPH AT							
+	304	2.90	1	FLOW	359.	294.	237.
				TIME	5.90	6.00	6.00
HYDROGRAPH AT							
+	305	3.30	1	FLOW	495.	408.	333.
				TIME	5.40	5.40	5.50
2 COMBINED AT							
+	.	6.20	1	FLOW	837.	687.	557.
				TIME	5.60	5.60	5.70
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	1635.	1434.	1245.
				TIME	9.90	9.70	9.50
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	7735.	6470.	5326.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	7734.	6469.	5326.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC3	111.56	1	FLOW	7734.	6468.	5325.
				TIME	7.80	7.80	7.90
ROUTED TO							
+	AC4	111.56	1	FLOW	7733.	6467.	5324.
				TIME	7.80	7.90	7.90
2 COMBINED AT							
+	NCHANNL	172.20	1	FLOW	8100.	6797.	5610.
				TIME	7.80	7.90	8.00

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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.06									
NC1	MANE	0.37	408.85	594.70	0.11	6.00	408.84	594.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3435E+03 EXCESS=0.0000E+00 OUTFLOW=0.3433E+03 BASIN STORAGE=0.1099E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC1	MANE	0.44	358.60	582.57	0.08	6.00	358.59	582.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2726E+03 EXCESS=0.0000E+00 OUTFLOW=0.2726E+03 BASIN STORAGE=0.6440E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC1	MANE	0.44	311.34	569.94	0.07	6.00	311.34	570.00	0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2106E+03 EXCESS=0.0000E+00 OUTFLOW=0.2106E+03 BASIN STORAGE=0.5238E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.34	408.83	596.13	0.11	6.00	408.80	594.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3433E+03 EXCESS=0.0000E+00 OUTFLOW=0.3428E+03 BASIN STORAGE=0.6045E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.32	358.59	584.22	0.08	6.00	358.57	582.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2726E+03 EXCESS=0.0000E+00 OUTFLOW=0.2723E+03 BASIN STORAGE=0.3681E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.36	311.34	572.22	0.07	6.00	311.33	570.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2106E+03 EXCESS=0.0000E+00 OUTFLOW=0.2102E+03 BASIN STORAGE=0.2993E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC2	MANE	0.94	408.80	595.89	0.11	6.00	408.80	600.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3427E+03 EXCESS=0.0000E+00 OUTFLOW=0.3424E+03 BASIN STORAGE=0.3421E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC2	MANE	0.84	358.57	583.71	0.08	6.00	358.55	588.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2722E+03 EXCESS=0.0000E+00 OUTFLOW=0.2719E+03 BASIN STORAGE=0.2048E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC2	MANE	0.88	311.32	572.16	0.06	6.00	311.30	570.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2102E+03 EXCESS=0.0000E+00 OUTFLOW=0.2101E+03 BASIN STORAGE=0.1600E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC3	MANE	2.51	408.79	604.64	0.11	6.00	408.77	600.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3423E+03 EXCESS=0.0000E+00 OUTFLOW=0.3414E+03 BASIN STORAGE=0.1116E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

NC3	MANE	2.62	358.54	592.61	0.08	6.00	358.53	588.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2719E+03 EXCESS=0.0000E+00 OUTFLOW=0.2713E+03 BASIN STORAGE=0.6817E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC3	MANE	2.74	311.30	575.47	0.06	6.00	311.29	576.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2100E+03 EXCESS=0.0000E+00 OUTFLOW=0.2096E+03 BASIN STORAGE=0.5193E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NC4	MANE	0.77	408.77	601.60	0.11	6.00	408.77	606.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3410E+03 EXCESS=0.0000E+00 OUTFLOW=0.3407E+03 BASIN STORAGE=0.3218E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NC4	MANE	0.78	358.53	589.61	0.08	6.00	358.52	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2712E+03 EXCESS=0.0000E+00 OUTFLOW=0.2709E+03 BASIN STORAGE=0.1975E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NC4	MANE	0.72	311.29	577.93	0.06	6.00	311.26	576.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2095E+03 EXCESS=0.0000E+00 OUTFLOW=0.2093E+03 BASIN STORAGE=0.1466E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

NCS	MANE	0.50	408.76	606.32	0.11	6.00	408.76	606.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3407E+03 EXCESS=0.0000E+00 OUTFLOW=0.3405E+03 BASIN STORAGE=0.1802E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

NCS	MANE	0.54	358.52	594.18	0.08	6.00	358.52	594.00	0.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2709E+03 EXCESS=0.0000E+00 OUTFLOW=0.2708E+03 BASIN STORAGE=0.1106E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

NCS	MANE	0.48	311.26	577.23	0.06	6.00	311.25	582.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2093E+03 EXCESS=0.0000E+00 OUTFLOW=0.2092E+03 BASIN STORAGE=0.8155E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.48	565.06	235.24	0.89	6.00	561.86	234.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8612E+02 EXCESS=0.0000E+00 OUTFLOW=0.8633E+02 BASIN STORAGE=0.7206E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

V	MANE	3.74	465.14	235.82	0.73	6.00	460.81	234.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7078E+02 EXCESS=0.0000E+00 OUTFLOW=0.7095E+02 BASIN STORAGE=0.6199E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.85

V	MANE	4.03	375.82	235.23	0.59	6.00	372.10	234.00	0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5747E+02 EXCESS=0.0000E+00 OUTFLOW=0.5766E+02 BASIN STORAGE=0.7762E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.06

V	MANE	3.53	557.46	240.14	0.89	6.00	556.84	240.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8633E+02 EXCESS=0.0000E+00 OUTFLOW=0.8641E+02 BASIN STORAGE=0.8356E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V	MANE	3.78	460.26	241.49	0.73	6.00	455.96	246.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7095E+02 EXCESS=0.0000E+00 OUTFLOW=0.7101E+02 BASIN STORAGE=0.8245E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

V	MANE	3.98	371.76	245.74	0.59	6.00	371.45	246.00	0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5766E+02 EXCESS=0.0000E+00 OUTFLOW=0.5774E+02 BASIN STORAGE=0.8090E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.55	864.34	244.19	0.94	6.00	861.39	246.00	0.94

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1380E+03 EXCESS=0.0000E+00 OUTFLOW=0.1381E+03 BASIN STORAGE=0.1196E-01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.79	712.74	244.38	0.78	6.00	712.64	246.00	0.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1141E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=0.1204E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.92	583.52	249.23	0.64	6.00	580.13	246.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9339E+02 EXCESS=0.0000E+00 OUTFLOW=0.9340E+02 BASIN STORAGE=0.1120E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AP_TO_VE	MANE	1.79	66.74	632.85	0.23	6.00	66.74	636.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9552E+02 EXCESS=0.0000E+00 OUTFLOW=0.9526E+02 BASIN STORAGE=0.3113E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.95

AP_TO_VE	MANE	1.68	64.38	622.51	0.22	6.00	64.38	624.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9210E+02 EXCESS=0.0000E+00 OUTFLOW=0.9176E+02 BASIN STORAGE=0.3188E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AP_TO_VE	MANE	1.81	62.01	609.91	0.21	6.00	62.01	612.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8856E+02 EXCESS=0.0000E+00 OUTFLOW=0.8828E+02 BASIN STORAGE=0.2928E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	1.34	66.74	637.76	0.22	6.00	66.74	636.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9513E+02 EXCESS=0.0000E+00 OUTFLOW=0.9481E+02 BASIN STORAGE=0.2981E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	1.34	64.38	626.84	0.22	6.00	64.38	624.00	0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9173E+02 EXCESS=0.0000E+00 OUTFLOW=0.9144E+02 BASIN STORAGE=0.2923E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	1.34	62.01	614.25	0.21	6.00	62.01	612.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8820E+02 EXCESS=0.0000E+00 OUTFLOW=0.8799E+02 BASIN STORAGE=0.2865E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

BUFFALO_	MANE	4.02	281.30	315.96	0.31	6.00	281.26	318.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1522E+03 EXCESS=0.0000E+00 OUTFLOW=0.1509E+03 BASIN STORAGE=0.1645E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.95

BUFFALO_	MANE	4.11	243.64	320.29	0.29	6.00	243.61	324.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1392E+03 EXCESS=0.0000E+00 OUTFLOW=0.1377E+03 BASIN STORAGE=0.1601E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

BUFFALO_	MANE	4.42	209.86	329.05	0.26	6.00	209.78	330.00	0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1272E+03 EXCESS=0.0000E+00 OUTFLOW=0.1259E+03 BASIN STORAGE=0.1455E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

V	MANE	1.35	857.68	327.02	0.83	6.00	856.85	330.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2184E+03 EXCESS=0.0000E+00 OUTFLOW=0.2184E+03 BASIN STORAGE=0.2821E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

V	MANE	1.32	709.43	332.16	0.68	6.00	709.40	330.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1787E+03 EXCESS=0.0000E+00 OUTFLOW=0.1787E+03 BASIN STORAGE=0.2405E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

V	MANE	1.47	579.99	332.23	0.55	6.00	579.47	330.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1444E+03 EXCESS=0.0000E+00 OUTFLOW=0.1444E+03 BASIN STORAGE=0.2612E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

R.GSOUT	MANE	1.00	412.54	479.97	0.46	6.00	412.54	480.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4762E+03 EXCESS=0.0000E+00 OUTFLOW=0.4754E+03 BASIN STORAGE=0.7008E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R.GSOUT	MANE	1.02	384.80	474.78	0.41	6.00	384.80	474.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4197E+03 EXCESS=0.0000E+00 OUTFLOW=0.4192E+03 BASIN STORAGE=0.5230E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R.GSOUT	MANE	1.01	361.33	464.52	0.35	6.00	361.33	468.00	0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3625E+03 EXCESS=0.0000E+00 OUTFLOW=0.3620E+03 BASIN STORAGE=0.4237E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

V	MANE	2.98	105.08	348.96	0.23	6.00	105.02	348.00	0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2622E+02 EXCESS=0.0000E+00 OUTFLOW=0.2622E+02 BASIN STORAGE=0.1064E-02 PERCENT ERROR= 0.0

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          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.24     81.14    353.49      0.17      6.00     81.11    354.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2002E+02 EXCESS=0.0000E+00 OUTFLOW=0.2002E+02 BASIN STORAGE=0.1075E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          3.59     61.14    356.78      0.13      6.00     61.07    354.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1491E+02 EXCESS=0.0000E+00 OUTFLOW=0.1491E+02 BASIN STORAGE=0.1025E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          3.58    104.97    356.01      0.23      6.00    104.82    354.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2622E+02 EXCESS=0.0000E+00 OUTFLOW=0.2622E+02 BASIN STORAGE=0.1099E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          3.87     81.03    360.13      0.17      6.00     81.03    360.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2003E+02 EXCESS=0.0000E+00 OUTFLOW=0.2003E+02 BASIN STORAGE=0.1222E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          4.18     61.06    362.97      0.13      6.00     61.04    366.00         0.13

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1491E+02 EXCESS=0.0000E+00 OUTFLOW=0.1491E+02 BASIN STORAGE=0.1235E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          6.00     67.38    359.35      0.40      6.00     67.37    354.00         0.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1620E+02 EXCESS=0.0000E+00 OUTFLOW=0.1621E+02 BASIN STORAGE=0.1127E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          6.00     51.55    357.99      0.30      6.00     51.53    360.00         0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1224E+02 EXCESS=0.0000E+00 OUTFLOW=0.1225E+02 BASIN STORAGE=0.1147E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          5.77     38.47    369.09      0.22      6.00     38.44    366.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8994E+01 EXCESS=0.0000E+00 OUTFLOW=0.8996E+01 BASIN STORAGE=0.1031E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          R.G-UPS.  MANE          0.75    328.91   1045.76      0.24      6.00    328.91   1050.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4010E+03 EXCESS=0.0000E+00 OUTFLOW=0.4003E+03 BASIN STORAGE=0.6315E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          R.G-UPS.  MANE          0.75    308.77    919.48      0.22      6.00    308.77    918.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3745E+03 EXCESS=0.0000E+00 OUTFLOW=0.3738E+03 BASIN STORAGE=0.5978E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          R.G-UPS.  MANE          0.76    290.37    805.18      0.21      6.00    290.37    804.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3492E+03 EXCESS=0.0000E+00 OUTFLOW=0.3487E+03 BASIN STORAGE=0.5589E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.61    332.10   1194.83      0.23      6.00    328.98   1194.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4002E+03 EXCESS=0.0000E+00 OUTFLOW=0.3983E+03 BASIN STORAGE=0.2225E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.69    308.77    921.72      0.22      6.00    308.77    924.00         0.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3738E+03 EXCESS=0.0000E+00 OUTFLOW=0.3723E+03 BASIN STORAGE=0.2096E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.71    290.37    806.34      0.20      6.00    290.37    804.00         0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3485E+03 EXCESS=0.0000E+00 OUTFLOW=0.3468E+03 BASIN STORAGE=0.2003E+01 PERCENT ERROR=  -0.1
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          FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.69    593.09    420.49      0.29      6.00    593.09    420.00         0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4945E+03 EXCESS=0.0000E+00 OUTFLOW=0.4920E+03 BASIN STORAGE=0.2968E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.66    515.58    423.77      0.26      6.00    515.31    426.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4470E+03 EXCESS=0.0000E+00 OUTFLOW=0.4448E+03 BASIN STORAGE=0.2809E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.72    449.62    423.95      0.24      6.00    449.61    426.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4042E+03 EXCESS=0.0000E+00 OUTFLOW=0.4017E+03 BASIN STORAGE=0.2662E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          0.91    593.02    421.33      0.29      6.00    592.83    420.00         0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4915E+03 EXCESS=0.0000E+00 OUTFLOW=0.4901E+03 BASIN STORAGE=0.1563E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.02    515.30    425.92      0.26      6.00    515.30    426.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4442E+03 EXCESS=0.0000E+00 OUTFLOW=0.4430E+03 BASIN STORAGE=0.1480E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.04    449.56    428.50      0.24      6.00    449.42    426.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4016E+03 EXCESS=0.0000E+00 OUTFLOW=0.4005E+03 BASIN STORAGE=0.1405E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          0.98    592.79    422.48      0.29      6.00    592.60    426.00         0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4900E+03 EXCESS=0.0000E+00 OUTFLOW=0.4889E+03 BASIN STORAGE=0.1566E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          0.99    515.25    427.21      0.26      6.00    515.18    426.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4428E+03 EXCESS=0.0000E+00 OUTFLOW=0.4413E+03 BASIN STORAGE=0.1482E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          0.91    449.42    428.04      0.23      6.00    449.32    432.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4002E+03 EXCESS=0.0000E+00 OUTFLOW=0.3990E+03 BASIN STORAGE=0.1404E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               V  MANE          1.01   1875.36    458.09      0.44      6.00   1874.32    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1046E+04 EXCESS=0.0000E+00 OUTFLOW=0.1043E+04 BASIN STORAGE=0.2998E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               V  MANE          1.12   1559.13    463.40      0.38      6.00   1558.97    462.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8945E+03 EXCESS=0.0000E+00 OUTFLOW=0.8924E+03 BASIN STORAGE=0.2845E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
               V  MANE          1.28   1287.14    464.19      0.32      6.00   1286.83    468.00         0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7622E+03 EXCESS=0.0000E+00 OUTFLOW=0.7601E+03 BASIN STORAGE=0.2685E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
              SNIC  MANE          0.63   3512.94    487.03      0.55      6.00   3512.68    486.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1880E+04 EXCESS=0.0000E+00 OUTFLOW=0.1878E+04 BASIN STORAGE=0.1808E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              SNIC  MANE          0.66   2897.38    487.67      0.46      6.00   2896.50    486.00         0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1572E+04 EXCESS=0.0000E+00 OUTFLOW=0.1570E+04 BASIN STORAGE=0.1693E+01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 0.85
              SNIC  MANE          0.76   2365.71    493.23       0.38       6.00   2365.50    492.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1304E+04 EXCESS=0.0000E+00 OUTFLOW=0.1303E+04 BASIN STORAGE=0.1582E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               LBC  MANE          1.01   3512.40    487.52       0.54       6.00   3511.56    486.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1879E+04 EXCESS=0.0000E+00 OUTFLOW=0.1875E+04 BASIN STORAGE=0.3599E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               LBC  MANE          1.22   2896.46    488.82       0.46       6.00   2896.26    492.00         0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1570E+04 EXCESS=0.0000E+00 OUTFLOW=0.1567E+04 BASIN STORAGE=0.3384E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               LBC  MANE          1.26   2365.33    494.70       0.38       6.00   2364.50    492.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1303E+04 EXCESS=0.0000E+00 OUTFLOW=0.1300E+04 BASIN STORAGE=0.3176E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          5.94    148.70    260.63       0.64       6.00    147.96    258.00         0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2768E+02 OUTFLOW=0.2718E+02 BASIN STORAGE=0.1537E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 1.06
              310W  MANE          5.70    174.39    253.92       0.71       6.00    171.81    252.00         0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3081E+02 OUTFLOW=0.3032E+02 BASIN STORAGE=0.1527E+00 PERCENT ERROR=   1.1

          FOR PLAN = 1  RATIO= 0.95
              310W  MANE          6.00    129.01    260.11       0.58       6.00    128.62    264.00         0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2514E+02 OUTFLOW=0.2466E+02 BASIN STORAGE=0.1607E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.85
              310W  MANE          5.59     95.31    275.19       0.46       6.00     94.99    276.00         0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2025E+02 OUTFLOW=0.1980E+02 BASIN STORAGE=0.1654E+00 PERCENT ERROR=   1.4

          FOR PLAN = 1  RATIO= 1.06
             R310W  MANE          5.75    171.16    271.50       0.71       6.00    168.82    270.00         0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3028E+02 EXCESS=0.0000E+00 OUTFLOW=0.3047E+02 BASIN STORAGE=0.1820E+00 PERCENT ERROR=  -1.2

          FOR PLAN = 1  RATIO= 0.95
             R310W  MANE          6.00    127.17    285.27       0.57       6.00    124.76    288.00         0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2464E+02 EXCESS=0.0000E+00 OUTFLOW=0.2449E+02 BASIN STORAGE=0.1756E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
             R310W  MANE          5.82     94.60    295.90       0.47       6.00     94.06    300.00         0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1980E+02 EXCESS=0.0000E+00 OUTFLOW=0.2003E+02 BASIN STORAGE=0.1824E+00 PERCENT ERROR=  -2.1

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          5.28    174.02    263.95       0.52       6.00    173.97    264.00         0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3515E+02 OUTFLOW=0.3452E+02 BASIN STORAGE=0.2076E+00 PERCENT ERROR=   1.2

          FOR PLAN = 1  RATIO= 1.06
              310E  MANE          6.29    205.07    254.21       0.59       6.00    205.02    258.00         0.59

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3952E+02 OUTFLOW=0.3887E+02 BASIN STORAGE=0.1776E+00 PERCENT ERROR=   1.2

          FOR PLAN = 1  RATIO= 0.95
              310E  MANE          5.61    147.73    269.85       0.47       6.00    147.63    270.00         0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3163E+02 OUTFLOW=0.3101E+02 BASIN STORAGE=0.2099E+00 PERCENT ERROR=   1.3

          FOR PLAN = 1  RATIO= 0.85
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310E	MANE	6.00	113.70	314.93	0.37	6.00	113.36	312.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2491E+02 OUTFLOW=0.2434E+02 BASIN STORAGE=0.2074E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	3.07	354.32	275.93	0.64	6.00	354.21	276.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6929E+02 EXCESS=0.0000E+00 OUTFLOW=0.6908E+02 BASIN STORAGE=0.1423E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	3.37	259.85	295.07	0.51	6.00	258.99	294.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5548E+02 EXCESS=0.0000E+00 OUTFLOW=0.5531E+02 BASIN STORAGE=0.1358E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	3.70	204.09	312.03	0.41	6.00	204.09	312.00	0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4434E+02 EXCESS=0.0000E+00 OUTFLOW=0.4417E+02 BASIN STORAGE=0.1364E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	3.87	139.84	256.28	0.51	6.00	138.81	258.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2679E+02 OUTFLOW=0.2635E+02 BASIN STORAGE=0.1283E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

311W	MANE	3.64	165.70	250.86	0.58	6.00	165.26	252.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3015E+02 OUTFLOW=0.2970E+02 BASIN STORAGE=0.1218E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

311W	MANE	4.11	119.52	257.33	0.46	6.00	119.52	258.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2408E+02 OUTFLOW=0.2367E+02 BASIN STORAGE=0.1236E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

311W	MANE	4.71	88.23	313.09	0.36	6.00	88.10	312.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1892E+02 OUTFLOW=0.1853E+02 BASIN STORAGE=0.1236E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R311W	MANE	3.75	478.05	285.17	0.62	6.00	474.86	282.00	0.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9885E+02 EXCESS=0.0000E+00 OUTFLOW=0.9849E+02 BASIN STORAGE=0.2496E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R311W	MANE	4.18	360.06	304.62	0.49	6.00	359.63	306.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7896E+02 EXCESS=0.0000E+00 OUTFLOW=0.7866E+02 BASIN STORAGE=0.2474E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R311W	MANE	4.63	291.79	322.46	0.39	6.00	291.33	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6269E+02 EXCESS=0.0000E+00 OUTFLOW=0.6244E+02 BASIN STORAGE=0.2437E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

311E	MANE	5.50	42.24	339.06	0.20	6.00	42.15	336.00	0.20

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8698E+01 OUTFLOW=0.8411E+01 BASIN STORAGE=0.1319E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 1.06

311E	MANE	6.00	51.46	331.45	0.24	6.00	51.34	330.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1034E+02 OUTFLOW=0.1003E+02 BASIN STORAGE=0.1243E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.95

311E	MANE	5.96	35.14	346.37	0.17	6.00	34.98	348.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7413E+01 OUTFLOW=0.7150E+01 BASIN STORAGE=0.1274E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.85

311E	MANE	6.00	21.61	368.74	0.12	6.00	21.47	372.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5095E+01 OUTFLOW=0.4858E+01 BASIN STORAGE=0.1257E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.90	22.64	384.32	0.12	6.00	22.62	384.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5639E+01 OUTFLOW=0.5349E+01 BASIN STORAGE=0.1648E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.95	30.35	366.98	0.15	6.00	30.26	366.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6969E+01 OUTFLOW=0.6651E+01 BASIN STORAGE=0.1689E+00 PERCENT ERROR= 2.1

FOR PLAN = 1 RATIO= 0.95

309W	MANE	5.80	17.04	402.23	0.10	6.00	17.03	402.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4621E+01 OUTFLOW=0.4342E+01 BASIN STORAGE=0.1618E+00 PERCENT ERROR= 2.5

FOR PLAN = 1 RATIO= 0.85

309W	MANE	6.00	8.21	455.90	0.06	6.00	8.21	456.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2853E+01 OUTFLOW=0.2592E+01 BASIN STORAGE=0.1650E+00 PERCENT ERROR= 3.4

FOR PLAN = 1 RATIO= 1.06

R309W	MANE	6.00	30.15	455.84	0.17	6.00	30.13	456.00	0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6646E+01 EXCESS=0.0000E+00 OUTFLOW=0.7351E+01 BASIN STORAGE=0.5630E+00 PERCENT ERROR= -19.1

FOR PLAN = 1 RATIO= 0.95

R309W	MANE	6.00	16.92	514.39	0.11	6.00	16.88	510.00	0.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4332E+01 EXCESS=0.0000E+00 OUTFLOW=0.4879E+01 BASIN STORAGE=0.5540E+00 PERCENT ERROR= -25.4

FOR PLAN = 1 RATIO= 0.85

R309W	MANE	6.00	8.17	606.06	0.06	6.00	8.17	606.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2584E+01 EXCESS=0.0000E+00 OUTFLOW=0.2722E+01 BASIN STORAGE=0.5666E+00 PERCENT ERROR= -27.2

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	138.51	314.78	0.50	6.00	138.45	312.00	0.50

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3261E+02 OUTFLOW=0.3180E+02 BASIN STORAGE=0.4115E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.00	155.36	308.43	0.56	6.00	155.32	306.00	0.56

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3668E+02 OUTFLOW=0.3583E+02 BASIN STORAGE=0.4399E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	124.60	316.82	0.45	6.00	124.50	318.00	0.45

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2932E+02 OUTFLOW=0.2852E+02 BASIN STORAGE=0.4342E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	95.78	328.15	0.35	6.00	95.73	330.00	0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2307E+02 OUTFLOW=0.2235E+02 BASIN STORAGE=0.4099E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

FCP1	MANE	0.21	635.52	288.38	0.49	6.00	635.01	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.4616E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP1	MANE	0.21	502.01	324.23	0.39	6.00	501.96	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.4563E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP1	MANE	0.21	391.20	330.09	0.30	6.00	391.19	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9225E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.4510E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCP2	MANE	0.36	634.69	288.58	0.49	6.00	633.60	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.8037E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCP2	MANE	0.32	501.91	324.57	0.39	6.00	501.78	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.7944E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCP2	MANE	0.43	391.11	330.51	0.30	6.00	391.08	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9225E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.7859E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC1	MANE	0.23	633.42	288.55	0.49	6.00	632.61	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1831E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC1	MANE	0.30	501.72	324.28	0.39	6.00	501.66	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1816E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC1	MANE	0.19	391.05	330.28	0.30	6.00	390.98	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9224E+02 BASIN STORAGE=0.1799E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC1	MANE	0.31	632.44	288.57	0.49	6.00	631.43	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1516E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1975E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC1	MANE	0.29	501.60	324.46	0.39	6.00	501.53	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1191E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1958E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC1	MANE	0.21	390.95	330.44	0.30	6.00	390.84	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9223E+02 BASIN STORAGE=0.1943E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC2/FC	MANE	0.27	631.31	288.73	0.49	6.00	630.16	288.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1517E+03 EXCESS=0.0000E+00 OUTFLOW=0.1516E+03 BASIN STORAGE=0.1891E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC2/FC	MANE	0.32	501.47	324.39	0.39	6.00	501.39	324.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1192E+03 EXCESS=0.0000E+00 OUTFLOW=0.1191E+03 BASIN STORAGE=0.1873E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC2/FC	MANE	0.22	390.78	330.29	0.30	6.00	390.68	330.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9226E+02 EXCESS=0.0000E+00 OUTFLOW=0.9223E+02 BASIN STORAGE=0.1859E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	4.04	232.72	257.22	0.61	6.00	232.09	258.00	0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4392E+02 OUTFLOW=0.4318E+02 BASIN STORAGE=0.2276E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

307NW	MANE	3.83	272.05	251.40	0.68	6.00	271.79	252.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4899E+02 OUTFLOW=0.4824E+02 BASIN STORAGE=0.2273E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

307NW	MANE	4.23	202.53	262.82	0.55	6.00	201.37	264.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3980E+02 OUTFLOW=0.3912E+02 BASIN STORAGE=0.2137E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307NW	MANE	4.81	146.02	270.47	0.44	6.00	145.66	276.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3189E+02 OUTFLOW=0.3121E+02 BASIN STORAGE=0.2248E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

R307NW	MANE	2.66	269.92	256.48	0.68	6.00	269.81	258.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4826E+02 EXCESS=0.0000E+00 OUTFLOW=0.4809E+02 BASIN STORAGE=0.7468E-01 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R307NW	MANE	2.94	201.30	268.45	0.55	6.00	200.28	270.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3908E+02 EXCESS=0.0000E+00 OUTFLOW=0.3896E+02 BASIN STORAGE=0.7315E-01 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R307NW	MANE	3.39	145.64	279.69	0.44	6.00	145.55	282.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3120E+02 EXCESS=0.0000E+00 OUTFLOW=0.3111E+02 BASIN STORAGE=0.7527E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	3.33	115.50	257.68	0.64	6.00	115.42	258.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2215E+02 OUTFLOW=0.2177E+02 BASIN STORAGE=0.1199E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 1.06

307NE	MANE	3.24	134.35	254.63	0.71	6.00	134.27	252.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2465E+02 OUTFLOW=0.2427E+02 BASIN STORAGE=0.1182E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.95

307NE	MANE	3.50	100.43	263.17	0.58	6.00	100.17	264.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2011E+02 OUTFLOW=0.1976E+02 BASIN STORAGE=0.1192E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307NE	MANE	3.95	73.34	271.72	0.46	6.00	73.17	276.00	0.46

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1620E+02 OUTFLOW=0.1584E+02 BASIN STORAGE=0.1174E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

307SW	MANE	6.00	5.33	515.28	0.04	6.00	5.33	516.00	0.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2491E+01 OUTFLOW=0.2148E+01 BASIN STORAGE=0.2070E+00 PERCENT ERROR= 5.5

FOR PLAN = 1 RATIO= 1.06

307SW	MANE	5.53	9.18	468.60	0.05	6.00	9.17	468.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3486E+01 OUTFLOW=0.3127E+01 BASIN STORAGE=0.2125E+00 PERCENT ERROR= 4.2

FOR PLAN = 1 RATIO= 0.95

307SW	MANE	5.90	3.08	577.78	0.02	6.00	3.08	576.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1781E+01 OUTFLOW=0.1448E+01 BASIN STORAGE=0.2032E+00 PERCENT ERROR= 7.3

FOR PLAN = 1 RATIO= 0.85

307SW	MANE	5.95	0.68	823.08	0.01	6.00	0.68	822.00	0.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7071E+00 OUTFLOW=0.3969E+00 BASIN STORAGE=0.1963E+00 PERCENT ERROR= 16.1

FOR PLAN = 1 RATIO= 1.06

R307SW	MANE	6.00	9.17	516.90	0.05	6.00	9.16	516.00	0.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3123E+01 EXCESS=0.0000E+00 OUTFLOW=0.2935E+01 BASIN STORAGE=0.1820E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R307SW	MANE	6.00	3.08	655.40	0.02	6.00	3.07	654.00	0.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1443E+01 EXCESS=0.0000E+00 OUTFLOW=0.1266E+01 BASIN STORAGE=0.1841E+00 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 0.85

R307SW	MANE	6.00	0.68	973.72	0.00	6.00	0.68	972.00	0.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3963E+00 EXCESS=0.0000E+00 OUTFLOW=0.2282E+00 BASIN STORAGE=0.1770E+00 PERCENT ERROR= -2.3

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.32	268.90	258.33	0.60	6.00	268.20	258.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5155E+02 OUTFLOW=0.5063E+02 BASIN STORAGE=0.2951E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

307SE	MANE	4.07	314.78	256.60	0.67	6.00	312.31	258.00	0.67

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5754E+02 OUTFLOW=0.5660E+02 BASIN STORAGE=0.2981E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

307SE	MANE	4.66	235.05	263.94	0.54	6.00	235.01	264.00	0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4669E+02 OUTFLOW=0.4583E+02 BASIN STORAGE=0.2817E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.85

307SE	MANE	5.29	169.18	276.50	0.43	6.00	168.87	276.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3736E+02 OUTFLOW=0.3650E+02 BASIN STORAGE=0.2999E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	22.21	385.17	0.12	6.00	22.16	384.00	0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5616E+01 OUTFLOW=0.5315E+01 BASIN STORAGE=0.1688E+00 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 1.06

308W	MANE	6.00	29.67	367.58	0.15	6.00	29.53	366.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6944E+01 OUTFLOW=0.6616E+01 BASIN STORAGE=0.1717E+00 PERCENT ERROR= 2.2

FOR PLAN = 1 RATIO= 0.95

308W	MANE	5.97	16.65	403.34	0.10	6.00	16.62	402.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4601E+01 OUTFLOW=0.4320E+01 BASIN STORAGE=0.1636E+00 PERCENT ERROR= 2.6

FOR PLAN = 1 RATIO= 0.85

308W	MANE	6.00	7.97	457.44	0.06	6.00	7.97	456.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2837E+01 OUTFLOW=0.2569E+01 BASIN STORAGE=0.1643E+00 PERCENT ERROR= 3.7

FOR PLAN = 1 RATIO= 1.06

R308W	MANE	5.87	29.52	390.00	0.15	6.00	29.52	390.00	0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6616E+01 EXCESS=0.0000E+00 OUTFLOW=0.6489E+01 BASIN STORAGE=0.1162E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.95

R308W	MANE	6.00	16.61	433.08	0.10	6.00	16.53	432.00	0.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4309E+01 EXCESS=0.0000E+00 OUTFLOW=0.4182E+01 BASIN STORAGE=0.1180E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.85

R308W	MANE	6.00	7.95	501.06	0.06	6.00	7.94	498.00	0.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2566E+01 EXCESS=0.0000E+00 OUTFLOW=0.2445E+01 BASIN STORAGE=0.1207E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

308E	MANE	4.97	124.60	256.26	0.58	6.00	124.01	258.00	0.58

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2281E+02 OUTFLOW=0.2242E+02 BASIN STORAGE=0.1245E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 1.06

308E	MANE	4.63	144.34	250.59	0.65	6.00	144.19	252.00	0.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2550E+02 OUTFLOW=0.2510E+02 BASIN STORAGE=0.1202E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.95

308E	MANE	5.24	107.88	261.65	0.53	6.00	106.79	264.00	0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2063E+02 OUTFLOW=0.2026E+02 BASIN STORAGE=0.1187E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.85

308E	MANE	5.97	77.23	274.53	0.42	6.00	76.91	276.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1646E+02 OUTFLOW=0.1610E+02 BASIN STORAGE=0.1166E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 1.06

R307/308	MANE	2.14	1241.63	328.39	0.49	6.00	1240.77	330.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3149E+03 EXCESS=0.0000E+00 OUTFLOW=0.3142E+03 BASIN STORAGE=0.5224E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R307/308	MANE	2.32	975.40	346.04	0.39	6.00	974.25	348.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2491E+03 EXCESS=0.0000E+00 OUTFLOW=0.2485E+03 BASIN STORAGE=0.5040E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R307/308	MANE	2.57	755.73	358.50	0.30	6.00	754.90	360.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1942E+03 EXCESS=0.0000E+00 OUTFLOW=0.1937E+03 BASIN STORAGE=0.4962E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.78	73.39	318.46	0.36	6.00	73.36	318.00	0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1537E+02 OUTFLOW=0.1495E+02 BASIN STORAGE=0.1484E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 1.06

312W	MANE	5.41	83.66	314.47	0.42	6.00	83.36	312.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1762E+02 OUTFLOW=0.1721E+02 BASIN STORAGE=0.1430E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 0.95

312W	MANE	6.00	65.88	322.34	0.32	6.00	65.63	318.00	0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1357E+02 OUTFLOW=0.1320E+02 BASIN STORAGE=0.1372E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 0.85

312W	MANE	5.26	48.38	329.47	0.24	6.00	48.36	330.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1021E+02 OUTFLOW=0.9868E+01 BASIN STORAGE=0.1466E+00 PERCENT ERROR= 1.9

FOR PLAN = 1 RATIO= 1.06

R312W	MANE	2.08	1318.81	333.46	0.49	6.00	1316.84	330.00	0.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3314E+03 EXCESS=0.0000E+00 OUTFLOW=0.3308E+03 BASIN STORAGE=0.5518E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R312W	MANE	2.30	1031.08	347.06	0.38	6.00	1030.80	348.00	0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2616E+03 EXCESS=0.0000E+00 OUTFLOW=0.2610E+03 BASIN STORAGE=0.5454E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	2.52	795.39	362.64	0.30	6.00	795.05	360.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2034E+03 EXCESS=0.0000E+00 OUTFLOW=0.2028E+03 BASIN STORAGE=0.5431E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312E	MANE	5.01	54.52	322.70	0.29	6.00	54.42	318.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1099E+02 OUTFLOW=0.1072E+02 BASIN STORAGE=0.1012E+00 PERCENT ERROR= 1.6

```
          FOR PLAN = 1  RATIO= 1.06
              312E  MANE          6.00     63.19    317.91      0.33      6.00     63.18    318.00         0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1278E+02 OUTFLOW=0.1248E+02 BASIN STORAGE=0.1050E+00 PERCENT ERROR=    1.6

          FOR PLAN = 1  RATIO= 0.95
              312E  MANE          5.27     46.70    327.72      0.25      6.00     46.67    324.00         0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9573E+01 OUTFLOW=0.9311E+01 BASIN STORAGE=0.9888E-01 PERCENT ERROR=    1.7

          FOR PLAN = 1  RATIO= 0.85
              312E  MANE          6.00     32.30    335.77      0.18      6.00     32.29    336.00         0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6960E+01 OUTFLOW=0.6722E+01 BASIN STORAGE=0.1039E+00 PERCENT ERROR=    1.9

          FOR PLAN = 1  RATIO= 1.06
              FC3  MANE          0.33   4256.33    456.92      0.54      6.00   4255.81    456.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2374E+04 EXCESS=0.0000E+00 OUTFLOW=0.2374E+04 BASIN STORAGE=0.8051E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
              FC3  MANE          0.44   3531.80    462.48      0.44      6.00   3531.75    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1961E+04 EXCESS=0.0000E+00 OUTFLOW=0.1961E+04 BASIN STORAGE=0.7540E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
              FC3  MANE          0.35   2890.49    462.70      0.36      6.00   2890.12    462.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1606E+04 EXCESS=0.0000E+00 OUTFLOW=0.1606E+04 BASIN STORAGE=0.7039E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
              FC4/FC5  MANE          0.33   4255.80    456.64      0.54      6.00   4255.57    462.00         0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2374E+04 EXCESS=0.0000E+00 OUTFLOW=0.2373E+04 BASIN STORAGE=0.6313E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
              FC4/FC5  MANE          0.25   3531.68    462.43      0.44      6.00   3531.61    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1961E+04 EXCESS=0.0000E+00 OUTFLOW=0.1960E+04 BASIN STORAGE=0.5931E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
              FC4/FC5  MANE          0.26   2890.10    462.62      0.36      6.00   2889.82    462.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1606E+04 EXCESS=0.0000E+00 OUTFLOW=0.1605E+04 BASIN STORAGE=0.5557E+00 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 1.06
              FC6  MANE          1.73   4255.49    463.12      0.53      6.00   4255.46    462.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2373E+04 EXCESS=0.0000E+00 OUTFLOW=0.2367E+04 BASIN STORAGE=0.5128E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
              FC6  MANE          1.74   3531.15    464.39      0.44      6.00   3530.20    462.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1960E+04 EXCESS=0.0000E+00 OUTFLOW=0.1956E+04 BASIN STORAGE=0.4803E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
              FC6  MANE          1.78   2889.78    466.26      0.36      6.00   2889.67    468.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1605E+04 EXCESS=0.0000E+00 OUTFLOW=0.1602E+04 BASIN STORAGE=0.4491E+01 PERCENT ERROR=   -0.1

          FOR PLAN = 1  RATIO= 1.06
              FC7  MANE          0.86   4255.20    463.34      0.53      6.00   4254.44    462.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2367E+04 EXCESS=0.0000E+00 OUTFLOW=0.2365E+04 BASIN STORAGE=0.2585E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.95
              FC7  MANE          0.83   3530.18    463.95      0.44      6.00   3530.03    468.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1955E+04 EXCESS=0.0000E+00 OUTFLOW=0.1952E+04 BASIN STORAGE=0.2430E+01 PERCENT ERROR=    0.0

          FOR PLAN = 1  RATIO= 0.85
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          FC7  MANE          0.92   2889.47    469.39      0.36      6.00   2888.91    468.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1600E+04 EXCESS=0.0000E+00 OUTFLOW=0.1598E+04 BASIN STORAGE=0.2273E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 1.06
       FCBC4/FC  MANE          1.05   4254.29    463.95      0.53      6.00   4253.47    468.00         0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2365E+04 EXCESS=0.0000E+00 OUTFLOW=0.2361E+04 BASIN STORAGE=0.3538E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
       FCBC4/FC  MANE          1.15   3529.96    470.29      0.44      6.00   3529.49    468.00         0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1952E+04 EXCESS=0.0000E+00 OUTFLOW=0.1949E+04 BASIN STORAGE=0.3320E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.85
       FCBC4/FC  MANE          1.20   2888.80    471.04      0.36      6.00   2888.33    474.00         0.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1598E+04 EXCESS=0.0000E+00 OUTFLOW=0.1594E+04 BASIN STORAGE=0.3112E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 1.06
       RRCHANNL  MANE          5.97      0.16    463.63      0.87      6.00      0.16    462.00         0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

       FOR PLAN = 1  RATIO= 0.95
       RRCHANNL  MANE          5.97      0.12    484.09      0.71      6.00      0.12    486.00         0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

       FOR PLAN = 1  RATIO= 0.85
       RRCHANNL  MANE          6.00      0.09    550.79      0.57      6.00      0.09    552.00         0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

       FOR PLAN = 1  RATIO= 1.06
        AC1/AC2  MANE          0.62   7734.44    468.74      0.79      6.00   7734.33    468.00         0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4713E+04 EXCESS=0.0000E+00 OUTFLOW=0.4709E+04 BASIN STORAGE=0.3515E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
        AC1/AC2  MANE          0.64   6469.86    469.13      0.64      6.00   6468.73    468.00         0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3828E+04 EXCESS=0.0000E+00 OUTFLOW=0.3825E+04 BASIN STORAGE=0.2868E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.85
        AC1/AC2  MANE          0.67   5326.02    475.43      0.51      6.00   5325.69    474.00         0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3063E+04 EXCESS=0.0000E+00 OUTFLOW=0.3060E+04 BASIN STORAGE=0.2605E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 1.06
             AC3  MANE          0.44   7734.12    468.50      0.79      6.00   7733.87    468.00         0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4709E+04 EXCESS=0.0000E+00 OUTFLOW=0.4706E+04 BASIN STORAGE=0.2607E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
             AC3  MANE          0.52   6468.60    469.24      0.64      6.00   6467.53    468.00         0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3825E+04 EXCESS=0.0000E+00 OUTFLOW=0.3823E+04 BASIN STORAGE=0.2143E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.85
             AC3  MANE          0.46   5325.53    474.67      0.51      6.00   5325.12    474.00         0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3061E+04 EXCESS=0.0000E+00 OUTFLOW=0.3059E+04 BASIN STORAGE=0.1946E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 1.06
             AC4  MANE          0.54   7733.59    469.15      0.79      6.00   7733.10    468.00         0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4706E+04 EXCESS=0.0000E+00 OUTFLOW=0.4703E+04 BASIN STORAGE=0.3175E+01 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
             AC4  MANE          0.51   6467.52    469.28      0.64      6.00   6467.33    474.00         0.64
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3823E+04 EXCESS=0.0000E+00 OUTFLOW=0.3820E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC4	MANE	0.57	5325.02	475.24	0.51	6.00	5324.25	474.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3059E+04 EXCESS=0.0000E+00 OUTFLOW=0.3057E+04 BASIN STORAGE=0.2368E+01 PERCENT ERROR= 0.0

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/10/96  TIME  16:22:53   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X         XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                *DIAGRAM
             1  ID          FEMA FLOOD INSURANCE STUDY, 1996
             2  ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
             3  ID          LOWER CENTRAL VALLEY 500-YEAR STORM
             4  ID
             5  ID          Current (05/96) model based on a HEC-1 model prepared by James M
             6  ID          Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance
             7  ID          Study Hydrology Report dated 9/91.  Three modifications were made
             8  ID          to the source model.  First, Upper Las Vegas Detention Basin storage
             9  ID          and outflow characteristics were revised to reflect the as-built
            10  ID          configuration described by construction drawings dated 5/91 and HEC-1
            11  ID          models prepared in 1993 by Black & Veatch.  Second, the stage-outflow
            12  ID          relationship for the North Las Vegas Detention Basin was revised
            13  ID          to reflect the current three-pipe outlet condition (two of the five
            14  ID          pipes were blocked following construction of the upper basin) and the
            15  ID          hydraulic control created by the 4-foot high barrier wall located
            16  ID          upstream from the pipe inlets.  Third, the source 100-year model
            17  ID          was converted to reflect 500-year conditions by replacing all PB
            18  ID          cards with 500-year amounts.  500-year rainfall amounts were
            19  ID          determined for each subbasin by frequency extrapolation of the
            20  ID          amounts presented by JMM in the 10-, 50-, and 100-year Lower Central
            21  ID          Valley Storm models.
            22  ID
            23  ID          Remaining comments are from the original model dated 1/91.
            24  ID
            25  ID          CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
            26  ID          Northern Las Vegas Wash - FIS FLOWS
            27  ID          Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91
            28  ID
            29  ID          Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
            30  ID          Lower Central Valley 100-Year Storm, Existing Conditions
            31  ID          Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88
            32  ID          (EPT.H1); VTN, 1/90 (3900EX4.DAT); & B&V La Madre Area, (LAME.DAT)
            33  ID          PB & CN values adjusted by JMM to be consistent with B&V values, 8/90
            34  ID
            35  ID          All routing steps immediately d/s of a diversion converted to
            36  ID          Muskingum routing to avoid zero flow, 8/90
            37  ID
            38  ID          Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo
            39  ID          Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall
            40  ID          Channel and Hualapai Diversion included, 8/90
            41  ID
            42  ID          This data file models DARF's at certain locations where FIS flows are
            43  ID          required.  The original B&V data file used a factor of 0.62; ratios
            44  ID          of this factor are used in the JR card to model DA's at the points
            45  ID          of interest (JMM DARF's extracted from CCRFCD Design Manual):
            46  ID
            47  ID           PT OF                AREA          DARF       DARF/0.62      RATIO
            48  ID          INTEREST             (SQ MI)
            49  ID
            50  ID     RRBRIDGE, NC5, & 304    60.7 - 64.5       0.66         1.06          1
            51  ID          ACHANNL              111.6           0.59         0.95          2
            52  ID          NCHANNL              172.2           0.53         0.85          3
            53  ID
 *** FREE ***
```

1 HEC-1 INPUT PAGE 2

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          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
            54  IT      6       0       0     200
            55  IO      5       0       0
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```
56          IN       5       0       0
57          JR    PRBC    1.06    0.95    0.85

58          KK     112
59          KM   RUNOFF FROM SUBBASIN 112
60          BA   5.333
61          PB    2.63
62          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
63          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
64          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
65          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
66          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
67          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
68          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
69          PC    .997    .999   1.00
70          LS       0      82
71          UD    .462

72          KK     119
73          KM   RUNOFF FROM SUBBASIN 119
74          BA   2.739
75          PB    2.84
76          LS       0      82
77          UD    .346

78          KK       .
79          KM   COMBINE SUBBASINS 112 & 119
80          HC       2

81          KK     120
82          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 120
83          RM       3    0.27    0.15

84          KK  125UDB
85          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 125
86          RM       5    0.53    0.15

87          KK     117
88          KM   ROUTE SUBBASINS 112 & 119 THRU SUBBASIN 117
89          RM       4    0.43    0.15

90          KK     118
91          KM   RUNOFF FROM SUBBASIN 118
92          BA   5.079
93          PB    2.43
94          LS       0      84
95          UD    .233
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

96          KK     117
97          KM   ROUTE SUBBASIN 118 THRU SUBBASIN 117
98          RM       1    0.13    0.15

99          KK       V
100         RM       3    0.25    0.15

101         KK       V
102         RM       4    0.37    0.15

103         KK     117
104         KM   RUNOFF FROM SUBBASIN 117
105         BA   7.366
106         PB    2.23
107         LS       0      78
108         UD   1.699

109         KK       .
110         KM   COMBINE SUBBASINS 112, 117, 118, & 119
111         HC       3

112         KK   ULWDB
            *  *** lines from 1/91 model removed 5/96
            * KM      UPPER LAS VEGAS WASH DETENTION BASIN
            * KM      DATA FROM B&V PREDESIGN (SPILLWAY ELEV = 2372; 3-8' OUTLET PIPES)
            * RS 1 STOR -1
            * SV 0 40 75 110 250 500 920 1550 1700 1860
            * SV 2060 2200 2380 2530 2750 3000 3450 4880 6680
            * SE 2335 2340 2345 2350 2355 2360 2365 2370 2371 2372
            * SE 2373 2374 2375 2376 2377 2378 2380 2385 2390
            * SQ 0 585 1485 2370 2910 3300 3660 4140 4206 4272
            * SQ 8823 17080 27775 40425 54764 70611 106254 215322 347908
113         KM        UPPER LAS VEGAS WASH DETENTION BASIN B&V FINAL DESIGN DATA
114         KM           (SPILLWAY EL.= 2372; DBL 8'-0" SQ. OUTLET CONDUITS)
115         RS       1    STOR      -1
116         SV       0      12      80     170     320     560    1000    1610    1800    1980
117         SV    2150    2330    2500    2690    2900    3100    3600    4950    6680
118         SE    2335    2340    2345    2350    2355    2360    2365    2370    2371    2372
119         SE    2373    2374    2375    2376    2377    2378    2380    2385    2390
120         SQ       0     600    1700    2300    2800    3300    3750    4100    4170    4240
121         SQ    6200    9960   15150   21140   28320   36220   54120  110170  180730

122         KK     116
123         KM   ROUTE SUBBASINS 112, 117, 118, & 119 (ULVW BASIN OUTFLOW) THRU SUBBASIN 116
124         RM       5    0.50    0.15

125         KK     111
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          126          KM   RUNOFF FROM SUBBASIN 111
          127          BA    4.08
          128          PB    2.54
          129          LS       0      84
          130          UD    .239
1                                        HEC-1 INPUT                                        PAGE  4

        LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          131          KK     116
          132          KM   ROUTE SUBBASIN 111 THRU SUBBASIN 116
          133          RM       1    0.10    0.15

          134          KK       V
          135          RM       2    0.21    0.15

          136          KK     116
          137          KM   RUNOFF FROM SUBBASIN 116
          138          BA   5.189
          139          PB    2.13
          140          LS       0      78
          141          UD   1.418

          142          KK       .
          143          KM   COMBINE SUBBASINS 111, 112, 116, 117, 118, & 119
          144          HC       3

          145          KK     109
          146          KM   ROUTE SUBBASINS 111, 112, 116, 117, 118, & 119 THRU SUBBASIN 109
          147          RM       4    0.42    0.15

          148          KK     110
          149          KM   RUNOFF FROM SUBBASIN 110
          150          BA   2.945
          151          PB    2.38
          152          LS       0      86
          153          UD    .237

          154          KK     109
          155          KM   ROUTE SUBBASIN 110 THRU SUBBASIN 109
          156          RM       1    0.09    0.15

          157          KK       V
          158          RM       2    0.19    0.15

          159          KK     109
          160          KM   RUNOFF FROM SUBBASIN 109
          161          BA   4.183
          162          PB    2.13
          163          LS       0      78
          164          UD   1.281

          165          KK       .
          166          KM   COMBINE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
          167          HC       3

          168          KK     101
          169          KM   ROUTE SUBBASINS 109, 110, 111, 112, 116, 117, 118, & 119
          170          KM   THRU SUBBASIN 101
          171          RM       5    0.54    0.15
1                                        HEC-1 INPUT                                        PAGE  5

        LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          172          KK     103
          173          KM   RUNOFF FROM SUBBASIN 103
          174          BA   6.195
          175          PB    2.58
          176          LS       0      84
          177          UD    .324

          178          KK     102
          179          KM   ROUTE SUBBASIN 103 THRU SUBBASIN 102
          180          RM       1    0.11    0.15

          181          KK     102
          182          KM   RUNOFF FROM SUBBASIN 102
          183          BA   8.455
          184          PB    2.38
          185          LS       0      83
          186          UD    .369

          187          KK       .
          188          KM   COMBINE SUBBASINS 102 & 103
          189          HC       2

          190          KK     101
          191          KM   ROUTE SUBBASIN 102 & 103 THRU SUBBASIN 101
          192          RM       1    0.11    0.15

          193          KK       V
          194          RM       2    0.22    0.15

          195          KK     101
          196          KM   RUNOFF FROM SUBBASIN 101
          197          BA   9.082
          198          PB    2.13
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          199          LS       0      77
          200          UD   1.505

          201          KK   NLVIN
          202          KM   COMBINE SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116, 117, 118, & 119
          203          HC       3

          204          KK       .
          205          KM   DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          206          DT DIVDIKE
          207          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          208          DI   17775   20135   23000
          209          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          210          DQ    6775    8635   11000

          211          KK  NLVDET
          212          KM   ROUTE NON-DIVERTED FLOW FROM SUBBASINS 101, 102, 103, 109, 110, 111, 112, 116
          213          KM    117, 118, & 119 THRU NLV DETENTION BASIN
          214          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          215          RS       1    STOR      -1
          216          SV       0      25     100     190     430     665    1095    1285    1435    1540
1                                                HEC-1 INPUT                                          PAGE  6

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          217          SV    1650    1825    1920    2000    2110    2200    2310    2430
          218          SE       0       2       4       6      10      14      21      24      26      27
          219          SE      28      30      31      32      33      34      35      36
                       *  *** lines from 1/91 model removed 5/96
                       * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
                       * SQ 4180 5968 7095 8334 9676 11101 12630 14294
          220          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          221          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          222          KK       .
          223          KM   RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          224          DR DIVDIKE

          225          KK       .
          226          KM   COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          227          HC       2

          228          KK     303
          229          KM   ROUTE OUTFLOW THRU SUBBASIN 303
          230          RM      13    1.28    0.15

          231          KKRRBRIDGE
          232          KM   DIVERT FLOW IN EXCESS OF CAPACITY OF RR BRIDGE SOUTH ALONG RR TO "A" CHANNEL
          233          DTRRCHANNL
          234          DI       0    6000   20000
          235          DQ       0       0   13500

          236          KK     I15
          237          KM       DIVERT FLOW INTO KING CHARLES CHANNEL
          238          DT   KCHAR
          239          DI       0    1000   10000
          240          DQ       0     800    8000

          241          KK     NC1
          242          KM   ROUTE OUTFLOW FROM NLV DET. BASIN THRU "N" CHANNEL TO BARR ROAD
          243          RK     700  0.0058   0.016       0    TRAP      10       2

          244          KK       V
          245          RK    2000  0.0100   0.035       0    TRAP      30       2

          246          KK     NC2
          247          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM BARR ROAD
          248          KM   TO GOWAN AVE.
          249          RK    1300   .0056    .030       0    TRAP      12       2

          250          KK     NC3
          251          KM   ROUTE 302 & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL FROM GOWAN AVE.
          252          KM   TO CHEYENNE AVE.
          253          RK    2600   .0021    .030       0    TRAP      20     2.5
1                                                HEC-1 INPUT                                          PAGE  7

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          254          KK     NC4
          255          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SUBBASINS THRU "N" CHANNEL
          256          KM   FROM CHEYENNE AVE. TO THE "N" CHANNEL DROP STRUCTURE (LINED CHANNEL)
          257          RK    1300    .003    .016       0    TRAP      18       2

          258          KK     NC5
          259          KM   ROUTE SUBBASINS 302, & 303 AND UPSTREAM SIBBASINS THRU "N" CHANNEL FROM DROP
          260          KM   TO "A" CHANNEL (LINED CHANNEL)
          261          RK     500    .001    .016       0    TRAP      18       2
          262          KM   ********************** BEGIN GOWAN MODEL (by others) **********************

          263          KK    AP.1
          264          KM       Begin subareas tributary to Gowan-South Detention Basin
          265          KM       Begin subareas tributary to Angel Park Detention Basin
          266          KM       From Wallace Angel Park Model
          267          BA   0.001
          268          PB    2.71
          269          LS       0      89
          270          UD    0.62
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271          KK       V
272          KM   Route AP.1
273          RM       7    0.67    0.15

274          KK    AP.2
275          KM   One-third of subbasin AP.2
276          KM   From Wallace Angel Park Model
277          BA   0.853
278          PB    2.54
279          LS       0      87
280          UD   0.363

281          KK       .
282          KM   Combine AP.1 & AP.2
283          HC       2

284          KK       V
285          RM      11    1.06    0.15

286          KK    AP.3
287          BA    3.62
288          PB    2.42
289          LS       0      89
290          UD    2.41

291          KK    AP.4
292          KM   From Wallace Angel Park Model
293          BA   0.001
294          PB    2.29
295          LS       0      89
296          UD    1.03
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

297          KK       .
298          KM   Combine AP.1, AP.2, AP.3, AP.4
299          HC       3

300          KK    AP.5
301          KM   From Wallace Angel Park Model
302          BA   0.001
303          PB    2.71
304          LS       0      89
305          UD    0.39

306          KK       V
307          KM   Route AP.5
308          RM       8    0.82    0.15

309          KK    AP.6
310          BA   0.001
311          PB    2.71
312          LS       0      88
313          UD    0.75

314          KK       .
315          KM   Combine AP.5 & AP.6
316          HC       2

317          KK       V
318          KM   Route AP.5 & AP.6
319          RM       7    0.66    0.15

320          KK    AP.7
321          KM      One-half of subbasin AP.7
322          BA    1.02
323          PB    2.33
324          LS       0      86
325          UD    0.59

326          KK   N_CHN
327          KM   COMBINE NORTH CHANNEL FLOWS
328          HC       2

329          KK    GD.1
330          KM   Begin subareas tributary to Hualapai Diversion
331          KM   From VTN (PB & CN from B&V-La Madre)
332          BA   0.001
333          PB    2.82
334          LS       0      87
335          UD    0.62

336          KK       V
337          KM   Route GD.1
338          RM       2    0.24    0.15
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

339          KK       V
340          KM   Routing Cont'd
341          RM       3    0.27    0.15

342          KK    GD.2
343          KM   From VTN
344          BA   0.001
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345          PB    2.60
346          LS       0      89
347          UD    0.83

348          KK       .
349          KM   Combine GD.1 & GD.2
350          HC       2

351          KK  TO_DIV
352          KM   ROUTE GD.1 & GD.2 TO HUALAPAI DIVERSION
353          RM       3    0.34    0.15

354          KK    GD.3(=AP.12)
355          KM   From VTN
356          BA    0.80
357          PB    2.46
358          LS       0      87
359          UD    0.32

360          KKHUALAPAI
361          KM   Combine subareas tributary to Hualapai Diverison (GD.1, GD.2 & GD.3)
362          HC       2

363          KK     HUA& NO.CH
364          KM   Combine No.Ch Flows w/Hualapai Diverted Flows (AP Subareas+Div. GD Subareas)
365          HC       2

366          KK       V
367          KM   Route Combined Flows
368          RK    5500    .023     .04       0    TRAP     100       2

369          KK       V
370          KM   Routing Cont'd
371          RK    4500    .004     .03       0    TRAP      30       4

372          KK    AP.8
373          BA    0.93
374          PB    2.41
375          LS       0      89
376          UD    0.62

377          KK     BOX
378          KM   SUMMERLIN PARKWAY CULVERT
379          HC       2
1                                    HEC-1 INPUT                                    PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

380          KK       V
381          KM   ROUTE TO ANGEL PARK DETENTION BASIN
382          RK    3000    .027     .04       0    TRAP     100       2

383          KK    AP.9
384          BA    0.68
385          PB    2.29
386          LS       0      89
387          UD     .83

388          KK  N_CHAN
389          KM   INTERIM TOTAL AT ANGEL PARK DUE TO HUALAPAI DIVERSION
390          HC       2

391          KKANGEL.PK
392          KM   EXISTING TOTAL AT ANGEL PARK DETENTION BASIN (AP.1 - AP.9 & GD.1 - GD.3)
393          HC       2

394          KKSPILLWAY
395          KM   ANGEL PARK RETENTION - SPILLWAY RATING CURVES
396          KM   Data remains same as B&V Lower Central Valley Storm Existing Conditions run
397          RS       1    STOR      -1
398          SV       0       3      22      45      80     125     190     270     369     492
399          SV     630     780     942    1115    1209
400          SE    2596    2598    2600    2602    2604    2606    2608    2610    2612    2614
401          SE    2616    2618    2620    2622    2623
402          SL  2592.5    3.14     0.6     0.5
403          SS  2619.1    1275     3.2     1.5

404          KKAP_TO_VEGAS/PIONEER
405          KM   ROUTE ANGEL PARK OUTFALL TO VEGAS/PIONEER VIA VEGAS DRIVE OUTFALL
406          KM   From VTN
407          RK    7500    0.03   0.012       0    CIRC       5       0

408          KKBUFFALO_1
409          KM   ROUTE FLOWS FROM VEGAS/PIONEER IN BUFFALO CHANNEL (from VTN)
410          RK    1500    0.02    0.03       0    TRAP      20       4

411          KK    GD.7
412          KM   INTERSECTION OF LAKE MEAD & BUFFALO
413          BA    1.13
414          PB    2.29
415          LS       0      89
416          UD    1.38

417          KKBUFFALO_1
418          KM   Combine GD.7 W/ Buffalo Channel
419          HC       2
1                                    HEC-1 INPUT                                    PAGE 11
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 420      KKBUFFALO_2
 421      KM   ROUTE FLOWS TO GOWAN-SOUTH DETENTION BASIN (from VTN)
 422      RK    5000   0.005   0.025       0    TRAP      30       4

 423      KK    GD.4
 424      KM   From B&V-La Madre
 425      BA   0.001
 426      PB    2.60
 427      LS       0      88
 428      UD    0.62

 429      KK       V
 430      KM   ALLUVIAL FAN BRAIDED CHANEL ROUTING (FEMA)
 431      RM       7    0.74    0.15

 432      KK    GD.5
 433      BA    3.31
 434      PB    2.41
 435      LS       0      86
 436      UD    1.38

 437      KK       .
 438      KM   Combine GD.4 & GD.5 at the INTERSECTION OF RAMPART AND LAKE MEAD
 439      HC       2

 440      KK       V
 441      KM   ROUTE NORTH ALONG RAMPART
 442      RM       4    0.43    0.15

 443      KK    GD.6
 444      KM   DEL WEBB-SUN CITY SUMMERLIN
 445      BA     1.6
 446      PB    2.25
 447      LS       0      86
 448      UD     .96

 449      KK       .
 450      KM   Combine GD.4 - GD.6 at the INTERSECTION OF RAMPART AND CHEYENNE
 451      HC       2

 452      KK       V
 453      KM   ROUTE TO BUFFALO along Cheyenne Channel
 454      RK    5500    .015    .015       0    TRAP      20       2

 455      KK    GD.8
 456      KM   R.A. HOMES-DESERT SHORES
 457      BA    1.53
 458      PB    2.17
 459      LS       0      85
 460      UD    1.11
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 461      KK       .
 462      KM    INFLOW FROM WEST INTO GOWAN-SOUTH DETENTION BASIN
 463      HC       2

 464      KK   GD.34
 465      KM   AREA BETWEEN BUFFALO AND OK GRAGSON HWY
 466      BA    3.84
 467      PB    2.17
 468      LS       0      84
 469      UD    1.72

 470      KKGOWAN_SOUTH
 471      KM    TOTAL INFLOW TO GOWAN-SOUTH DETENTION BASIN
 472      HC       3

 473      KK  DET.GS
 474      KM    Gowan-South Detention Basin data from VTN
 475      RS       1    STOR      -1
 476      SV       0     9.8     113     435     454     680
 477      SE    2326    2330    2340  2349.6    2350    2354
 478      SQ       0     112     328     455     459   30700

 479      KK R.GSOUT
 480      KM    ROUTE GOWAN-SOUTH OUTFLOW TO GOWAN-NORTH DETENTION BASIN
 481      RK    3200   0.007   0.012       0    CIRC       5       0

 482      KK    GD.9
 483      KM    Begin subareas tributary to Gowan-North Detention Basin
 484      KM    From B&V-LaMadre
 485      BA   0.001
 486      PB    2.71
 487      LS       0      89
 488      UD    0.30

 489      KK       V
 490      RM       5    0.52    0.15

 491      KK   GD.10
 492      KM    From B&V-LaMadre
 493      BA   0.001
 494      PB    2.41
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          495          LS       0      88
          496          UD    0.90

          497          KK       .
          498          KM   Combine GD.9 & GD.10
          499          HC       2

          500          KK       V
          501          KM   ROUTE EAST TO GOWAN-NORTH DETENTION BASIN
          502          RM       6    0.61    0.15
1                                                HEC-1 INPUT                                                PAGE 13

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          503          KK       V
          504          KM   Routing Cont'd
          505          RM       7    0.74    0.15

          506          KK   GD.11
          507          KM   From B&V-LaMadre
          508          BA    3.17
          509          PB    2.25
          510          LS       0      85
          511          UD    2.44

          512          KK       .
          513          KM   INFLOW FROM WEST INTO GOWAN-NORTH (GD.9 - GD.11)
          514          HC       2

          515          KK   GD.33
          516          KM   From Wallace EPT.H1
          517          BA   0.001
          518          PB    2.41
          519          LS       0      89
          520          UD     3.5

          521          KK  RANCHO
          522          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
          523          KM   From Wallace
          524          DTCULVERTS
          525          DI       0    1545    3129    4000    8000
          526          DQ       0    1545    1545    2416    6416

          527          KK       V
          528          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
          529          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
          530          RM       2    0.15    0.15

          531          KK  GD.32C
          532          KM   One-half of subbasin GD.32C
          533          BA   0.365
          534          PB    2.38
          535          LS       0      86
          536          UD    0.27

          537          KK       .
          538          KM   Combine GD.32 & GD.33
          539          HC       2

          540          KK  RANCHO
          541          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
          542          KM   From Wallace
          543          DTCULVERTS
          544          DI       0     900    2484    4000    8000
          545          DQ       0     900     900    2416    6416
1                                                HEC-1 INPUT                                                PAGE 14

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


          546          KK       V
          547          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
          548          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
          549          RM       1    0.14    0.15

          550          KK   GD.30
          551          KM   From Wallace
          552          KM   LARGE, FORESTED AREA EXTENDING TO MOUNT CHARLESTON
          553          BA   0.001
          554          PB    2.85
          555          LS       0      80
          556          UD    2.69

          557          KK       V
          558          KM   ROUTE WEST TO RANCHO (HWY 95)
          559          RM      12    1.23    0.15

          560          KK  GD.31B
          561          KM   One-half of subbasin GD.31B
          562          BA   0.665
          563          PB    2.37
          564          LS       0      81
          565          UD    0.97

          566          KK       .
          567          KM   Combine GD.30 - GD.33
          568          HC       3
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569          KK  RANCHO
570          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
571          DTCULVERTS
572          DI       0     520    1889    4000    8000
573          DQ       0     520     520    2631    6631

574          KK       V
575          KM   ROUTE SOUTH ALONG WEST SIDE OF RANCHO (HWY 95)
576          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
577          RM       1    0.14    0.15

578          KK   GD.28
579          KM   From Wallace
580          BA   0.001
581          PB    2.23
582          LS       0      77
583          UD    2.52

584          KK       .
585          KM   Combine GD.28 & GD.30 - GD.33
586          HC       2
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

587          KK  RANCHO
588          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
589          DTCENTNIAL
590          DI       0    1040    5456    8000
591          DQ       0    1040    1040    3585

592          KK       V
593          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
594          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
595          RM       1    0.07    0.15

596          KK   GD.25
597          KM   From Wallace
598          BA   0.001
599          PB    2.53
600          LS       0      89
601          UD    1.09

602          KK       V
603          RM       7    0.69    0.15

604          KK   GD.26
605          KM   From Wallace
606          BA   0.001
607          PB    2.35
608          LS       0      78
609          UD    1.23

610          KK       .
611          KM   Combine GD.25 & GD.26
612          HC       2

613          KK       V
614          KM   ROUTE WEST TO ANN ROAD AND HWY 95
615          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
616          RM       4    0.43    0.15

617          KK       V
618          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
619          RM       5    0.49    0.15

620          KK   GD.27
621          KM   From Wallace
622          BA    1.13
623          PB    2.26
624          LS       0      78
625          UD    1.61

626          KK       .
627          KM   Combine GD.25-GD.28 & GD.30-GD.33 at the INTERSECTION OF ANN ROAD AND HWY 95
628          HC       3
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

629          KK       V
630          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
631          RK    3000   0.009   0.025       0    TRAP      50       3

632          KK       V
633          RK    3000   0.004   0.022       0    TRAP      25       8

634          KK   GD.29
635          KM   From Wallace
636          BA    0.76
637          PB    2.26
638          LS       0      77
639          UD    1.49

640          KK       V
641          RK    8000    0.01   0.025       0    TRAP      20       8
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642          KK    PDGC
643          KM   PAINTED DESERT GOLF COURSE
644          KM   From Wallace
645          BA    0.53
646          PB    2.17
647          LS       0       80
648          UD     1.2

649          KK        .
650          KM   Combine GD.25 - GD.33 & PDGC at the SOUTH SIDE OF PAINTED DESERT AT HWY 95
651          HC        3

652          KK  RANCHO
653          KM   DIVERT CHANNEL EXCESS AND CULVERT CAPACITIES WEST
654          DTP.DESERT
655          DI        0      233     1318     8000
656          DQ        0      233      233     6915

657          KK        V
658          KM   ROUTE SOUTH ALONG WEST SIDE OF HWY 95
659          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
660          RM        1     0.14     0.15

661          KK   GD.21
662          KM   From Wallace
663          BA   0.001
664          PB    2.71
665          LS       0       89
666          UD    0.72

667          KK        V
668          RM        8     0.81     0.15
1                                        HEC-1 INPUT                                        PAGE 17

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

669          KK   GD.22
670          KM   From Wallace
671          BA   0.001
672          PB    2.49
673          LS       0       86
674          UD     1.5

675          KK   GD.23
676          KM   From Wallace
677          BA   0.001
678          PB    2.53
679          LS       0       86
680          UD    1.41

681          KK        .
682          KM   Combine GD.21 - GD.23
683          HC        3

684          KK        V
685          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
686          RM        7     0.65     0.15

687          KK   GD.24
688          KM   From Wallace
689          BA    0.64
690          PB    2.23
691          LS       0       77
692          UD     1.2

693          KK        .
694          KM   Combine GD.21 - GD.24
695          HC        2

696          KK        V
697          KM   ROUTE WEST TO HWY 95
698          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
699          RM        7     0.65     0.15

700          KK   GD.18
701          KM   From Wallace
702          BA   0.001
703          PB    2.66
704          LS       0       89
705          UD    0.31

706          KK        V
707          RM        6     0.62     0.15

708          KK   GD.19
709          KM   From Wallace
710          BA   0.001
711          PB    2.39
712          LS       0       82
713          UD    1.24
1                                        HEC-1 INPUT                                        PAGE 18

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

714          KK        .
715          KM   Combine GD.18 & GD.19
716          HC        2
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717          KK       V
718          KM   ROUTE WEST TO HWY 95 AT CRAIG ROAD
719          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
720          RM       9    0.88    0.15

721          KK   GD.20
722          KM   From Wallace
723          BA    2.35
724          PB    2.17
725          LS       0      82
726          UD    2.51

727          KK       .
728          KM   Combine GD.18 - GD.33 & PDGC at the INTERSECTION OF CRAIG ROAD AND HWY 95
729          HC       4

730          KK  HWY.95
731          KM   DIVERT CAPACITY OF BRIDGE AT CRAIG ROAD
732          DT   CRAIG
733          DI       0     465    2056   10000
734          DQ       0     465     465    8409

735          KK       V
736          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO ALEXANDER ROAD
737          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
738          RM       1    0.07    0.15

739          KK   GD.15
740          KM   From Wallace
741          BA   0.001
742          PB    2.71
743          LS       0      88
744          UD    0.48

745          KK       V
746          RM       7    0.74    0.15

747          KK   GD.16
748          KM   From Wallace
749          BA   0.001
750          PB    2.62
751          LS       0      82
752          UD    1.63

753          KK       .
754          HC       2
1                                        HEC-1 INPUT                                    PAGE 19

           LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

755          KK       V
756          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
757          RM      10    1.01    0.15

758          KK   GD.17
759          KM   From Wallace
760          BA    0.56
761          PB    2.41
762          LS       0      80
763          UD     2.0

764          KK       .
765          KM   Combine GD.15 - GD.17
766          HC       3

767          KK   HWY95
768          KM   DIVERT CAPACITY OF CULVERT AT ALEXANDER ROAD UNDER HWY
769          DTALEXANDR
770          DI       0     155    1746   10000
771          DQ       0     155     155    8409

772          KK       V
773          KM   ROUTE SOUTH ALONG WEST SIDE OF ORAN GRAGSON HWY TO GOWAN ROAD
774          KM   Convert from kinematic wave to Muskingum routing to avoid zero flow
775          RM       1    0.11    0.15

776          KK   GD.12
777          KM   From Wallace
778          BA   0.001
779          PB    2.69
780          LS       0      89
781          UD     0.3

782          KK       V
783          RM       4    0.42    0.15

784          KK   GD.13
785          KM   From Wallace
786          BA   0.001
787          PB    2.62
788          LS       0      86
789          UD    1.10

790          KK       .
791          KM   Combine GD.12 & GD.13
792          HC       2
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                793          KK       V
                794          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
                795          RM       4    0.43    0.15
1                                                HEC-1 INPUT                                                PAGE 20

              LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


                796          KK       V
                797          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
                798          RM      11    1.06    0.15

                799          KK  GD.14A
                800          KM   From Wallace
                801          BA    1.71
                802          PB    2.29
                803          LS       0      81
                804          UD    0.88

                805          KK       .
                806          KM   Combine GD.12, GD.13 & GD.14A
                807          HC       2

                808          KK       V
                809          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
                810          RM       5    0.53    0.15

                811          KK  GD.14B
                812          KM   From Wallace
                813          BA    0.68
                814          PB    2.15
                815          LS       0      83
                816          UD    1.67

                817          KK       .
                818          KM   Combine GD.12, GD.13, GD.14A, GD.14B & GD.15 - GD.17
                819          HC       3

                820          KK   GN_IN
                821          KM   TOTAL INFLOW TO GOWAN-NORTH (including Gowan-South Outflow)
                822          HC       3

                823          KK  DET.GN
                824          KM   ROUTE FLOW THROUGH GOWAN-NORTH DETENTION BASIN: 72" RCP OUTLET
                825          KM   From VTN
                826          RS       1    STOR      -1
                827          SV       0      28      46     113     774     885    1163
                828          SE    2308    2311    2312    2314    2324  2325.5    2329
                829          SQ       0       0     126     251     519     539   35800

                830          KKR.G-UPS.
                831          KM   ROUTE GOWAN-NORTH DETENTION BASIN OUTFLOW TO UNDERPASS
                832          RK    2000   0.005   0.013       0    CIRC       6       0

                833          KK       V
                834          KM   Route Gowan outflow along Gowan Outfall Channel
                835          RK    7000   0.009   0.015       0    TRAP      10       0
1                                                HEC-1 INPUT                                                PAGE 21

              LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


                836          KK       .
                837          KM   Recall flow diverted at Craig Road
                838          DR   CRAIG

                839          KK       V
                840          KM   Route to Rancho
                841          RM       4    0.42    0.15

                842          KK       .
                843          KM   Recall flow diverted at Alexander
                844          DRALEXANDR

                845          KK       V
                846          KM   Route to Rancho
                847          RM       9    0.92    0.15

                848          KK       .
                849          KM   Combine Gowan Outfall Channel with flows diverted at Craig and Alexander
                850          KM   at Rancho
                851          HC       3

                852          KK       V
                853          KM   Route combined flows downstream of Rancho in Gowan Outfall Channel (Wallace
                854          KM   App. F)
                855          RK    8400   0.007   0.015       0    TRAP      10       0

                856          KK       V
                857          KM   Routing Cont'd
                858          RK    4000   0.005   0.015       0    TRAP      10       0

                859          KK       V
                860          KM   Routing Cont'd
                861          RK    4000   0.005   0.015       0    TRAP      10       0

                862          KK       .
                863          KM   Begin modeling of subareas on the east side of Rancho Road
                864          KM   Recall flow diverted at Centenial
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          865          DRCENTNIAL

          866          KK       .
          867          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          868          RM       20     2.03     0.15

          869          KK   EPT.1
          870          BA    3.76
          871          PB    2.22
          872          LS       0       85
          873          UD    3.36
1                                        HEC-1 INPUT                                        PAGE 22

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          874          KK       .
          875          KM   Combine EPT.1 & flow diverted at Centenial
          876          HC       2

          877          KK       V
          878          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          879          RM       8     0.76     0.15

          880          KK       .
          881          KM   Recall flow diverted at Painted Desert
          882          DRP.DESERT

          883          KK       V
          884          KM   ALLUVIAL FAN BRAIDED CHANNEL ROUTING (FEMA)
          885          RM       20     2.03     0.15

          886          KK   EPT.3
          887          BA   4.391
          888          PB    2.22
          889          LS       0       88
          890          UD    3.67

          891          KK       .
          892          KM   Combine EPT.1, EPT.3 & flows diverted at P. Desert & Centenial
          893          HC       3

          894          KK   EPT.4
          895          BA   1.372
          896          PB    2.22
          897          LS       0       89
          898          UD     2.7

          899          KK       V
          900          RM       9     0.88     0.15

          901          KK       .
          902          KM   Combine EPT.1, EPT.3, EPT.4 & flows diverted at P.Desert & Centenial at
          903          KM   Gowan Outfall Channel
          904          HC       2

          905          KK       .
          906          KM   Combine EPT.1, EPT.3, EPT.4, Gowan outflow & flows diverted at Craig,
          907          KM   Alexander, Painted Desert & Centenial
          908          HC       2

          909          KK   EPT.5
          910          BA   3.005
          911          PB    2.22
          912          LS       0       87
          913          UD     4.7
1                                        HEC-1 INPUT                                        PAGE 23

        LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          914          KK       .
          915          KM   Combine EPT.1, EPT.3, EPT.4, EPT.5, Gowan outflow & flows diverted at Craig,
          916          KM   Alexander, Painted Desert & Centenial
          917          HC       2

          918          KK       V
          919          RK   10000     .013     .015        0     TRAP       10        0

          920          KK   EPT.2
          921          BA   1.492
          922          PB    2.22
          923          LS       0       85
          924          UD    2.51

          925          KK  LVWASH
          926          KM   Combine entire Gowan Area at the PROJECT TERMINUS AT LAS VEGAS WASH
          927          HC       2
          928          KM   ************************** END GOWAN MODEL ***********************************

          929          KKGOWANDIV
          930          KM   RECALL FLOW DIVERTED IN GOWAN MODEL
          931          DRCULVERTS

          932          KK      301
          933          KM   ROUTE DIVERTED GOWAN FLOW THRU SUBBASIN 301
          934          RM       22     2.17     0.15

          935          KK      301
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 936          KM   RUNOFF FROM SUBBASIN 301
 937          BA  18.616
 938          PB    2.43
 939          LS       0      85
 940          UD     4.3

 941          KK WTRIBUS
 942          KM   COMBINE SUBBASIN 301 & DIVERTED GOWAN FLOW
 943          HC       2

 944          KKWTRIBTOT
 945          KM   COMBINE SUBBASIN 301, GOWAN OUTFALL, AND DIVERTED GOWAN FLOW
 946          HC       2

 947          KK     304
 948          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU SUBBASIN 304 TO CRAIG ROAD
 949          RM       3    0.28    0.15

 950          KK    SNIC
 951          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE SOUTHERN NEVADA INDUSTRIAL CENTER
 952          KM   FLOOD CONTROL CHANNEL FROM CRAIG ROAD TO ALEXANDER
 953          RK    3850   .0122   0.016       0    TRAP      20       2
1                                        HEC-1 INPUT                                        PAGE 24

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 954          KK     LBC
 955          KM   ROUTE SUBBASIN 301 & GOWAN OUTFALL THRU THE LOSEE BRIDGE CHANNEL
 956          KM   FROM ALEXANDER TO THE BEGINNING OF THE "A" CHANNEL
 957          RK    2800    .002   0.016       0    TRAP      80       2

 958          KK    310W
 959          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 310
 960          BA      .8
 961          PB    2.19
 962          LS       0      87       0       0      87
 963          UK     150    .010      .3      38
 964          UK     300    .015     .25      62
 965          RK    1000   .0075     .02    .013    TRAP      51       0
 966          RK    2600   .0075     .02      .2    TRAP      80       0
 967          RK    8700   .0150     .02       0    TRAP     100       0

 968          KK    R310W
 969          KM   ROUTE RUNOFF FROM 310W TO 310E
 970          RK   10500    .015     .02       0    TRAP     100       0

 971          KK    310E
 972          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 310
 973          BA   1.238
 974          PB    2.19
 975          LS       0      86       0       0      83
 976          UK     150     .01      .3      46
 977          UK     300    .015     .25      54
 978          RK    1000   .0075     .02    .019    TRAP      51       0
 979          RK    2000   .0075     .02    .31     TRAP      80       0
 980          RK   10500    .015     .02       0    TRAP     100       0

 981          KK    310E
 982          KM   COMBINE ROUTED 310W WITH 310E
 983          HC       2

 984          KK    R310E
 985          KM   ROUTE FROM 310E TO 311W
 986          RK    5300   .0132     .02       0    TRAP     100       0

 987          KK    311W
 988          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 311
 989          BA     .96
 990          PB    2.19
 991          LS       0      85       0       0      83
 992          UK     150    .010      .3      60
 993          UK     300   .0132     .25      40
 994          RK     650   .0065     .02     .01    TRAP      51       0
 995          RK    2200   .0065     .02     .14    TRAP      80       0
 996          RK    5300   .0132     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                        PAGE 25

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 997          KK    311W
 998          KM   COMBINE ROUTED 310E WITH 311W
 999          HC       2

1000          KK    R311W
1001          KM   ROUTE FROM 311W TO 311E
1002          RK    7500   .0132     .02       0    TRAP     100       0

1003          KK    311E
1004          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 311
1005          BA     .77
1006          PB    2.19
1007          LS       0      75       0       0      72
1008          UK     150    .010      .3      75
1009          UK     300   .0132     .25      25
1010          RK     650   .0065     .02    .008    TRAP      51
1011          RK    2200   .0065     .02     .11    TRAP      80       0
1012          RK    7500   .0132     .02       0    TRAP     100       0
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1013          KK    311E
1014          KM    COMBINE ROUTED 311W WITH 311E
1015          HC       2

1016          KK    309W
1017          KM    RUNOFF FROM WESTERN PORTION OF SUBBASIN 309
1018          BA     .81
1019          PB    2.19
1020          LS       0      71       0       0      70
1021          UK     150     .01      .3      22
1022          UK     300    .0144     .25     78
1023          RK    1000    .007     .02     .013    TRAP      51       0
1024          RK    2600    .007     .02     .20     TRAP      80       0
1025          RK    8700    .0144    .02       0     TRAP     100       0

1026          KK    R309W
1027          KM    ROUTE FROM 309W TO 309E
1028          RK   21000    .0144    .02       0     TRAP     100       0

1029          KK    309E
1030          KM    RUNOFF FROM EASTERN PORTION OF SUBBASIN 309
1031          BA    1.19
1032          PB    2.19
1033          LS       0      87       0       0      80
1034          UK     150     .01      .3      52
1035          UK     300    .0144     .25     48
1036          RK    1000    .007     .02     .019    TRAP      51       0
1037          RK    2600    .007     .02     .30     TRAP      80       0
1038          RK   21000    .0144    .02       0     TRAP     100       0
1                                      HEC-1 INPUT                                    PAGE 26

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1039          KK    309E
1040          KM    COMBINE ROUTED 309W WITH 309E
1041          HC       2

1042          KK       .
1043          KM    COMBINE RUNOFF FROM SUBBASINS 309, 310, & 311
1044          HC       2

1045          KK    FCP1
1046          KM    ROUTE 309, 310, & 311 THRU FREEWAY CHANNEL FROM OWENS AVE.
1047          KM    TO LAKE MEAD BLVD.
1048          RK     410    .0045    .016      0     CIRC       5       0

1049          KK    FCP2
1050          RK     740    .0048    .016      0     CIRC     5.5       0

1051          KK    FCBC1
1052          RK     800    .0056    .016      0     TRAP       8       0

1053          KK     FC1
1054          RK    1250    .0195    .016      0     TRAP       8       0

1055          KKFCBC2/FC2/FCBC3
1056          KM    COMBINE FCBC2, FC2, & FCBC3 ROUTING STEPS
1057          RK    1430     .03     .016      0     TRAP       7       0

1058          KK    307NW
1059          KM    RUNOFF FROM NORTHWEST PORTION OF SUBBASIN 307
1060          BA    1.33
1061          PB    2.19
1062          LS       0      85       0       0      87
1063          UK     150     .010     .3      32
1064          UK     300     .011     .25     68
1065          RK    1000    .0055     .02     .017    TRAP      51       0
1066          RK    2600    .0055     .02     .27     TRAP      80       0
1067          RK    6400     .011     .02       0     TRAP     100       0

1068          KK   R307NW
1069          KM    ROUTE FROM 307NW TO 307NE
1070          RK    4000     .011     .02       0     TRAP     100       0

1071          KK    307NE
1072          KM    RUNOFF FROM NORTHEAST PORTION OF SUBBASIN 307
1073          BA     .64
1074          PB    2.19
1075          LS       0      87       0       0      87
1076          UK     150     .010     .3      11
1077          UK     300     .011     .25     89
1078          RK    1000    .0055     .02     .013    TRAP      51       0
1079          RK    2600    .0055     .02     .21     TRAP      80       0
1080          RK    4000     .011     .02       0     TRAP     100       0
1                                      HEC-1 INPUT                                    PAGE 27

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1081          KK    307NE
1082          KM    COMBINE ROUTED 307NW WITH 307NE
1083          HC       2

1084          KK       .
1085          KM    COMBINE NORTHERN PORTION OF SUBBASIN 307 AT CHEYENNE AVENUE AND RANCHO DRIVE
1086          HC       2
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1087          KK       V
1088          KM   ROUTE FLOW ALONG RANCHO DRIVE TO SMOKE RANCH ROAD
1089          RM       4    0.37    0.15

1090          KK   307SW
1091          KM   RUNOFF FROM SOUTHWEST PORTION OF SUBBASIN 307
1092          BA     1.1
1093          PB    2.19
1094          LS       0      61       0       0      64
1095          UK     150    .010      .3      16
1096          UK     300    .011     .25      84
1097          RK    1000   .0055     .02     .01    TRAP      51
1098          RK    2200   .0055     .02     .16    TRAP      80
1099          RK    6100    .011     .02       0    TRAP     100       0

1100          KK  R307SW
1101          KM   ROUTE FROM 307SW TO 307SE
1102          RK    7300    .011     .02       0    TRAP     100       0

1103          KK   307SE
1104          KM   RUNOFF FROM SOUTHEAST PORTION OF SUBBASIN 307
1105          BA    1.58
1106          PB    2.19
1107          LS       0      85       0       0      87
1108          UK     150     .01      .3      40
1109          UK     300    .011     .25      60
1110          RK    1000   .0055     .02     .01    TRAP      51       0
1111          RK    2200   .0055     .02     .17    TRAP      80       0
1112          RK    7300    .011     .02       0    TRAP     100       0

1113          KK   307SE
1114          KM   COMBINE ROUTED 307SW WITH 307SE
1115          HC       2

1116          KK       .
1117          KM   COMBINE FLOW AT SMOKE RANCH ROAD AND RANCHO DRIVE
1118          HC       2

1119          KK       V
1120          KM   ROUTE FLOW TO LAKE MEAD BLVD. ALONG RANCHO DRIVE
1121          RM       2    0.18    0.15
1                                        HEC-1 INPUT                                        PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1122          KK    308W
1123          KM   RUNOFF FROM WESTERN PORTION OF SUBBASIN 308
1124          BA     .81
1125          PB    2.19
1126          LS       0      71       0       0      70
1127          UK     150     .01      .3      19
1128          UK     300   .0134     .25      81
1129          RK    1000    .006     .02    .017    TRAP      51       0
1130          RK    2600    .006     .02     .27    TRAP      80       0
1131          RK    8700   .0134     .02       0    TRAP     100       0

1132          KK   R308W
1133          KM   ROUTE FROM 308W TO 308E
1134          RK    6500   .0134     .02       0    TRAP     100       0

1135          KK    308E
1136          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 308
1137          BA     .72
1138          PB    2.19
1139          LS       0      85       0       0      87
1140          UK     150     .01      .3      59
1141          UK     300   .0134     .25      41
1142          RK    1000    .006     .02    .015    TRAP      51       0
1143          RK    2600    .006     .02     .24    TRAP      80       0
1144          RK    6500   .0134     .02       0    TRAP     100       0

1145          KK    308E
1146          KM   COMBINE ROUTED 308W WITH 308E
1147          HC       2

1148          KK       .
1149          KM   COMBINE RUNOFF FROM SUBBBASINS 307 & 308
1150          HC       2

1151          KKR307/308
1152          KM   ROUTE SUBBASINS 307 & 308 THRU 312W
1153          RK    6100   .0132     .02       0    TRAP     100       0

1154          KK    312W
1155          KM   RUNOFF FROM WESTERN PORTION OF SUBBBASIN 312
1156          KM   ROUTE SUBBASINS 307 & 308 THRU SUBBASIN 312
1157          BA     .77
1158          PB    2.19
1159          LS       0      81       0       0      80
1160          UK     150    .010      .3      20
1161          UK     300   .0132     .25      80
1162          RK    1000   .0065     .02    .012    TRAP      51       0
1163          RK    2600   .0065     .02    .175    TRAP      80       0
1164          RK    6100   .0132     .02       0    TRAP     100       0
1                                        HEC-1 INPUT                                        PAGE 29

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
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1165          KK    312W
1166          KM   COMBINE ROUTED 307 & 308 WITH 312W
1167          HC       2

1168          KK   R312W
1169          KM   ROUTE FROM 312W TO 312E
1170          RK    6100    .0132      .02        0     TRAP      100        0

1171          KK    312E
1172          KM   RUNOFF FROM EASTERN PORTION OF SUBBASIN 312
1173          BA      .7
1174          PB    2.19
1175          LS       0       79        0        0       76
1176          UK     150     .010       .3       50
1177          UK     300    .0132      .25       50
1178          RK     500    .0065      .02     .012     TRAP       51        0
1179          RK    2600    .0065      .02     .175     TRAP       80        0
1180          RK    6100    .0132      .02        0     TRAP      100        0

1181          KK    312E
1182          KM   COMBINE ROUTED 312W WITH 312E
1183          HC       2

1184          KK     306
1185          KM   RUNOFF FROM SUBBASIN 306
1186          BA   5.073
1187          PB    2.19
1188          LS       0       84
1189          UD    3.02

1190          KK       .
1191          KM   COMBINE RUNOFF SUBBASINS 306, 307, 308, 309, 310, 311, & 312
1192          HC       3

1193          KK     FC3
1194          KM   ROUTE SUBBASINS 306, 307, 308, 309, 310, 311, & 312 FROM LAKE MEAD BLVD.
1195          KM   TO THE "A" CHANNEL THRU THE FREEWAY CHANNEL
1196          RK     900    .0012      .016        0     TRAP       10      1.5

1197          KK FC4/FC5
1198          RK     600  0.0012    0.016        0     TRAP       24      1.5

1199          KK     FC6
1200          RK    5150    .0011      .016        0     TRAP       16      1.5

1201          KK     FC7
1202          RK    2400    .0010      .016        0     TRAP       20      1.5

1203          KKFCBC4/FC8
1204          KM   COMBINE FCBC4 & FC8 ROUTING STEPS
1205          RK    3475    .0012      .016        0     TRAP       20      1.5
1                                          HEC-1 INPUT                                          PAGE 30

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1206          KK     302
1207          KM   RUNOFF SUBBASIN 302
1208          BA  12.113
1209          PB    2.19
1210          LS       0       86
1211          UD     3.1

1212          KK     303
1213          KM   ROUTE SUBBASIN 302 THRU SUBBASIN 303
1214          RM       8    0.83    0.15

1215          KK     303
1216          KM   RUNOFF FROM 303
1217          BA  10.217
1218          PB    2.19
1219          LS       0       84
1220          UD    4.24

1221          KK       .
1222          KM   COMBINE FLOW FROM SUBBASINS 302 & 303 AT THE "A" CHANNEL
1223          HC       2

1224          KK     304
1225          KM   RUNOFF FROM SUBBASIN 304
1226          BA   2.903
1227          PB    2.16
1228          LS       0       86
1229          UD    1.98

1230          KK     305
1231          KM   RUNOFF FROM SUBBASIN 305
1232          BA   3.298
1233          PB    2.19
1234          LS       0       87
1235          UD    1.49

1236          KK       .
1237          KM   COMBINE SUBBASINS 304 & 305 AT THE "A" CHANNEL
1238          HC       2

1239          KKRRRBRIDGE
1240          DRRRCHANNL
```

```
          1241          KKDUMMY_AREA
          1242          KM   Add dummy subarea with near-zero area to the recalled RRCHANNEL diversion
          1243          BA   0.001
          1244          PB    2.00
          1245          LS       0      80
          1246          UD    1.00
1                                                  HEC-1 INPUT                                                 PAGE 31

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          1247          KKDUMMY_COMBINE
          1248          KM   Combine dummy subarea with recalled RRCHANNEL diversion
          1249          HC       2

          1250          KKRRCHANNL
          1251          RK    4900   .0041     .03       0    TRAP      40       2

          1252          KK    I-15
          1253          DR   KCHAR

          1254          KKDUMMY_AREA
          1255          KM   Add dummy subarea with near-zero area to the recalled KCHAR diversion
          1256          BA   0.001
          1257          PB    2.00
          1258          LS       0      80
          1259          UD    1.00

          1260          KKDUMMY_COMBINE
          1261          KM   Combine dummy subarea with recalled KCHAR diversion
          1262          HC       2

          1263          KK ACHANNL
          1264          KM   COMBINE ALL SUBBASINS AT START OF "A" CHANNEL
          1265          HC       5

          1266          KK AC1/AC2
          1267          KM   COMBINE ROUTING STEPS AC1 AND AC2 (use wtd avg for invert slope, width, ss)
          1268          KM   ROUTE FLOW THRU "A" CHANNEL TO CIVIC CENTER DRIVE THEN TO CHEYENNE AVE.
          1269          RK    2350  0.0074   0.035       0    TRAP      30       2

          1270          KK     AC3
          1271          RK    1600   .0065    .030       0    TRAP      52     1.5

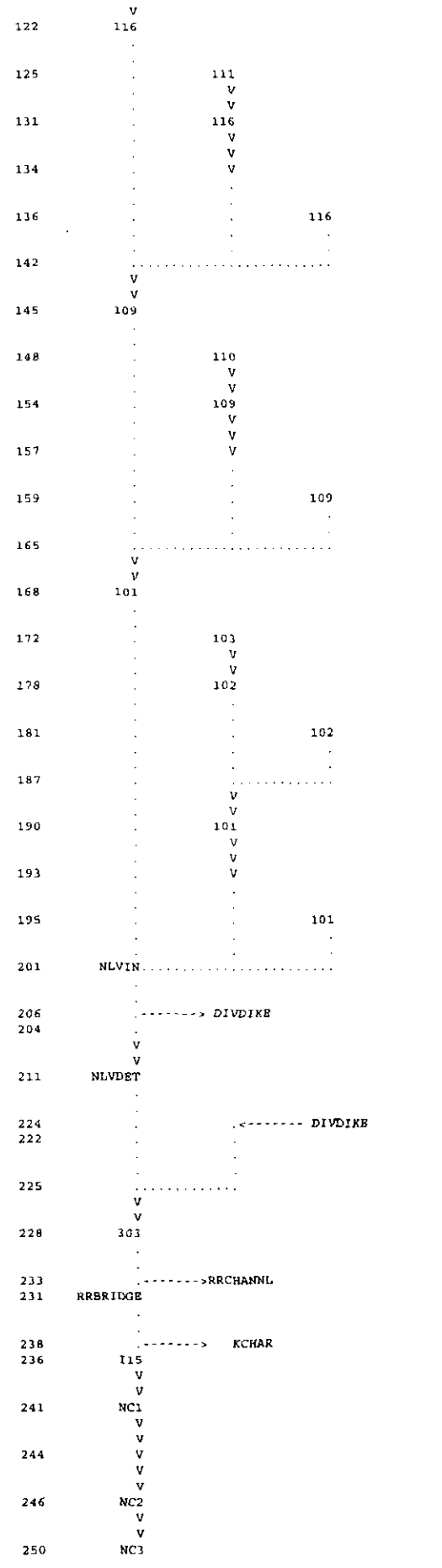
          1272          KK     AC4
          1273          KM   ROUTE FLOW IN "A" CHANNEL AT CHEYENNE AVE. TO INTERSECTION OF "N" CHANNEL
          1274          RK    1650   .0053    .030       0    TRAP      70     1.5

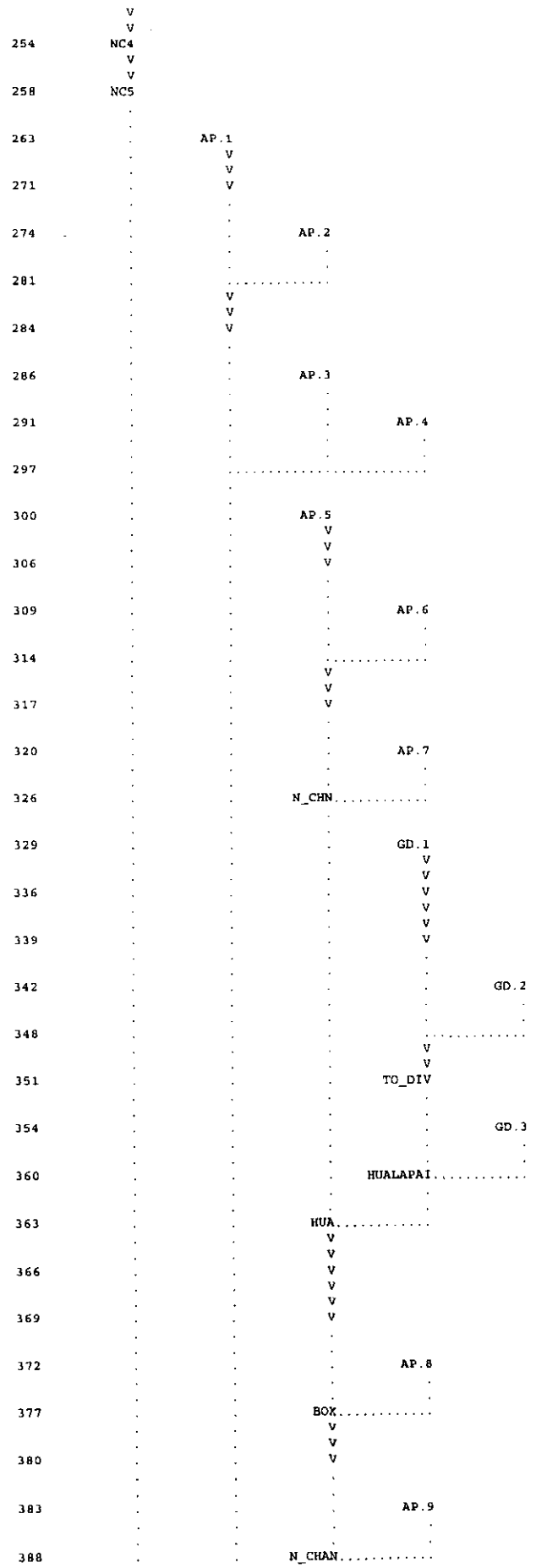
          1275          KK NCHANNL
          1276          KM   COMBINE ALL UPSTREAM SUBBASINS AT INTERSECTION OF "N" CHANNEL AND "A" CHANNEL
          1277          HC       2
                        * Truncate this run at NCHANNL
          1278          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK

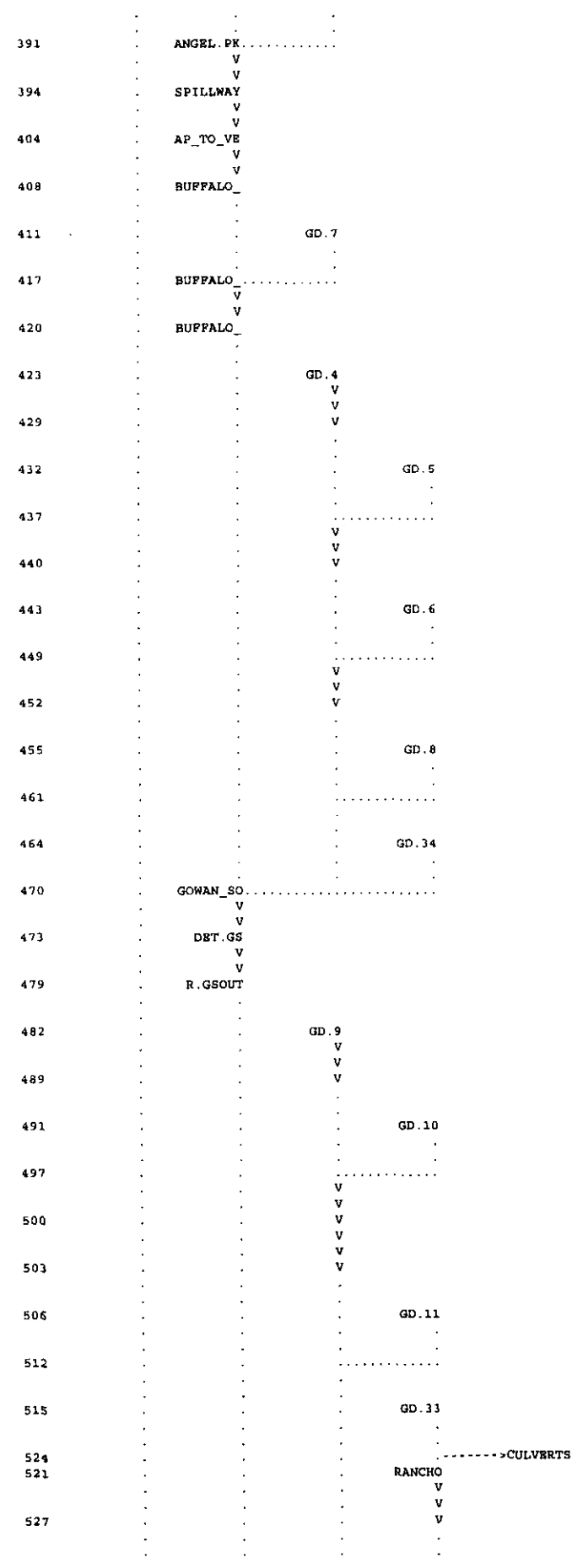
 INPUT
  LINE      (V) ROUTING           (<---> DIVERSION OR PUMP FLOW

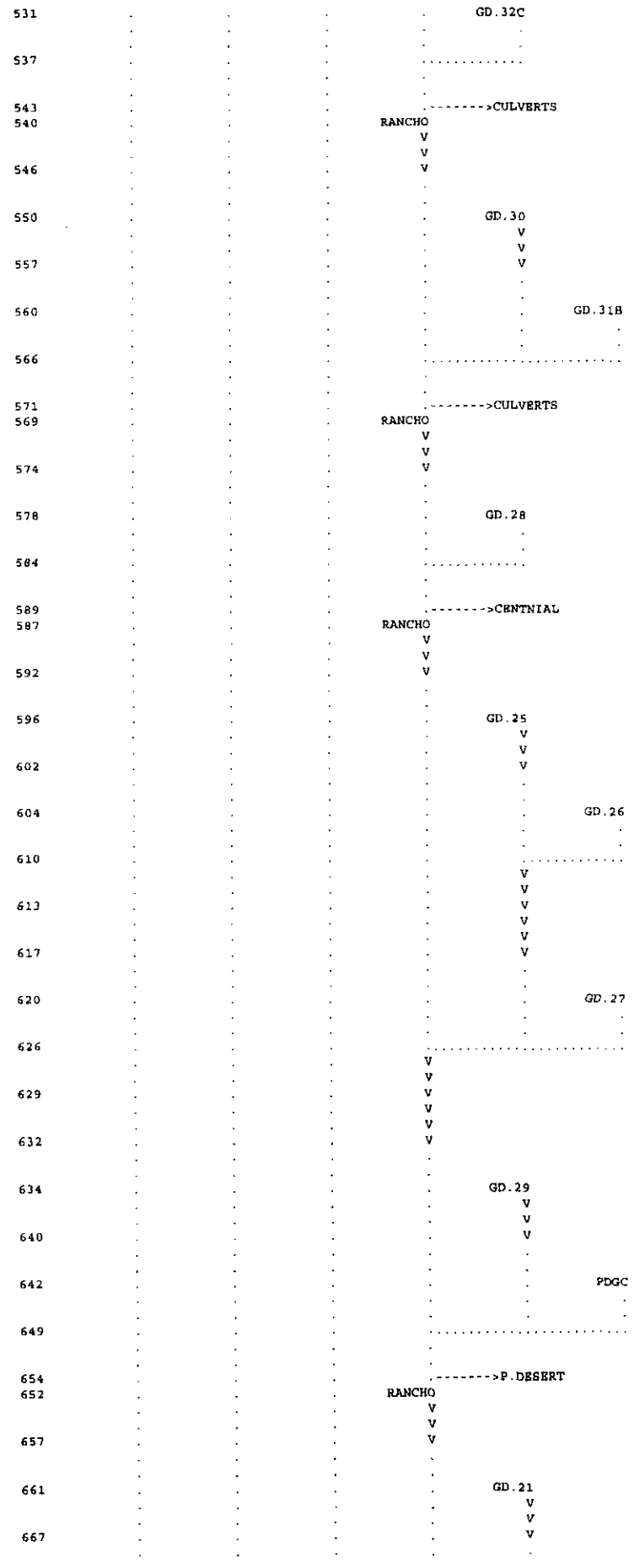
   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

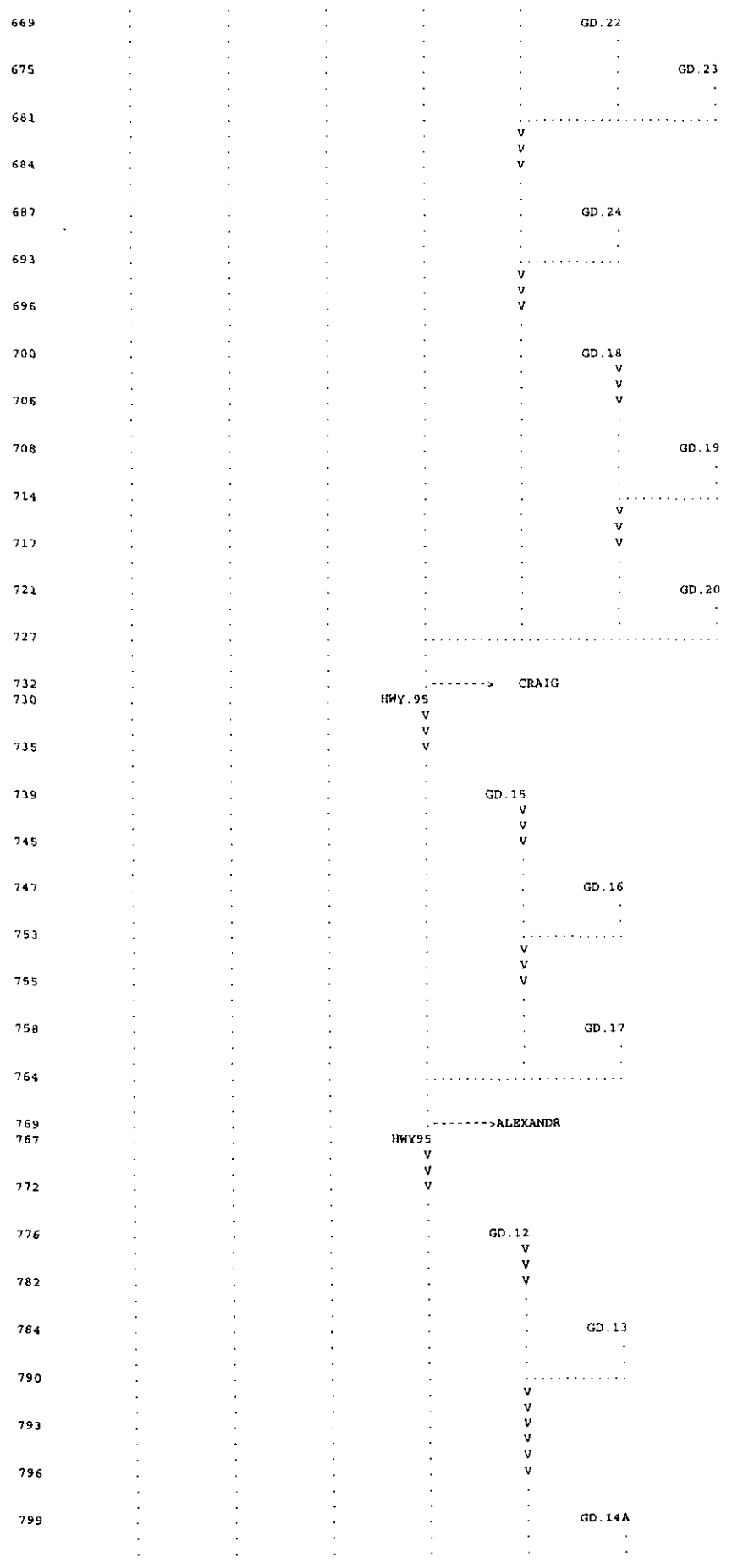
    58         112
                 .
                 .
    72           .          119
                 .            .
                 .            .
    78           ..............
                 V
                 V
    81         120
                 V
                 V
    84       125UDB
                 V
                 V
    87         117
                 .
                 .
    90           .          118
                 .            V
                 .            V
    96           .          117
                 .            V
                 .            V
    99           .            V
                 .            V
                 .            V
   101           .            V
                 .            .
                 .            .
   103           .            .          117
                 .            .            .
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   109           ............................
                 V
                 V
   112        ULWDB
                 V
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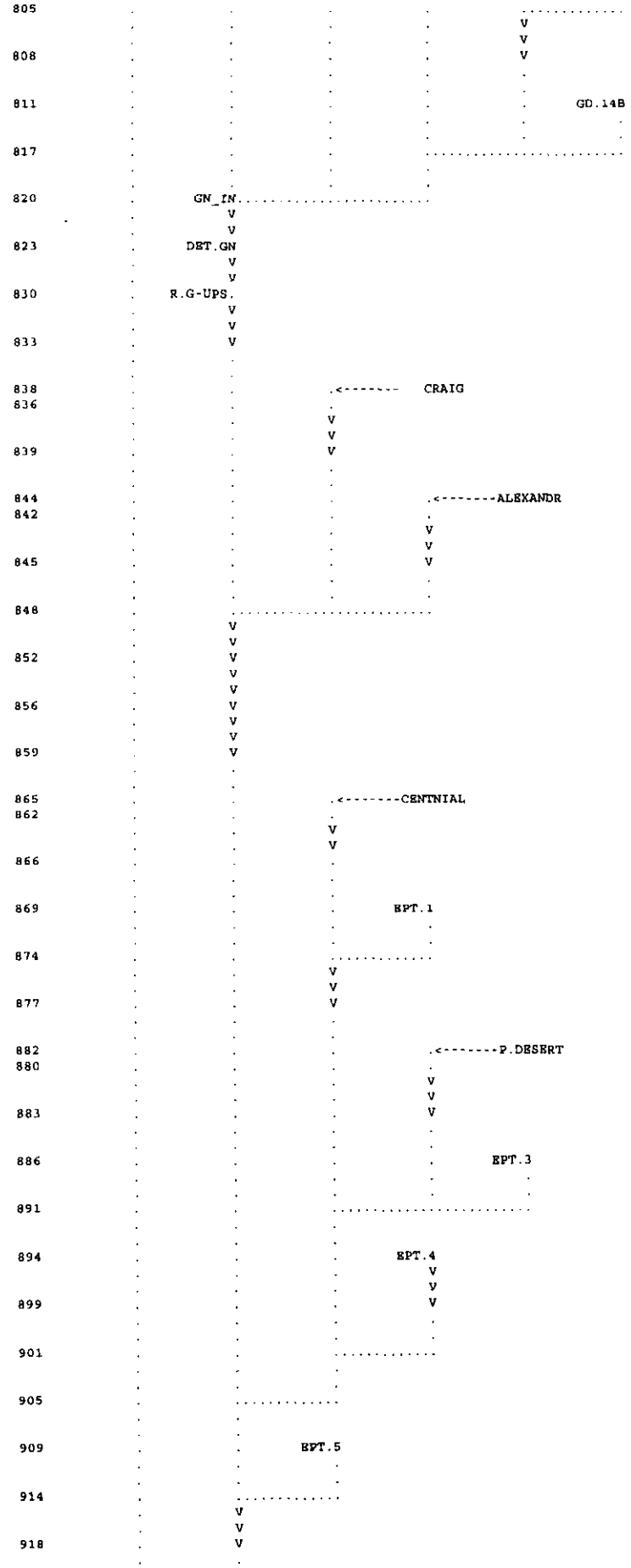

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187
190 101
193
195 101
201 NLVIN
206 DIVDIKE
204
211 NLVDET
224 DIVDIKE
222
225
228 303
233 RRCHANNL
231 RRBRIDGE
238 KCHAR
236 I15
241 NC1
244
246 NC2
250 NC3

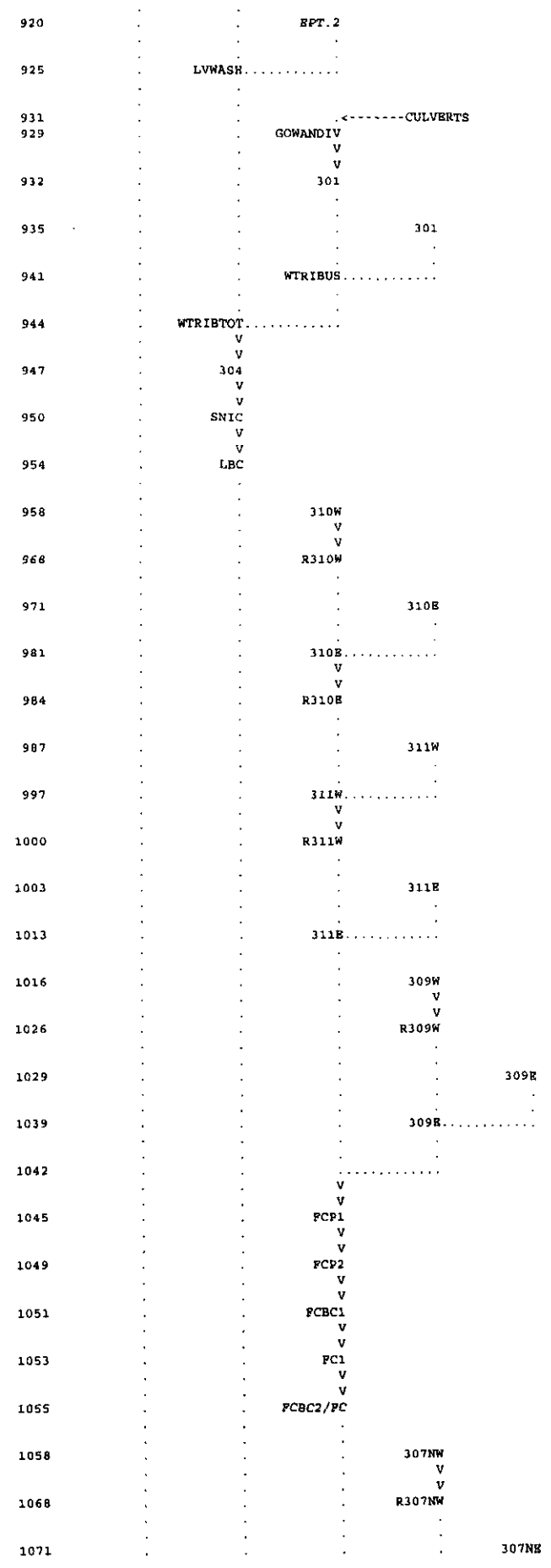

NC4
NC5
AP.1
AP.2
AP.3
AP.4
AP.5
AP.6
AP.7
N_CHN
GD.1
GD.2
TO_DIV
GD.3
HUALAPAI
HUA
AP.8
BOX
AP.9
N_CHAN

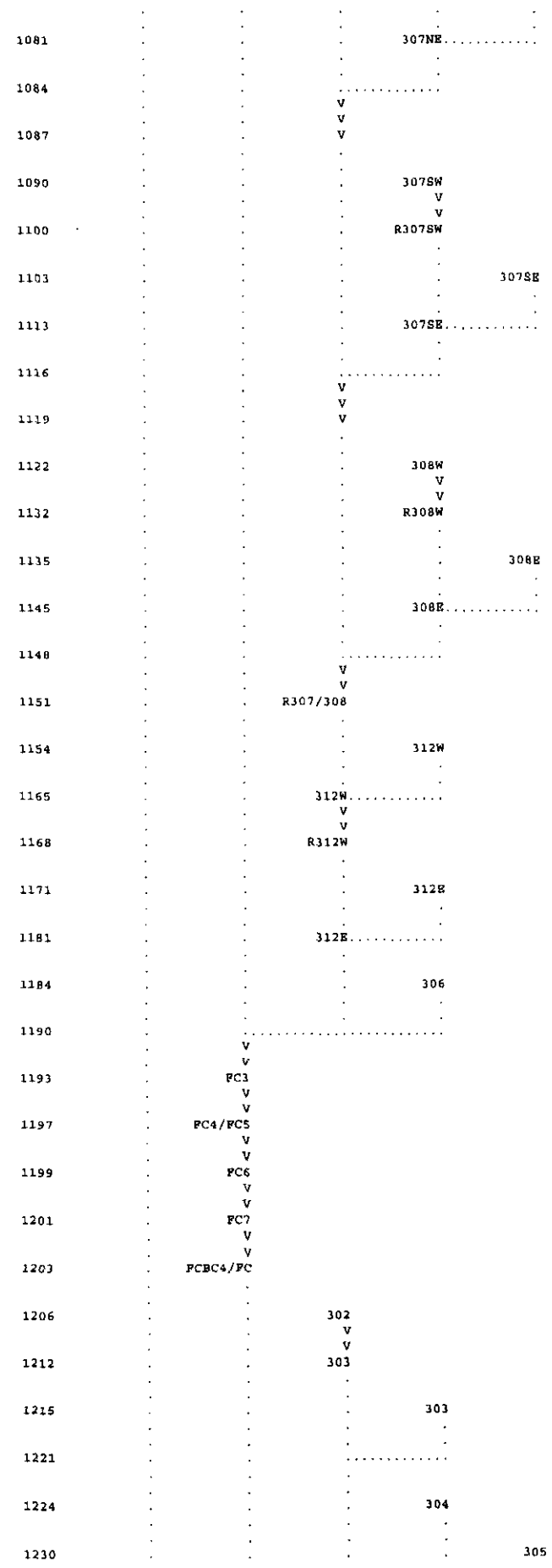

391
ANGEL.PK
394
SPILLWAY
404
AP_TO_VE
408
BUFFALO_
411
GD.7
417
BUFFALO_
420
BUFFALO_
423
GD.4
429
432
GD.5
437
440
443
GD.6
449
452
455
GD.8
461
464
GD.34
470
GOWAN_SO
473
DET.GS
479
R.GSOUT
482
GD.9
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GD.10
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GD.11
512
515
GD.33
524
CULVERTS
521
RANCHO
527

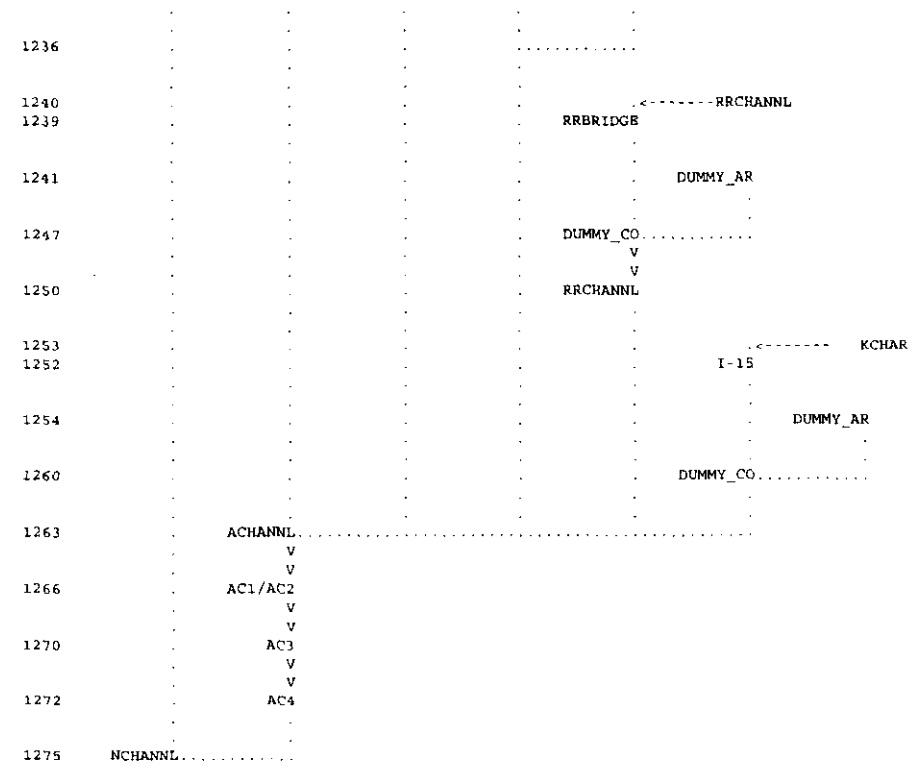

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RANCHO
>CULVERTS
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GD.30
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GD.31B
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571
569
RANCHO
>CULVERTS
574
578
GD.28
584
589
587
RANCHO
>CENTNIAL
592
596
GD.25
602
604
GD.26
610
613
617
620
GD.27
626
629
632
634
GD.29
640
642
PDGC
649
654
652
RANCHO
>P.DESERT
657
661
GD.21
667


669
GD.22
675
GD.23
681
684
687
GD.24
693
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700
GD.18
706
708
GD.19
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GD.20
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732
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CRAIG
HWY.95
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GD.15
745
747
GD.16
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755
758
GD.17
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769
767
ALEXANDR
HWY95
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GD.12
782
784
GD.13
790
793
796
799
GD.14A


805
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GD.14B
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DET.GN
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R.G-UPS.
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CRAIG
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ALEXANDR
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EPT.1
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P.DESERT
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883
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EPT.3
891
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EPT.4
899
901
905
909
EPT.5
914
918


920
EPT.2
925
LVWASH
931
<-------CULVERTS
929
GOWANDIV
932
301
935
301
941
WTRIBUS
944
WTRIBTOT
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SNIC
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LBC
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310W
968
R310W
971
310E
981
310E
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R310E
987
311W
997
311W
1000
R311W
1003
311E
1013
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1016
309W
1026
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1029
309E
1039
309E
1042
1045
FCP1
1049
FCP2
1051
FCBC1
1053
FC1
1055
FCBC2/FC
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307NW
1068
R307NW
1071
307NE


1081
307NE
1084
1087
1090
307SW
1100
R307SW
1103
307SE
1113
307SE
1116
1119
1122
308W
1132
R308W
1135
308E
1145
308E
1148
1151
R307/308
1154
312W
1165
312W
1168
R312W
1171
312E
1181
312E
1184
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1190
1193
FC3
1197
FC4/FC5
1199
FC6
1201
FC7
1203
FCBC4/FC
1206
302
1212
303
1215
303
1221
1224
304
1230
305



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*          FEBRUARY  1991            *
*           VERSION 4.0.1 (LOCAL)    *
*                                    *
*  RUN DATE  05/10/96  TIME  16:22:53*
*                                    *
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**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 551-1748           *
*                                    *
**************************************
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FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
LOWER CENTRAL VALLEY 500-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by James M Montgomery (JMM) in 1/91 for the Las Vegas Valley Flood Insurance Study Hydrology Report dated 9/91. Three modifications were made to the source model. First, Upper Las Vegas Detention Basin storage and outflow characteristics were revised to reflect the as-built configuration described by construction drawings dated 5/91 and HEC-1 models prepared in 1993 by Black & Veatch. Second, the stage-outflow relationship for the North Las Vegas Detention Basin was revised to reflect the current three-pipe outlet condition (two of the five pipes were blocked following construction of the upper basin) and the hydraulic control created by the 4-foot high barrier wall located upstream from the pipe inlets. Third, the source *100-year model* was converted to reflect 500-year conditions by replacing all PB cards with 500-year amounts. 500-year rainfall amounts were determined for each subbasin by frequency extrapolation of the amounts presented by *JMM in the 10-, 50-, and 100-year* Lower Central Valley Storm models.

Remaining comments are from the original model dated 1/91.

CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE
Northern Las Vegas Wash - FIS FLOWS
Prepared by James M. Montgomery, Consulting Engineers, Inc., 1/91

Based on Black & Veatch Northern Las Vegas Wash HEC-1 Model, 8/89
Lower Central Valley 100-Year Storm, Existing Conditions
Additional subareas and facilities from Wallace, 7/88 (EAP.H1) & 8/88 (EPT.H1); VTN, 1/90 (3900RX4.DAT); & B&V La Madre Area, (LAME.DAT)
PB & CN values adjusted by JMM to be consistent with B&V values, *8/90*

All routing steps immediately d/s of a diversion converted to Muskingum routing to avoid zero flow, 8/90

Gowan-North & Gowan-South Detention Basins & Outfall Channel, Buffalo Channel, Cheyenne Channel, Angel Park Detention Basin & Outfall Channel and Hualapai Diversion included, 8/90

This data file models DARF's at certain locations where FIS flows are

required. The original B&V data file used a factor of 0.62; ratios of this factor are used in the JR card to model DA's at the points of interest (JMM DARF's extracted from CCRFCD Design Manual):

PT OF INTEREST	AREA (SQ MI)	DARF	DARF/0.62	RATIO
RRBRIDGE, NC5, & 304	60.7 - 64.5	0.66	1.06	1
ACHANNL	111.6	0.59	0.95	2
NCHANNL	172.2	0.53	0.85	3

```
55 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT           HYDROGRAPH TIME DATA
                     NMIN          6  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     1   0  ENDING DATE
                    NDTIME       1954  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                       TOTAL TIME BASE    19.90 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

   JP           MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

   JR           MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  1.06      0.95      0.85

      *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

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PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2	RATIO 3
					1.06	0.95	0.85
HYDROGRAPH AT							
+	112	5.33	1	FLOW	2401.	1980.	1609.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	119	2.74	1	FLOW	1622.	1344.	1098.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	8.07	1	FLOW	3971.	3278.	2667.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	120	8.07	1	FLOW	3720.	3072.	2502.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	125UDB	8.07	1	FLOW	3338.	2752.	2236.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	117	8.07	1	FLOW	3130.	2585.	2105.
				TIME	5.10	5.10	5.10
HYDROGRAPH AT							
+	118	5.08	1	FLOW	3024.	2508.	2052.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	117	5.08	1	FLOW	2714.	2246.	1833.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	5.08	1	FLOW	2498.	2071.	1694.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	5.08	1	FLOW	2258.	1872.	1532.
				TIME	4.40	4.40	4.40
HYDROGRAPH AT							
+	117	7.37	1	FLOW	1054.	840.	657.
				TIME	5.70	5.80	5.80
3 COMBINED AT							
+	.	20.52	1	FLOW	5062.	4146.	3353.
				TIME	5.00	5.00	5.10
ROUTED TO							
+	ULWDB	20.52	1	FLOW	2960.	2689.	2400.
				TIME	6.40	6.30	6.20
			** PEAK STAGES IN FEET **				
			1	STAGE	2356.60	2353.89	2351.00
				TIME	6.40	6.30	6.20
ROUTED TO							
+	116	20.52	1	FLOW	2953.	2680.	2393.
				TIME	6.90	6.80	6.70
HYDROGRAPH AT							
+	111	4.08	1	FLOW	2579.	2146.	1762.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	116	4.08	1	FLOW	2417.	2010.	1650.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	4.08	1	FLOW	2179.	1811.	1485.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	116	5.19	1	FLOW	726.	576.	448.
				TIME	5.50	5.50	5.60
3 COMBINED AT							
+	.	29.79	1	FLOW	4158.	3602.	3071.
				TIME	5.30	5.30	5.30
ROUTED TO							
+	109	29.79	1	FLOW	3999.	3474.	2967.
				TIME	5.70	5.80	5.80
HYDROGRAPH AT							
+	110	2.94	1	FLOW	1852.	1553.	1286.
				TIME	3.60	3.60	3.60
ROUTED TO							
+	109	2.94	1	FLOW	1755.	1471.	1219.
				TIME	3.70	3.70	3.70

ROUTED TO							
+	V	2.94	1	FLOW	1603.	1343.	1113.
				TIME	3.90	3.90	3.90
HYDROGRAPH AT							
+	109	4.18	1	FLOW	601.	477.	372.
				TIME	5.30	5.40	5.50
3 COMBINED AT							
+	.	36.91	1	FLOW	4879.	4164.	3505.
				TIME	5.60	5.60	5.70
ROUTED TO							
+	101	36.91	1	FLOW	4774.	4077.	3431.
				TIME	6.10	6.20	6.20
HYDROGRAPH AT							
+	103	6.20	1	FLOW	3554.	2959.	2434.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	102	6.20	1	FLOW	3363.	2798.	2299.
				TIME	3.80	3.80	3.80
HYDROGRAPH AT							
+	102	8.45	1	FLOW	3730.	3069.	2488.
				TIME	3.70	3.80	3.80
2 COMBINED AT							
+	.	14.65	1	FLOW	7093.	5867.	4787.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	101	14.65	1	FLOW	6819.	5637.	4595.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	14.65	1	FLOW	6370.	5259.	4281.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	101	9.08	1	FLOW	1170.	920.	708.
				TIME	5.60	5.60	5.70
3 COMBINED AT							
+	NLVIN	60.65	1	FLOW	8942.	7354.	6014.
				TIME	4.30	5.40	5.40
DIVERSION TO							
+	DIVDIKE	60.65	1	FLOW	430.	0.	0.
				TIME	4.30	0.10	0.10
HYDROGRAPH AT							
+	.	60.65	1	FLOW	8512.	7354.	6014.
				TIME	4.30	5.40	5.40
ROUTED TO							
+	NLVDET	60.65	1	FLOW	3411.	2436.	2151.
				TIME	8.30	9.00	8.80
			** PEAK STAGES IN FEET **				
			1	STAGE	28.46	26.23	21.82
				TIME	8.30	9.00	8.80
HYDROGRAPH AT							
+	.	0.00	1	FLOW	430.	0.	0.
				TIME	4.30	0.10	0.10
2 COMBINED AT							
+	.	60.65	1	FLOW	3411.	2436.	2151.
				TIME	8.30	9.00	8.80
ROUTED TO							
+	303	60.65	1	FLOW	3386.	2426.	2148.
				TIME	9.60	10.30	10.10
DIVERSION TO							
+	RRCHANNL	60.65	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	RRBRIDGE	60.65	1	FLOW	3386.	2426.	2148.
				TIME	9.60	10.30	10.10
DIVERSION TO							
+	KCHAR	60.65	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
HYDROGRAPH AT							
+	115	60.65	1	FLOW	677.	485.	430.
				TIME	9.60	10.30	10.10
ROUTED TO							
+	NC1	60.65	1	FLOW	677.	485.	430.
				TIME	9.60	10.30	10.10
ROUTED TO							
+	V	60.65	1	FLOW	677.	485.	430.
				TIME	9.70	10.40	10.10

ROUTED TO							
+	NC2	60.65	1	FLOW	677.	485.	430.
				TIME	9.70	10.40	10.10
ROUTED TO							
+	NC3	60.65	1	FLOW	677.	485.	430.
				TIME	9.80	10.50	10.20
ROUTED TO							
+	NC4	60.65	1	FLOW	677.	485.	430.
				TIME	9.80	10.50	10.20
ROUTED TO							
+	NC5	60.65	1	FLOW	677.	485.	430.
				TIME	9.80	10.50	10.30
HYDROGRAPH AT							
+	AP.1	0.00	1	FLOW	1.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.70	4.70	4.70
HYDROGRAPH AT							
+	AP.2	0.85	1	FLOW	515.	436.	364.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.85	1	FLOW	515.	436.	364.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.85	1	FLOW	406.	343.	287.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	AP.3	3.62	1	FLOW	850.	726.	615.
				TIME	6.20	6.20	6.30
HYDROGRAPH AT							
+	AP.4	0.00	1	FLOW	0.	0.	0.
				TIME	4.40	4.40	4.40
3 COMBINED AT							
+	.	4.47	1	FLOW	1079.	923.	784.
				TIME	6.00	6.00	6.10
HYDROGRAPH AT							
+	AP.5	0.00	1	FLOW	1.	1.	1.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.60	4.60	4.60
HYDROGRAPH AT							
+	AP.6	0.00	1	FLOW	0.	0.	0.
				TIME	4.10	4.10	4.10
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.10	5.10	5.20
HYDROGRAPH AT							
+	AP.7	1.02	1	FLOW	409.	342.	282.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	N_CHN	1.02	1	FLOW	410.	342.	283.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	GD.1	0.00	1	FLOW	1.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.50	4.50	4.50
HYDROGRAPH AT							
+	GD.2	0.00	1	FLOW	0.	0.	0.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.40	4.40	4.40
ROUTED TO							
+	TO_DIV	0.00	1	FLOW	1.	1.	1.
				TIME	4.80	4.80	4.80

HYDROGRAPH AT							
+	GD.3	0.80	1	FLOW	491.	415.	347.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUALAPAI	0.80	1	FLOW	491.	415.	347.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	HUA	1.82	1	FLOW	828.	695.	577.
				TIME	3.80	3.80	3.80
ROUTED TO							
+	V	1.82	1	FLOW	825.	690.	573.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	1.82	1	FLOW	820.	684.	567.
				TIME	4.00	4.00	4.00
HYDROGRAPH AT							
+	AP.8	0.93	1	FLOW	441.	376.	318.
				TIME	4.00	4.00	4.00
2 COMBINED AT							
+	BOX	2.75	1	FLOW	1261.	1060.	885.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	2.75	1	FLOW	1246.	1048.	879.
				TIME	4.00	4.10	4.10
HYDROGRAPH AT							
+	AP.9	0.68	1	FLOW	256.	217.	183.
				TIME	4.20	4.20	4.20
2 COMBINED AT							
+	N_CHAN	3.43	1	FLOW	1491.	1260.	1057.
				TIME	4.10	4.10	4.10
2 COMBINED AT							
+	ANGEL.PK	7.91	1	FLOW	1956.	1673.	1419.
				TIME	5.30	5.30	5.30
ROUTED TO							
+	SPILLWAY	7.91	1	FLOW	72.	69.	67.
				TIME	10.80	10.60	10.50
			** PEAK STAGES IN FEET **				
			1	STAGE	2614.91	2613.51	2612.20
				TIME	10.90	10.70	10.50
ROUTED TO							
+	AP_TO_VE	7.91	1	FLOW	72.	69.	67.
				TIME	10.90	10.70	10.50
ROUTED TO							
+	BUFFALO_	7.91	1	FLOW	72.	69.	67.
				TIME	10.90	10.70	10.50
HYDROGRAPH AT							
+	GD.7	1.13	1	FLOW	323.	275.	232.
				TIME	5.00	5.00	5.00
2 COMBINED AT							
+	BUFFALO_	9.04	1	FLOW	384.	334.	289.
				TIME	5.00	5.00	5.10
ROUTED TO							
+	BUFFALO_	9.04	1	FLOW	383.	334.	289.
				TIME	5.10	5.20	5.30
HYDROGRAPH AT							
+	GD.4	0.00	1	FLOW	1.	0.	0.
				TIME	4.00	4.00	4.00
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.80
HYDROGRAPH AT							
+	GD.5	3.31	1	FLOW	889.	747.	621.
				TIME	5.00	5.10	5.20
2 COMBINED AT							
+	.	3.31	1	FLOW	890.	747.	622.
				TIME	5.00	5.10	5.20
ROUTED TO							
+	V	3.31	1	FLOW	883.	742.	618.
				TIME	5.50	5.60	5.60
HYDROGRAPH AT							
+	GD.6	1.60	1	FLOW	464.	386.	318.
				TIME	4.40	4.40	4.40
2 COMBINED AT							
+	.	4.91	1	FLOW	1250.	1052.	877.
				TIME	5.40	5.40	5.40

ROUTED TO							
+	V	4.91	1	FLOW	1249.	1051.	876.
				TIME	5.40	5.40	5.50
HYDROGRAPH AT							
+	GD.8	1.53	1	FLOW	364.	300.	244.
				TIME	4.60	4.60	4.70
2 COMBINED AT							
+	.	6.44	1	FLOW	1573.	1323.	1101.
				TIME	5.40	5.40	5.40
HYDROGRAPH AT							
+	GD.34	3.84	1	FLOW	724.	599.	489.
				TIME	5.70	5.70	5.70
3 COMBINED AT							
+	GOWAN_SO	19.32	1	FLOW	2665.	2240.	1866.
				TIME	5.40	5.40	5.50
ROUTED TO							
+	DET.GS	19.32	1	FLOW	1550.	452.	418.
				TIME	6.80	8.00	8.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2350.14	2349.36	2346.77
				TIME	6.80	8.00	8.00
ROUTED TO							
+	R.GSOUT	19.32	1	FLOW	1534.	452.	418.
				TIME	6.80	8.10	8.00
HYDROGRAPH AT							
+	GD.9	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.20	4.20	4.20
HYDROGRAPH AT							
+	GD.10	0.00	1	FLOW	0.	0.	0.
				TIME	4.30	4.30	4.30
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.20	4.20	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	4.80	4.80	4.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.60	5.60	5.60
HYDROGRAPH AT							
+	GD.11	3.17	1	FLOW	549.	457.	376.
				TIME	6.30	6.40	6.40
2 COMBINED AT							
+	.	3.17	1	FLOW	550.	458.	376.
				TIME	6.30	6.40	6.40
HYDROGRAPH AT							
+	GD.33	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
DIVERSION TO							
+	CULVERTS	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
HYDROGRAPH AT							
+	RANCHO	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.32C	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
2 COMBINED AT							
+	.	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
DIVERSION TO							
+	CULVERTS	0.37	1	FLOW	213.	179.	149.
				TIME	3.70	3.70	3.70
HYDROGRAPH AT							
+	RANCHO	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	0.37	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10

HYDROGRAPH AT							
+	GD.30	0.00	1	FLOW	0.	0.	0.
				TIME	6.60	6.60	6.60
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	7.70	7.70
HYDROGRAPH AT							
+	GD.31B	0.67	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
3 COMBINED AT							
+	.	1.03	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
DIVERSION TO							
+	CULVERTS	1.03	1	FLOW	159.	128.	102.
				TIME	4.40	4.50	4.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.28	0.00	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
2 COMBINED AT							
+	.	1.03	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
DIVERSION TO							
+	CENTNIAL	1.03	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
HYDROGRAPH AT							
+	RANCHO	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
ROUTED TO							
+	V	1.03	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	GD.25	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.50
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	5.20	5.30	5.30
HYDROGRAPH AT							
+	GD.26	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.10	5.20
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	0.	0.
				TIME	5.20	5.30	5.30
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	5.70	5.70	5.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	6.20	6.20	6.20
HYDROGRAPH AT							
+	GD.27	1.13	1	FLOW	170.	136.	106.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	2.16	1	FLOW	170.	136.	107.
				TIME	5.70	5.70	5.70
ROUTED TO							
+	V	2.16	1	FLOW	170.	136.	107.
				TIME	5.70	5.80	5.80
ROUTED TO							
+	V	2.16	1	FLOW	170.	136.	107.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	GD.29	0.76	1	FLOW	111.	88.	69.
				TIME	5.50	5.60	5.60
ROUTED TO							
+	V	0.76	1	FLOW	111.	88.	68.
				TIME	5.80	5.90	5.90
HYDROGRAPH AT							
+	PDGC	0.53	1	FLOW	90.	73.	58.
				TIME	5.00	5.20	5.30

3 COMBINED AT							
+	.	3.45	1	FLOW	363.	289.	227.
				TIME	5.70	5.70	5.80
DIVERSION TO							
+	P.DESERT	3.45	1	FLOW	233.	233.	227.
				TIME	4.60	4.90	5.80
HYDROGRAPH AT							
+	RANCHO	3.45	1	FLOW	130.	56.	0.
				TIME	5.70	5.70	0.10
ROUTED TO							
+	V	3.45	1	FLOW	129.	55.	0.
				TIME	5.80	5.90	0.10
HYDROGRAPH AT							
+	GD.21	0.00	1	FLOW	1.	0.	0.
				TIME	4.10	4.10	4.10
ROUTED TO							
+	V	0.00	1	FLOW	0.	0.	0.
				TIME	4.90	4.90	4.90
HYDROGRAPH AT							
+	GD.22	0.00	1	FLOW	0.	0.	0.
				TIME	5.10	5.20	5.40
HYDROGRAPH AT							
+	GD.23	0.00	1	FLOW	0.	0.	0.
				TIME	5.00	5.00	5.20
3 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	5.00	5.00	5.00
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.24	0.64	1	FLOW	96.	76.	60.
				TIME	5.20	5.30	5.50
2 COMBINED AT							
+	.	0.64	1	FLOW	97.	77.	60.
				TIME	5.20	5.40	5.50
ROUTED TO							
+	V	0.64	1	FLOW	96.	76.	59.
				TIME	5.90	6.00	6.00
HYDROGRAPH AT							
+	GD.18	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.30	4.30	4.30
HYDROGRAPH AT							
+	GD.19	0.00	1	FLOW	0.	0.	0.
				TIME	4.80	4.80	4.90
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.30	4.30	4.30
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.30	5.30	5.30
HYDROGRAPH AT							
+	GD.20	2.35	1	FLOW	320.	260.	209.
				TIME	6.50	6.50	6.50
4 COMBINED AT							
+	.	6.45	1	FLOW	526.	378.	265.
				TIME	6.00	6.10	6.40
DIVERSION TO							
+	CRAIG	6.45	1	FLOW	465.	378.	265.
				TIME	5.50	6.10	6.40
HYDROGRAPH AT							
+	HWY.95	6.45	1	FLOW	61.	0.	0.
				TIME	6.00	0.10	0.10
ROUTED TO							
+	V	6.45	1	FLOW	60.	0.	0.
				TIME	6.10	0.10	0.10
HYDROGRAPH AT							
+	GD.15	0.00	1	FLOW	1.	1.	0.
				TIME	3.90	3.90	3.90
ROUTED TO							
+	V	0.00	1	FLOW	1.	0.	0.
				TIME	4.60	4.60	4.60

HYDROGRAPH AT							
+	GD.16	0.00	1	FLOW	0.	0.	0.
				TIME	5.50	5.50	5.50
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.70	4.70	4.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.17	0.56	1	FLOW	96.	78.	62.
				TIME	6.00	6.00	6.00
3 COMBINED AT							
+	.	7.01	1	FLOW	156.	78.	63.
				TIME	6.10	6.00	6.00
DIVERSION TO							
+	ALEXANDR	7.01	1	FLOW	155.	78.	63.
				TIME	6.10	6.00	6.00
HYDROGRAPH AT							
+	HWY95	7.01	1	FLOW	1.	0.	0.
				TIME	6.10	0.10	0.10
ROUTED TO							
+	V	7.01	1	FLOW	1.	0.	0.
				TIME	6.20	0.10	0.10
HYDROGRAPH AT							
+	GD.12	0.00	1	FLOW	1.	1.	1.
				TIME	3.70	3.70	3.70
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	0.
				TIME	4.10	4.10	4.10
HYDROGRAPH AT							
+	GD.13	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	4.60
2 COMBINED AT							
+	.	0.00	1	FLOW	1.	1.	1.
				TIME	4.10	4.10	4.20
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	4.60	4.60	4.60
ROUTED TO							
+	V	0.00	1	FLOW	1.	1.	1.
				TIME	5.70	5.70	5.70
HYDROGRAPH AT							
+	GD.14A	1.71	1	FLOW	405.	326.	258.
				TIME	4.30	4.40	4.40
2 COMBINED AT							
+	.	1.71	1	FLOW	405.	326.	258.
				TIME	4.30	4.40	4.40
ROUTED TO							
+	V	1.71	1	FLOW	388.	312.	246.
				TIME	4.90	4.90	5.00
HYDROGRAPH AT							
+	GD.14B	0.68	1	FLOW	121.	100.	81.
				TIME	5.60	5.70	5.70
3 COMBINED AT							
+	.	9.40	1	FLOW	495.	399.	316.
				TIME	5.00	5.00	5.00
3 COMBINED AT							
+	GN_IN	31.90	1	FLOW	2289.	1207.	1037.
				TIME	6.80	6.00	6.00
ROUTED TO							
+	DET.GN	31.90	1	FLOW	398.	355.	331.
				TIME	15.00	17.90	17.60
			** PEAK STAGES IN FEET **				
			1	STAGE	2319.50	2317.89	2317.00
				TIME	14.90	17.80	17.40
ROUTED TO							
+	R.G-UPS.	31.90	1	FLOW	398.	356.	331.
				TIME	15.00	19.90	17.60
ROUTED TO							
+	V	31.90	1	FLOW	398.	356.	332.
				TIME	15.00	19.90	19.90
HYDROGRAPH AT							
+	.	0.00	1	FLOW	465.	378.	265.
				TIME	5.50	6.10	6.40

ROUTED TO							
+	V	0.00	1	FLOW	465.	372.	263.
				TIME	6.60	6.50	6.80
HYDROGRAPH AT							
+	.	0.00	1	FLOW	155.	78.	63.
				TIME	6.10	6.00	6.00
ROUTED TO							
+	V	0.00	1	FLOW	142.	77.	61.
				TIME	7.00	6.90	7.00
3 COMBINED AT							
+	.	31.90	1	FLOW	921.	733.	606.
.				TIME	6.90	6.60	7.00
ROUTED TO							
+	V	31.90	1	FLOW	920.	733.	606.
				TIME	7.00	6.70	7.00
ROUTED TO							
+	V	31.90	1	FLOW	919.	733.	605.
				TIME	7.00	6.70	7.00
ROUTED TO							
+	V	31.90	1	FLOW	918.	732.	605.
				TIME	7.00	6.70	7.10
HYDROGRAPH AT							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	6.40	6.50	6.50
ROUTED TO							
+	.	0.00	1	FLOW	0.	0.	0.
				TIME	8.40	8.60	8.50
HYDROGRAPH AT							
+	EPT.1	3.76	1	FLOW	506.	420.	344.
				TIME	7.20	7.20	7.20
2 COMBINED AT							
+	.	3.76	1	FLOW	506.	420.	344.
				TIME	7.20	7.20	7.20
ROUTED TO							
+	V	3.76	1	FLOW	502.	417.	341.
				TIME	8.00	8.00	8.00
HYDROGRAPH AT							
+	.	0.00	1	FLOW	233.	233.	227.
				TIME	4.60	4.90	5.80
ROUTED TO							
+	V	0.00	1	FLOW	233.	232.	216.
				TIME	7.90	7.80	7.80
HYDROGRAPH AT							
+	EPT.3	4.39	1	FLOW	644.	543.	453.
				TIME	7.40	7.50	7.50
3 COMBINED AT							
+	.	8.15	1	FLOW	1367.	1182.	1002.
				TIME	7.70	7.70	7.80
HYDROGRAPH AT							
+	EPT.4	1.37	1	FLOW	264.	225.	189.
				TIME	6.50	6.50	6.50
ROUTED TO							
+	V	1.37	1	FLOW	261.	222.	187.
				TIME	7.40	7.40	7.40
2 COMBINED AT							
+	.	9.52	1	FLOW	1625.	1400.	1185.
				TIME	7.60	7.70	7.70
2 COMBINED AT							
+	.	41.42	1	FLOW	2491.	2076.	1765.
				TIME	7.20	7.40	7.50
HYDROGRAPH AT							
+	EPT.5	3.01	1	FLOW	341.	286.	237.
				TIME	8.50	8.50	8.50
2 COMBINED AT							
+	.	44.42	1	FLOW	2791.	2336.	1984.
				TIME	7.30	7.50	7.60
ROUTED TO							
+	V	44.42	1	FLOW	2790.	2335.	1983.
				TIME	7.30	7.50	7.60
HYDROGRAPH AT							
+	EPT.2	1.49	1	FLOW	248.	206.	169.
				TIME	6.40	6.40	6.50
2 COMBINED AT							
+	LVWASH	45.92	1	FLOW	2999.	2498.	2112.
				TIME	7.30	7.40	7.50

HYDROGRAPH AT							
+	GOWANDIV	0.00	1	FLOW	0.	0.	0.
				TIME	7.20	7.20	7.20
ROUTED TO							
+	301	0.00	1	FLOW	0.	0.	0.
				TIME	9.40	9.40	9.40
HYDROGRAPH AT							
+	301	18.62	1	FLOW	2383.	1985.	1636.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	WTRIBUS	18.62	1	FLOW	2383.	1986.	1636.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	WTRIBTOT	64.53	1	FLOW	5275.	4427.	3709.
				TIME	7.60	7.70	7.80
ROUTED TO							
+	304	64.53	1	FLOW	5266.	4420.	3701.
				TIME	7.90	8.00	8.10
ROUTED TO							
+	SNIC	64.53	1	FLOW	5266.	4419.	3701.
				TIME	7.90	8.00	8.10
ROUTED TO							
+	LBC	64.53	1	FLOW	5265.	4417.	3700.
				TIME	7.90	8.10	8.10
HYDROGRAPH AT							
+	310W	0.80	1	FLOW	322.	256.	198.
				TIME	4.00	4.20	4.20
ROUTED TO							
+	R310W	0.80	1	FLOW	315.	251.	196.
				TIME	4.20	4.30	4.50
HYDROGRAPH AT							
+	310E	1.24	1	FLOW	425.	323.	241.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	310E	2.04	1	FLOW	693.	541.	408.
				TIME	4.20	4.30	4.40
ROUTED TO							
+	R310E	2.04	1	FLOW	681.	533.	408.
				TIME	4.30	4.40	4.50
HYDROGRAPH AT							
+	311W	0.96	1	FLOW	339.	260.	196.
				TIME	3.90	4.00	4.10
2 COMBINED AT							
+	311W	3.00	1	FLOW	957.	729.	558.
				TIME	4.20	4.30	4.50
ROUTED TO							
+	R311W	3.00	1	FLOW	954.	725.	542.
				TIME	4.30	4.40	4.70
HYDROGRAPH AT							
+	311E	0.77	1	FLOW	104.	81.	61.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	311E	3.77	1	FLOW	1027.	770.	567.
				TIME	4.30	4.50	4.70
HYDROGRAPH AT							
+	309W	0.81	1	FLOW	83.	60.	39.
				TIME	5.40	5.60	5.90
ROUTED TO							
+	R309W	0.81	1	FLOW	83.	60.	39.
				TIME	6.30	6.70	7.20
HYDROGRAPH AT							
+	309E	1.19	1	FLOW	307.	231.	176.
				TIME	4.40	4.60	4.80
2 COMBINED AT							
+	309E	2.00	1	FLOW	307.	231.	176.
				TIME	4.40	4.60	4.80
2 COMBINED AT							
+	.	5.77	1	FLOW	1323.	1000.	740.
				TIME	4.30	4.50	4.70
ROUTED TO							
+	FCP1	5.77	1	FLOW	1322.	999.	739.
				TIME	4.40	4.50	4.70
ROUTED TO							
+	FCP2	5.77	1	FLOW	1322.	996.	736.
				TIME	4.40	4.50	4.70

ROUTED TO							
+	FCBC1	5.77	1	FLOW	1322.	995.	735.
				TIME	4.40	4.50	4.70
ROUTED TO							
+	FC1	5.77	1	FLOW	1321.	993.	733.
				TIME	4.40	4.50	4.70
ROUTED TO							
+	FCBC2/FC	5.77	1	FLOW	1320.	991.	731.
				TIME	4.40	4.50	4.70
HYDROGRAPH AT							
+	307NW	1.33	1	FLOW	516.	403.	312.
	.			TIME	4.00	4.10	4.10
ROUTED TO							
+	R307NW	1.33	1	FLOW	510.	401.	311.
				TIME	4.00	4.10	4.20
HYDROGRAPH AT							
+	307NE	0.64	1	FLOW	251.	198.	154.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	307NE	1.97	1	FLOW	761.	599.	465.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	.	7.74	1	FLOW	1929.	1441.	1068.
				TIME	4.30	4.50	4.70
ROUTED TO							
+	V	7.74	1	FLOW	1820.	1380.	1037.
				TIME	4.70	4.80	5.10
HYDROGRAPH AT							
+	307SW	1.10	1	FLOW	55.	31.	14.
				TIME	5.90	6.40	7.20
ROUTED TO							
+	R307SW	1.10	1	FLOW	55.	31.	14.
				TIME	6.30	6.90	7.90
HYDROGRAPH AT							
+	307SE	1.58	1	FLOW	606.	474.	365.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	307SE	2.68	1	FLOW	606.	474.	365.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	.	10.42	1	FLOW	2149.	1664.	1291.
				TIME	4.70	4.80	5.10
ROUTED TO							
+	V	10.42	1	FLOW	2112.	1645.	1283.
				TIME	4.90	5.00	5.30
HYDROGRAPH AT							
+	308W	0.81	1	FLOW	83.	60.	38.
				TIME	5.40	5.60	5.90
ROUTED TO							
+	R308W	0.81	1	FLOW	82.	59.	38.
				TIME	5.60	5.90	6.30
HYDROGRAPH AT							
+	308E	0.72	1	FLOW	278.	218.	168.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	308E	1.53	1	FLOW	278.	218.	168.
				TIME	4.00	4.10	4.20
2 COMBINED AT							
+	.	11.95	1	FLOW	2265.	1778.	1396.
				TIME	4.90	5.10	5.30
ROUTED TO							
+	R307/308	11.95	1	FLOW	2256.	1775.	1394.
				TIME	5.00	5.10	5.40
HYDROGRAPH AT							
+	312W	0.77	1	FLOW	177.	128.	92.
				TIME	4.20	4.40	5.20
2 COMBINED AT							
+	312W	12.72	1	FLOW	2388.	1888.	1484.
				TIME	5.00	5.10	5.40
ROUTED TO							
+	R312W	12.72	1	FLOW	2386.	1886.	1482.
				TIME	5.00	5.20	5.40
HYDROGRAPH AT							
+	312E	0.70	1	FLOW	129.	91.	72.
				TIME	4.20	5.20	5.20

2 COMBINED AT							
+	312E	13.42	1	FLOW	2493.	1977.	1552.
				TIME	5.00	5.20	5.40
HYDROGRAPH AT							
+	306	5.07	1	FLOW	686.	565.	460.
				TIME	6.90	6.90	7.00
3 COMBINED AT							
+	.	83.02	1	FLOW	6518.	5453.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC3	83.02	1	FLOW	6517.	5452.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC4/FC5	83.02	1	FLOW	6517.	5452.	4514.
				TIME	7.40	7.50	7.70
ROUTED TO							
+	FC6	83.02	1	FLOW	6515.	5450.	4513.
				TIME	7.50	7.60	7.80
ROUTED TO							
+	FC7	83.02	1	FLOW	6514.	5450.	4512.
				TIME	7.50	7.60	7.80
ROUTED TO							
+	FCBC4/FC	83.02	1	FLOW	6512.	5449.	4512.
				TIME	7.50	7.60	7.80
HYDROGRAPH AT							
+	302	12.11	1	FLOW	1787.	1489.	1228.
				TIME	6.90	6.90	7.00
ROUTED TO							
+	303	12.11	1	FLOW	1769.	1475.	1216.
				TIME	7.80	7.80	7.80
HYDROGRAPH AT							
+	303	10.22	1	FLOW	1053.	866.	702.
				TIME	8.10	8.10	8.10
2 COMBINED AT							
+	.	22.33	1	FLOW	2814.	2334.	1913.
				TIME	7.90	7.90	7.90
HYDROGRAPH AT							
+	304	2.90	1	FLOW	561.	469.	388.
				TIME	5.90	5.90	5.90
HYDROGRAPH AT							
+	305	3.30	1	FLOW	777.	653.	545.
				TIME	5.30	5.30	5.40
2 COMBINED AT							
+	.	6.20	1	FLOW	1310.	1099.	913.
				TIME	5.50	5.60	5.60
HYDROGRAPH AT							
+	RRBRIDGE	0.00	1	FLOW	0.	0.	0.
				TIME	0.10	0.10	0.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
ROUTED TO							
+	RRCHANNL	0.00	1	FLOW	0.	0.	0.
				TIME	7.70	8.00	9.20
HYDROGRAPH AT							
+	I-15	0.00	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
HYDROGRAPH AT							
+	DUMMY_AR	0.00	1	FLOW	0.	0.	0.
				TIME	4.50	4.50	5.30
2 COMBINED AT							
+	DUMMY_CO	0.00	1	FLOW	2709.	1941.	1718.
				TIME	9.60	10.30	10.10
5 COMBINED AT							
+	ACHANNL	111.56	1	FLOW	11748.	9884.	8274.
				TIME	7.70	7.60	7.80
ROUTED TO							
+	AC1/AC2	111.56	1	FLOW	11747.	9882.	8274.
				TIME	7.70	7.70	7.80
ROUTED TO							
+	AC3	111.56	1	FLOW	11745.	9882.	8273.
				TIME	7.70	7.70	7.80

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 ROUTED TO
+                    AC4     111.56      1   FLOW        11745.    9881.    8272.
                                             TIME          7.80     7.70     7.80

  2 COMBINED AT
+                  NCHANNL   172.20      1   FLOW        12241.   10309.    8658.
                                             TIME          7.80     7.70     7.90
1
                                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                                 COMPUTATION INTERVAL
          ISTAQ     ELEMENT        DT        PEAK     TIME TO      VOLUME        DT        PEAK     TIME TO      VOLUME
                                                        PEAK                                          PEAK

                                  (MIN)       (CFS)     (MIN)       (IN)      (MIN)       (CFS)     (MIN)       (IN)

          FOR PLAN = 1  RATIO= 1.06
               NC1  MANE          0.38     677.14     576.75       0.17      6.00      677.10     576.00       0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5521E+03 EXCESS=0.0000E+00 OUTFLOW=0.5518E+03 BASIN STORAGE=0.2504E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC1  MANE          0.28     485.15     618.46       0.14      6.00      485.13     618.00       0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4545E+03 EXCESS=0.0000E+00 OUTFLOW=0.4542E+03 BASIN STORAGE=0.2143E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC1  MANE          0.42     429.59     606.28       0.12      6.00      429.59     606.00       0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3758E+03 EXCESS=0.0000E+00 OUTFLOW=0.3756E+03 BASIN STORAGE=0.1412E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.18     677.08     578.56       0.17      6.00      676.92     582.00       0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5518E+03 EXCESS=0.0000E+00 OUTFLOW=0.5505E+03 BASIN STORAGE=0.1366E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.26     485.12     620.48       0.14      6.00      485.04     624.00       0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4543E+03 EXCESS=0.0000E+00 OUTFLOW=0.4532E+03 BASIN STORAGE=0.1124E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.22     429.58     608.68       0.12      6.00      429.57     606.00       0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3756E+03 EXCESS=0.0000E+00 OUTFLOW=0.3750E+03 BASIN STORAGE=0.7630E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               NC2  MANE          0.69     676.91     583.19       0.17      6.00      676.89     582.00       0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5503E+03 EXCESS=0.0000E+00 OUTFLOW=0.5495E+03 BASIN STORAGE=0.7958E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC2  MANE          0.75     485.04     624.83       0.14      6.00      485.03     624.00       0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4530E+03 EXCESS=0.0000E+00 OUTFLOW=0.4524E+03 BASIN STORAGE=0.6504E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC2  MANE          0.79     429.57     607.67       0.12      6.00      429.55     606.00       0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3748E+03 EXCESS=0.0000E+00 OUTFLOW=0.3743E+03 BASIN STORAGE=0.4372E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               NC3  MANE          2.02     676.82     584.89       0.17      6.00      676.66     588.00       0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5495E+03 EXCESS=0.0000E+00 OUTFLOW=0.5476E+03 BASIN STORAGE=0.2506E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
               NC3  MANE          2.25     485.03     628.17       0.14      6.00      484.95     630.00       0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4523E+03 EXCESS=0.0000E+00 OUTFLOW=0.4502E+03 BASIN STORAGE=0.2074E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC3  MANE          2.37     429.55     610.82       0.12      6.00      429.55     612.00       0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3743E+03 EXCESS=0.0000E+00 OUTFLOW=0.3729E+03 BASIN STORAGE=0.1424E+01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 1.06
               NC4  MANE          0.66    676.66    587.68      0.17      6.00    676.65    588.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5467E+03 EXCESS=0.0000E+00 OUTFLOW=0.5459E+03 BASIN STORAGE=0.7063E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC4  MANE          0.67    484.95    630.33      0.14      6.00    484.95    630.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4500E+03 EXCESS=0.0000E+00 OUTFLOW=0.4495E+03 BASIN STORAGE=0.5827E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC4  MANE          0.76    429.54    613.93      0.12      6.00    429.53    612.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3727E+03 EXCESS=0.0000E+00 OUTFLOW=0.3724E+03 BASIN STORAGE=0.4035E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               NC5  MANE          0.46    676.64    588.23      0.17      6.00    676.63    588.00         0.17

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5459E+03 EXCESS=0.0000E+00 OUTFLOW=0.5455E+03 BASIN STORAGE=0.4054E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               NC5  MANE          0.38    484.94    630.62      0.14      6.00    484.94    630.00         0.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4494E+03 EXCESS=0.0000E+00 OUTFLOW=0.4491E+03 BASIN STORAGE=0.3247E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               NC5  MANE          0.52    429.53    613.08      0.12      6.00    429.52    618.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3723E+03 EXCESS=0.0000E+00 OUTFLOW=0.3721E+03 BASIN STORAGE=0.2259E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          3.08    825.75    234.44      1.30      6.00    824.94    234.00         1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1265E+03 EXCESS=0.0000E+00 OUTFLOW=0.1268E+03 BASIN STORAGE=0.8465E-02 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          3.21    690.23    235.61      1.09      6.00    689.89    234.00         1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1056E+03 EXCESS=0.0000E+00 OUTFLOW=0.1058E+03 BASIN STORAGE=0.6286E-02 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
                    V  MANE          3.50    573.71    233.74      0.90      6.00    573.40    234.00         0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8735E+02 EXCESS=0.0000E+00 OUTFLOW=0.8754E+02 BASIN STORAGE=0.8055E-02 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          3.04    822.02    239.20      1.30      6.00    819.88    240.00         1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1269E+03 EXCESS=0.0000E+00 OUTFLOW=0.1269E+03 BASIN STORAGE=0.8518E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          3.19    684.84    241.88      1.09      6.00    683.61    240.00         1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1058E+03 EXCESS=0.0000E+00 OUTFLOW=0.1058E+03 BASIN STORAGE=0.8324E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
                    V  MANE          3.44    572.29    241.28      0.90      6.00    567.21    240.00         0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8755E+02 EXCESS=0.0000E+00 OUTFLOW=0.8759E+02 BASIN STORAGE=0.7587E-02 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
                    V  MANE          1.37   1257.09    243.31      1.37      6.00   1245.82    240.00         1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2015E+03 EXCESS=0.0000E+00 OUTFLOW=0.2016E+03 BASIN STORAGE=0.1148E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                    V  MANE          1.51   1058.49    243.16      1.15      6.00   1048.49    246.00         1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1690E+03 EXCESS=0.0000E+00 OUTFLOW=0.1690E+03 BASIN STORAGE=0.1182E-01 PERCENT ERROR=  -0.1
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          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.53    883.51    242.90       0.96       6.00    879.11    246.00         0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1406E+03 EXCESS=0.0000E+00 OUTFLOW=0.1407E+03 BASIN STORAGE=0.1124E-01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
          AP_TO_VE  MANE          1.78     71.50    656.88       0.24       6.00     71.50    660.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1028E+03 EXCESS=0.0000E+00 OUTFLOW=0.1026E+03 BASIN STORAGE=0.3291E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          AP_TO_VE  MANE          1.78     69.25    646.54       0.24       6.00     69.25    648.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9939E+02 EXCESS=0.0000E+00 OUTFLOW=0.9914E+02 BASIN STORAGE=0.3212E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.85
          AP_TO_VE  MANE          1.79     67.05    634.39       0.23       6.00     67.05    636.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9606E+02 EXCESS=0.0000E+00 OUTFLOW=0.9578E+02 BASIN STORAGE=0.3125E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          1.34     71.56   1195.32       0.24       6.00     71.50    660.00         0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1024E+03 EXCESS=0.0000E+00 OUTFLOW=0.1022E+03 BASIN STORAGE=0.3097E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          1.25     69.25    650.72       0.23       6.00     69.25    648.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9899E+02 EXCESS=0.0000E+00 OUTFLOW=0.9870E+02 BASIN STORAGE=0.3167E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          1.26     67.05    637.92       0.23       6.00     67.05    636.00         0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9567E+02 EXCESS=0.0000E+00 OUTFLOW=0.9545E+02 BASIN STORAGE=0.3099E+00 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 1.06
          BUFFALO_  MANE          3.67    383.53    309.26       0.38       6.00    383.36    306.00         0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1859E+03 EXCESS=0.0000E+00 OUTFLOW=0.1845E+03 BASIN STORAGE=0.1619E+01 PERCENT ERROR=  -0.1

          FOR PLAN = 1  RATIO= 0.95
          BUFFALO_  MANE          3.79    333.53    309.91       0.35       6.00    333.50    312.00         0.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1695E+03 EXCESS=0.0000E+00 OUTFLOW=0.1681E+03 BASIN STORAGE=0.1691E+01 PERCENT ERROR=  -0.2

          FOR PLAN = 1  RATIO= 0.85
          BUFFALO_  MANE          4.02    288.66    315.45       0.32       6.00    288.59    318.00         0.32

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1546E+03 EXCESS=0.0000E+00 OUTFLOW=0.1536E+03 BASIN STORAGE=0.1649E+01 PERCENT ERROR=  -0.4

          FOR PLAN = 1  RATIO= 1.06
                V  MANE          1.23   1249.43    326.33       1.24       6.00   1248.94    324.00         1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3256E+03 EXCESS=0.0000E+00 OUTFLOW=0.3257E+03 BASIN STORAGE=0.3639E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
                V  MANE          1.22   1052.00    325.97       1.04       6.00   1050.86    324.00         1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2711E+03 EXCESS=0.0000E+00 OUTFLOW=0.2711E+03 BASIN STORAGE=0.2602E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
                V  MANE          1.35    876.33    327.30       0.85       6.00    875.53    330.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2233E+03 EXCESS=0.0000E+00 OUTFLOW=0.2233E+03 BASIN STORAGE=0.3676E-03 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
           R.GSOUT  MANE          0.71   1548.34    409.28       0.61       6.00   1534.44    408.00         0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6299E+03 EXCESS=0.0000E+00 OUTFLOW=0.6292E+03 BASIN STORAGE=0.9109E+00 PERCENT ERROR=   0.0
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FOR PLAN = 1 RATIO= 0.95
R.GSOUT MANE 1.00 451.84 482.46 0.52 6.00 451.84 486.00 0.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5321E+03 EXCESS=0.0000E+00 OUTFLOW=0.5314E+03 BASIN STORAGE=0.8758E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
R.GSOUT MANE 1.01 417.55 481.28 0.47 6.00 417.55 480.00 0.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4848E+03 EXCESS=0.0000E+00 OUTFLOW=0.4841E+03 BASIN STORAGE=0.7222E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 2.60 170.47 343.59 0.38 6.00 170.45 342.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4358E+02 EXCESS=0.0000E+00 OUTFLOW=0.4359E+02 BASIN STORAGE=0.8848E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 2.76 136.20 347.18 0.30 6.00 136.10 348.00 0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3440E+02 EXCESS=0.0000E+00 OUTFLOW=0.3440E+02 BASIN STORAGE=0.9229E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 2.97 106.74 347.80 0.23 6.00 106.74 348.00 0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2665E+02 EXCESS=0.0000E+00 OUTFLOW=0.2665E+02 BASIN STORAGE=0.9610E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 3.05 170.38 349.32 0.38 6.00 170.27 348.00 0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4360E+02 EXCESS=0.0000E+00 OUTFLOW=0.4359E+02 BASIN STORAGE=0.1117E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 3.36 136.03 354.89 0.30 6.00 136.01 354.00 0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3441E+02 EXCESS=0.0000E+00 OUTFLOW=0.3440E+02 BASIN STORAGE=0.1243E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 3.54 106.70 354.81 0.23 6.00 106.60 354.00 0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2666E+02 EXCESS=0.0000E+00 OUTFLOW=0.2665E+02 BASIN STORAGE=0.1288E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
V MANE 5.43 111.02 350.43 0.68 6.00 110.99 348.00 0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2739E+02 EXCESS=0.0000E+00 OUTFLOW=0.2739E+02 BASIN STORAGE=0.1023E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
V MANE 5.68 88.11 351.66 0.53 6.00 87.98 354.00 0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2145E+02 EXCESS=0.0000E+00 OUTFLOW=0.2146E+02 BASIN STORAGE=0.1071E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
V MANE 6.00 68.47 358.41 0.41 6.00 68.41 354.00 0.41

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1647E+02 EXCESS=0.0000E+00 OUTFLOW=0.1648E+02 BASIN STORAGE=0.8688E-03 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06
R.G-UPS. MANE 0.73 398.32 901.66 0.29 6.00 398.32 900.00 0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4889E+03 EXCESS=0.0000E+00 OUTFLOW=0.4881E+03 BASIN STORAGE=0.7311E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95
R.G-UPS. MANE 0.73 357.17 1194.25 0.25 6.00 356.38 1194.00 0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4340E+03 EXCESS=0.0000E+00 OUTFLOW=0.4332E+03 BASIN STORAGE=0.6794E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85
R.G-UPS. MANE 0.75 331.44 1057.02 0.24 6.00 331.44 1056.00 0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4041E+03 EXCESS=0.0000E+00 OUTFLOW=0.4034E+03 BASIN STORAGE=0.6335E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

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V  MANE          1.43    400.38   1194.55      0.29      6.00    398.32    906.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4880E+03 EXCESS=0.0000E+00 OUTFLOW=0.4858E+03 BASIN STORAGE=0.2544E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.95
V  MANE          1.54    361.70   1195.33      0.25      6.00    356.40   1194.00        0.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4332E+03 EXCESS=0.0000E+00 OUTFLOW=0.4314E+03 BASIN STORAGE=0.2355E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.85
V  MANE          1.60    336.13   1195.09      0.24      6.00    331.85   1194.00        0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4034E+03 EXCESS=0.0000E+00 OUTFLOW=0.4016E+03 BASIN STORAGE=0.2238E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 1.06
V  MANE          1.34    920.33    416.38      0.39      6.00    919.63    420.00        0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6592E+03 EXCESS=0.0000E+00 OUTFLOW=0.6568E+03 BASIN STORAGE=0.3330E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.95
V  MANE          1.42    733.23    398.44      0.33      6.00    732.78    402.00        0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5624E+03 EXCESS=0.0000E+00 OUTFLOW=0.5595E+03 BASIN STORAGE=0.3118E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.85
V  MANE          1.55    605.61    421.32      0.29      6.00    605.61    420.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5013E+03 EXCESS=0.0000E+00 OUTFLOW=0.4985E+03 BASIN STORAGE=0.2984E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 1.06
V  MANE          0.80    919.42    420.76      0.38      6.00    919.21    420.00        0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6559E+03 EXCESS=0.0000E+00 OUTFLOW=0.6546E+03 BASIN STORAGE=0.1751E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.95
V  MANE          0.86    732.68    402.59      0.33      6.00    732.63    402.00        0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5593E+03 EXCESS=0.0000E+00 OUTFLOW=0.5577E+03 BASIN STORAGE=0.1645E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 0.85
V  MANE          0.83    605.56    421.42      0.29      6.00    605.36    420.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4984E+03 EXCESS=0.0000E+00 OUTFLOW=0.4970E+03 BASIN STORAGE=0.1574E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 1.06
V  MANE          0.69    919.08    421.15      0.38      6.00    918.44    420.00        0.38

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6542E+03 EXCESS=0.0000E+00 OUTFLOW=0.6526E+03 BASIN STORAGE=0.1750E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 0.95
V  MANE          0.74    732.62    403.44      0.33      6.00    732.24    402.00        0.33

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5577E+03 EXCESS=0.0000E+00 OUTFLOW=0.5563E+03 BASIN STORAGE=0.1649E+01 PERCENT ERROR=  -0.1

 FOR PLAN = 1  RATIO= 0.85
V  MANE          0.94    605.30    421.65      0.29      6.00    605.08    426.00        0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4968E+03 EXCESS=0.0000E+00 OUTFLOW=0.4954E+03 BASIN STORAGE=0.1575E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 1.06
V  MANE          0.96   2791.07    439.28      0.64      6.00   2790.29    438.00        0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1521E+04 EXCESS=0.0000E+00 OUTFLOW=0.1518E+04 BASIN STORAGE=0.3380E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 0.95
V  MANE          0.94   2336.17    451.73      0.54      6.00   2335.20    450.00        0.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1285E+04 EXCESS=0.0000E+00 OUTFLOW=0.1282E+04 BASIN STORAGE=0.3171E+01 PERCENT ERROR=   0.0

 FOR PLAN = 1  RATIO= 0.85
V  MANE          1.10   1983.78    457.79      0.46      6.00   1982.97    456.00        0.46
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1097E+04 EXCESS=0.0000E+00 OUTFLOW=0.1095E+04 BASIN STORAGE=0.3029E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.06

SNIC	MANE	0.59	5266.23	474.81	0.82	6.00	5265.94	474.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2813E+04 EXCESS=0.0000E+00 OUTFLOW=0.2811E+04 BASIN STORAGE=0.2091E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

SNIC	MANE	0.60	4419.37	481.05	0.68	6.00	4418.57	480.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2355E+04 EXCESS=0.0000E+00 OUTFLOW=0.2354E+04 BASIN STORAGE=0.1936E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

SNIC	MANE	0.63	3701.34	486.82	0.57	6.00	3701.24	486.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1974E+04 EXCESS=0.0000E+00 OUTFLOW=0.1972E+04 BASIN STORAGE=0.1826E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

LBC	MANE	0.93	5265.66	476.09	0.82	6.00	5264.70	474.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2811E+04 EXCESS=0.0000E+00 OUTFLOW=0.2807E+04 BASIN STORAGE=0.4125E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

LBC	MANE	1.03	4418.48	482.02	0.68	6.00	4417.32	486.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2353E+04 EXCESS=0.0000E+00 OUTFLOW=0.2349E+04 BASIN STORAGE=0.3838E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

LBC	MANE	1.03	3701.03	487.68	0.57	6.00	3700.39	486.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1972E+04 EXCESS=0.0000E+00 OUTFLOW=0.1968E+04 BASIN STORAGE=0.3634E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

310W	MANE	4.69	289.42	242.27	1.04	6.00	285.72	240.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4507E+02 OUTFLOW=0.4454E+02 BASIN STORAGE=0.1561E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 1.06

310W	MANE	4.44	323.09	240.77	1.15	6.00	321.93	240.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4963E+02 OUTFLOW=0.4905E+02 BASIN STORAGE=0.1603E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 0.95

310W	MANE	4.81	256.98	242.45	0.96	6.00	255.58	246.00	0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4134E+02 OUTFLOW=0.4080E+02 BASIN STORAGE=0.1552E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 0.85

310W	MANE	5.27	200.15	248.55	0.79	6.00	198.16	252.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3408E+02 OUTFLOW=0.3356E+02 BASIN STORAGE=0.1646E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

R310W	MANE	5.91	315.56	249.82	1.15	6.00	315.38	252.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4901E+02 EXCESS=0.0000E+00 OUTFLOW=0.4887E+02 BASIN STORAGE=0.1510E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

R310W	MANE	6.54	251.79	255.61	0.95	6.00	250.92	258.00	0.95

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4077E+02 EXCESS=0.0000E+00 OUTFLOW=0.4064E+02 BASIN STORAGE=0.1563E+00 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.85

R310W	MANE	5.33	195.60	269.95	0.78	6.00	195.52	270.00	0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3352E+02 EXCESS=0.0000E+00 OUTFLOW=0.3345E+02 BASIN STORAGE=0.1808E+00 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.06

310E	MANE	4.97	371.71	243.48	0.89	6.00	365.95	246.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5975E+02 OUTFLOW=0.5901E+02 BASIN STORAGE=0.2014E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 1.06

310E	MANE	4.76	425.36	237.80	0.99	6.00	425.09	240.00	0.99

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6629E+02 OUTFLOW=0.6558E+02 BASIN STORAGE=0.2025E+00 PERCENT ERROR= 0.8

FOR PLAN = 1 RATIO= 0.95

310E	MANE	5.23	325.00	243.45	0.81	6.00	323.40	246.00	0.81

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5441E+02 OUTFLOW=0.5369E+02 BASIN STORAGE=0.2023E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.85

310E	MANE	5.90	243.70	254.56	0.66	6.00	241.42	252.00	0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4412E+02 OUTFLOW=0.4346E+02 BASIN STORAGE=0.1858E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 1.06

R310E	MANE	2.27	688.57	257.11	1.05	6.00	681.47	258.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1144E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=0.1367E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R310E	MANE	2.54	534.61	261.86	0.86	6.00	533.35	264.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9423E+02 EXCESS=0.0000E+00 OUTFLOW=0.9395E+02 BASIN STORAGE=0.1418E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R310E	MANE	2.89	407.95	269.82	0.71	6.00	407.77	270.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7691E+02 EXCESS=0.0000E+00 OUTFLOW=0.7667E+02 BASIN STORAGE=0.1396E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.06

311W	MANE	2.85	297.40	238.87	0.88	6.00	296.22	240.00	0.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4574E+02 OUTFLOW=0.4527E+02 BASIN STORAGE=0.1288E+00 PERCENT ERROR= 0.7

FOR PLAN = 1 RATIO= 1.06

311W	MANE	2.77	340.89	236.09	0.98	6.00	339.00	234.00	0.98

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5078E+02 OUTFLOW=0.5029E+02 BASIN STORAGE=0.1251E+00 PERCENT ERROR= 0.7

FOR PLAN = 1 RATIO= 0.95

311W	MANE	3.01	261.85	241.31	0.80	6.00	260.05	240.00	0.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4162E+02 OUTFLOW=0.4113E+02 BASIN STORAGE=0.1331E+00 PERCENT ERROR= 0.9

FOR PLAN = 1 RATIO= 0.85

311W	MANE	3.43	195.88	245.62	0.65	6.00	195.87	246.00	0.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3369E+02 OUTFLOW=0.3322E+02 BASIN STORAGE=0.1354E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

R311W	MANE	2.91	955.05	258.09	1.03	6.00	954.48	258.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1644E+03 EXCESS=0.0000E+00 OUTFLOW=0.1639E+03 BASIN STORAGE=0.2579E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.95

R311W	MANE	3.12	728.68	264.41	0.84	6.00	724.85	264.00	0.84

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1350E+03 EXCESS=0.0000E+00 OUTFLOW=0.1346E+03 BASIN STORAGE=0.2586E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R311W	MANE	3.55	553.43	278.34	0.68	6.00	541.97	282.00	0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1099E+03 EXCESS=0.0000E+00 OUTFLOW=0.1095E+03 BASIN STORAGE=0.2615E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 1.06

311E	MANE	4.99	91.19	320.57	0.44	6.00	91.11	318.00	0.44

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1859E+02 OUTFLOW=0.1818E+02 BASIN STORAGE=0.1378E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

311E	MANE	6.00	103.95	319.84	0.51	6.00	103.94	318.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2141E+02 OUTFLOW=0.2097E+02 BASIN STORAGE=0.1301E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 0.95

311E	MANE	5.32	80.98	320.06	0.39	6.00	80.72	318.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1632E+02 OUTFLOW=0.1594E+02 BASIN STORAGE=0.1372E+00 PERCENT ERROR= 1.5

FOR PLAN = 1 RATIO= 0.85

311E	MANE	5.96	60.91	325.61	0.29	6.00	60.71	324.00	0.29

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1213E+02 OUTFLOW=0.1180E+02 BASIN STORAGE=0.1338E+00 PERCENT ERROR= 1.6

FOR PLAN = 1 RATIO= 1.06

309W	MANE	6.00	70.70	330.12	0.31	6.00	70.68	330.00	0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1394E+02 OUTFLOW=0.1353E+02 BASIN STORAGE=0.1785E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 1.06

309W	MANE	5.94	83.14	323.80	0.37	6.00	83.10	324.00	0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1641E+02 OUTFLOW=0.1597E+02 BASIN STORAGE=0.1669E+00 PERCENT ERROR= 1.7

FOR PLAN = 1 RATIO= 0.95

309W	MANE	5.40	60.17	336.52	0.27	6.00	60.16	336.00	0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1199E+02 OUTFLOW=0.1160E+02 BASIN STORAGE=0.1762E+00 PERCENT ERROR= 1.8

FOR PLAN = 1 RATIO= 0.85

309W	MANE	6.00	38.88	352.94	0.19	6.00	38.85	354.00	0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8447E+01 OUTFLOW=0.8109E+01 BASIN STORAGE=0.1685E+00 PERCENT ERROR= 2.0

FOR PLAN = 1 RATIO= 1.06

R309W	MANE	6.00	82.84	379.00	0.39	6.00	82.71	378.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1597E+02 EXCESS=0.0000E+00 OUTFLOW=0.1683E+02 BASIN STORAGE=0.5390E+00 PERCENT ERROR= -8.7

FOR PLAN = 1 RATIO= 0.95

R309W	MANE	5.86	59.79	396.14	0.30	6.00	59.75	402.00	0.30

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1159E+02 EXCESS=0.0000E+00 OUTFLOW=0.1278E+02 BASIN STORAGE=0.5612E+00 PERCENT ERROR= -15.1

FOR PLAN = 1 RATIO= 0.85

R309W	MANE	6.00	38.59	414.91	0.21	6.00	38.53	432.00	0.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8098E+01 EXCESS=0.0000E+00 OUTFLOW=0.9194E+01 BASIN STORAGE=0.5500E+00 PERCENT ERROR= -20.3

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.14	267.92	267.84	0.86	6.00	265.23	270.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5563E+02 OUTFLOW=0.5467E+02 BASIN STORAGE=0.4164E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 1.06

309E	MANE	6.93	309.43	262.65	0.96	6.00	307.29	264.00	0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6177E+02 OUTFLOW=0.6076E+02 BASIN STORAGE=0.4091E+00 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= 0.95

309E	MANE	6.00	233.47	274.01	0.78	6.00	231.00	276.00	0.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5062E+02 OUTFLOW=0.4965E+02 BASIN STORAGE=0.4195E+00 PERCENT ERROR= 1.1

FOR PLAN = 1 RATIO= 0.85

309E	MANE	6.00	176.15	287.14	0.63	6.00	175.91	288.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4098E+02 OUTFLOW=0.4013E+02 BASIN STORAGE=0.4159E+00 PERCENT ERROR= 1.1

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          FOR PLAN = 1  RATIO= 1.06
              FCP1  MANE          0.15    1322.55     258.40       0.85       6.00    1322.48     264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2624E+03 EXCESS=0.0000E+00 OUTFLOW=0.2624E+03 BASIN STORAGE=0.4714E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP1  MANE          0.23     999.70     270.34       0.69       6.00     998.99     270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2129E+03 BASIN STORAGE=0.4677E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP1  MANE          0.18     739.64     282.30       0.55       6.00     738.74     282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.4643E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              FCP2  MANE          0.29    1322.16     264.09       0.85       6.00    1322.11     264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2625E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.8209E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FCP2  MANE          0.34     997.93     270.38       0.69       6.00     996.29     270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.8151E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FCP2  MANE          0.38     737.92     282.47       0.55       6.00     736.37     282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.8086E-02 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             FCBC1  MANE          0.19    1321.64     264.09       0.85       6.00    1321.56     264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2625E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.1861E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             FCBC1  MANE          0.24     995.45     270.42       0.69       6.00     994.63     270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.1850E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
             FCBC1  MANE          0.16     736.11     282.41       0.55       6.00     734.90     282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1841E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
              FC1  MANE          0.20    1320.99     264.12       0.85       6.00    1320.84     264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2626E+03 EXCESS=0.0000E+00 OUTFLOW=0.2625E+03 BASIN STORAGE=0.2006E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
              FC1  MANE          0.24     993.97     270.25       0.69       6.00     992.82     270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2130E+03 EXCESS=0.0000E+00 OUTFLOW=0.2130E+03 BASIN STORAGE=0.1998E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
              FC1  MANE          0.22     734.63     282.46       0.55       6.00     733.18     282.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1985E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
          FCBC2/FC  MANE          0.18    1320.29     264.19       0.85       6.00    1320.10     264.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2626E+03 EXCESS=0.0000E+00 OUTFLOW=0.2626E+03 BASIN STORAGE=0.1922E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
          FCBC2/FC  MANE          0.26     992.11     270.36       0.69       6.00     990.82     270.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2131E+03 EXCESS=0.0000E+00 OUTFLOW=0.2131E+03 BASIN STORAGE=0.1909E-01 PERCENT ERROR=   0.0
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          FOR PLAN = 1  RATIO= 0.85
          FCBC2/FC  MANE          0.26    732.90    282.51      0.55      6.00    731.45    282.00        0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1705E+03 EXCESS=0.0000E+00 OUTFLOW=0.1705E+03 BASIN STORAGE=0.1901E-01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          3.04    457.97    239.71      1.01      6.00    457.79    240.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7222E+02 OUTFLOW=0.7145E+02 BASIN STORAGE=0.2303E+00 PERCENT ERROR=   0.7

          FOR PLAN = 1  RATIO= 1.06
             307NW  MANE          3.03    517.89    236.78      1.11      6.00    516.12    240.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7966E+02 OUTFLOW=0.7890E+02 BASIN STORAGE=0.2325E+00 PERCENT ERROR=   0.7

          FOR PLAN = 1  RATIO= 0.95
             307NW  MANE          3.20    405.72    244.61      0.92      6.00    402.50    246.00        0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6613E+02 OUTFLOW=0.6536E+02 BASIN STORAGE=0.2263E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 0.85
             307NW  MANE          3.68    314.60    249.17      0.75      6.00    311.81    246.00        0.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5431E+02 OUTFLOW=0.5355E+02 BASIN STORAGE=0.2315E+00 PERCENT ERROR=   1.0

          FOR PLAN = 1  RATIO= 1.06
            R307NW  MANE          2.09    514.66    243.57      1.11      6.00    510.12    240.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7892E+02 EXCESS=0.0000E+00 OUTFLOW=0.7874E+02 BASIN STORAGE=0.7697E-01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.95
            R307NW  MANE          2.38    401.75    249.31      0.92      6.00    401.08    246.00        0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6536E+02 EXCESS=0.0000E+00 OUTFLOW=0.6516E+02 BASIN STORAGE=0.7533E-01 PERCENT ERROR=   0.2

          FOR PLAN = 1  RATIO= 0.85
            R307NW  MANE          2.55    311.62    253.09      0.75      6.00    310.61    252.00        0.75

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5356E+02 EXCESS=0.0000E+00 OUTFLOW=0.5340E+02 BASIN STORAGE=0.7540E-01 PERCENT ERROR=   0.2

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          2.59    223.76    240.85      1.04      6.00    223.01    240.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3606E+02 OUTFLOW=0.3567E+02 BASIN STORAGE=0.1181E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 1.06
             307NE  MANE          2.41    250.84    240.11      1.15      6.00    250.80    240.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3970E+02 OUTFLOW=0.3933E+02 BASIN STORAGE=0.1221E+00 PERCENT ERROR=   0.6

          FOR PLAN = 1  RATIO= 0.95
             307NE  MANE          2.78    199.17    243.64      0.96      6.00    198.21    246.00        0.96

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3307E+02 OUTFLOW=0.3268E+02 BASIN STORAGE=0.1183E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 0.85
             307NE  MANE          2.96    155.01    246.93      0.79      6.00    154.24    252.00        0.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2726E+02 OUTFLOW=0.2689E+02 BASIN STORAGE=0.1155E+00 PERCENT ERROR=   0.9

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          5.86     40.79    366.10      0.15      6.00     40.78    366.00        0.15

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9422E+01 OUTFLOW=0.8998E+01 BASIN STORAGE=0.2113E+00 PERCENT ERROR=   2.3

          FOR PLAN = 1  RATIO= 1.06
             307SW  MANE          5.26     55.36    353.51      0.19      6.00     55.30    354.00        0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1171E+02 OUTFLOW=0.1126E+02 BASIN STORAGE=0.2122E+00 PERCENT ERROR=   2.1
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          FOR PLAN = 1  RATIO= 0.95
             307SW  MANE          5.39     30.71    385.23      0.12      6.00     30.66    384.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7675E+01 OUTFLOW=0.7287E+01 BASIN STORAGE=0.1999E+00 PERCENT ERROR=   2.5

          FOR PLAN = 1  RATIO= 0.85
             307SW  MANE          6.00     14.46    433.75      0.07      6.00     14.44    432.00         0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4659E+01 OUTFLOW=0.4284E+01 BASIN STORAGE=0.2067E+00 PERCENT ERROR=   3.6

          FOR PLAN = 1  RATIO= 1.06
             R307SW  MANE          6.00     54.95    376.96      0.19      6.00     54.74    378.00         0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1124E+02 EXCESS=0.0000E+00 OUTFLOW=0.1110E+02 BASIN STORAGE=0.1519E+00 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
             R307SW  MANE          5.80     30.60    414.46      0.12      6.00     30.58    414.00         0.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7270E+01 EXCESS=0.0000E+00 OUTFLOW=0.7142E+01 BASIN STORAGE=0.1703E+00 PERCENT ERROR=  -0.6

          FOR PLAN = 1  RATIO= 0.85
             R307SW  MANE          5.86     14.43    472.80      0.07      6.00     14.42    474.00         0.07

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4279E+01 EXCESS=0.0000E+00 OUTFLOW=0.4139E+01 BASIN STORAGE=0.1766E+00 PERCENT ERROR=  -0.9

          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE          3.26    535.80    241.85      1.00      6.00    530.41    240.00         1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8499E+02 OUTFLOW=0.8400E+02 BASIN STORAGE=0.3097E+00 PERCENT ERROR=   0.8

          FOR PLAN = 1  RATIO= 1.06
             307SE  MANE          3.25    607.04    239.30      1.10      6.00    605.74    240.00         1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.9379E+02 OUTFLOW=0.9281E+02 BASIN STORAGE=0.3104E+00 PERCENT ERROR=   0.7

          FOR PLAN = 1  RATIO= 0.95
             307SE  MANE          3.51    473.93    243.32      0.91      6.00    473.60    246.00         0.91

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7779E+02 OUTFLOW=0.7680E+02 BASIN STORAGE=0.2887E+00 PERCENT ERROR=   0.9

          FOR PLAN = 1  RATIO= 0.85
             307SE  MANE          3.88    366.81    250.60      0.75      6.00    365.46    252.00         0.75

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6382E+02 OUTFLOW=0.6286E+02 BASIN STORAGE=0.3052E+00 PERCENT ERROR=   1.0

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE          6.00     70.16    325.24      0.31      6.00     70.12    330.00         0.31

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1390E+02 OUTFLOW=0.1340E+02 BASIN STORAGE=0.1756E+00 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 1.06
             308W  MANE          6.00     82.96    324.91      0.37      6.00     82.89    324.00         0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1637E+02 OUTFLOW=0.1593E+02 BASIN STORAGE=0.1691E+00 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 0.95
             308W  MANE          5.53     59.56    331.96      0.27      6.00     59.51    336.00         0.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1196E+02 OUTFLOW=0.1159E+02 BASIN STORAGE=0.1635E+00 PERCENT ERROR=   1.7

          FOR PLAN = 1  RATIO= 0.85
             308W  MANE          5.57     38.47    356.58      0.19      6.00     38.43    354.00         0.19

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8418E+01 OUTFLOW=0.8081E+01 BASIN STORAGE=0.1680E+00 PERCENT ERROR=   2.0

          FOR PLAN = 1  RATIO= 1.06
             R308W  MANE          6.00     82.44    339.04      0.37      6.00     82.40    336.00         0.37

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1592E+02 EXCESS=0.0000E+00 OUTFLOW=0.1582E+02 BASIN STORAGE=0.9200E-01 PERCENT ERROR=   0.1

          FOR PLAN = 1  RATIO= 0.95
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          R308W  MANE          5.65     59.32    351.13      0.27      6.00     59.04    354.00         0.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1157E+02 EXCESS=0.0000E+00 OUTFLOW=0.1145E+02 BASIN STORAGE=0.1061E+00 PERCENT ERROR=    0.1

       FOR PLAN = 1  RATIO= 0.85
          R308W  MANE          6.00     38.27    376.30      0.18      6.00     38.08    378.00         0.18

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8076E+01 EXCESS=0.0000E+00 OUTFLOW=0.7953E+01 BASIN STORAGE=0.1060E+00 PERCENT ERROR=    0.2

       FOR PLAN = 1  RATIO= 1.06
           308E  MANE          3.78    247.20    241.60      0.97      6.00    246.19    240.00         0.97

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3786E+02 OUTFLOW=0.3743E+02 BASIN STORAGE=0.1274E+00 PERCENT ERROR=    0.8

       FOR PLAN = 1  RATIO= 1.06
           308E  MANE          3.55    279.50    239.36      1.08      6.00    278.30    240.00         1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4183E+02 OUTFLOW=0.4134E+02 BASIN STORAGE=0.1336E+00 PERCENT ERROR=    0.8

       FOR PLAN = 1  RATIO= 0.95
           308E  MANE          4.02    220.87    242.66      0.89      6.00    218.19    246.00         0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3462E+02 OUTFLOW=0.3419E+02 BASIN STORAGE=0.1250E+00 PERCENT ERROR=    0.9

       FOR PLAN = 1  RATIO= 0.85
           308E  MANE          4.35    169.76    249.35      0.73      6.00    167.51    252.00         0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2833E+02 OUTFLOW=0.2793E+02 BASIN STORAGE=0.1176E+00 PERCENT ERROR=    1.0

       FOR PLAN = 1  RATIO= 1.06
       R307/308  MANE          1.69   2263.64    297.03      0.85      6.00   2256.45    300.00         0.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5415E+03 EXCESS=0.0000E+00 OUTFLOW=0.5408E+03 BASIN STORAGE=0.5255E+00 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
       R307/308  MANE          1.92   1776.51    308.72      0.69      6.00   1775.34    306.00         0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4402E+03 EXCESS=0.0000E+00 OUTFLOW=0.4395E+03 BASIN STORAGE=0.5206E+00 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.85
       R307/308  MANE          1.99   1395.93    321.88      0.55      6.00   1394.06    324.00         0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3534E+03 EXCESS=0.0000E+00 OUTFLOW=0.3528E+03 BASIN STORAGE=0.5135E+00 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 1.06
           312W  MANE          4.38    151.05    259.56      0.68      6.00    150.27    258.00         0.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2837E+02 OUTFLOW=0.2788E+02 BASIN STORAGE=0.1499E+00 PERCENT ERROR=    1.2

       FOR PLAN = 1  RATIO= 1.06
           312W  MANE          4.13    178.76    253.72      0.76      6.00    176.82    252.00         0.76

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.3193E+02 OUTFLOW=0.3139E+02 BASIN STORAGE=0.1524E+00 PERCENT ERROR=    1.2

       FOR PLAN = 1  RATIO= 0.95
           312W  MANE          4.66    128.36    265.03      0.61      6.00    128.06    264.00         0.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2550E+02 OUTFLOW=0.2503E+02 BASIN STORAGE=0.1422E+00 PERCENT ERROR=    1.3

       FOR PLAN = 1  RATIO= 0.85
           312W  MANE          5.22     92.48    315.74      0.48      6.00     92.32    312.00         0.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2003E+02 OUTFLOW=0.1959E+02 BASIN STORAGE=0.1495E+00 PERCENT ERROR=    1.4

       FOR PLAN = 1  RATIO= 1.06
          R312W  MANE          1.69   2387.35    302.83      0.84      6.00   2385.94    300.00         0.84

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5721E+03 EXCESS=0.0000E+00 OUTFLOW=0.5713E+03 BASIN STORAGE=0.5634E+00 PERCENT ERROR=    0.0

       FOR PLAN = 1  RATIO= 0.95
          R312W  MANE          1.74   1887.73    309.71      0.68      6.00   1885.78    312.00         0.68
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4645E+03 EXCESS=0.0000E+00 OUTFLOW=0.4637E+03 BASIN STORAGE=0.5695E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.85

R312W	MANE	2.01	1483.20	327.23	0.55	6.00	1481.73	324.00	0.55

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3723E+03 EXCESS=0.0000E+00 OUTFLOW=0.3716E+03 BASIN STORAGE=0.5539E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

312E	MANE	4.98	105.70	258.24	0.57	6.00	105.50	258.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2150E+02 OUTFLOW=0.2112E+02 BASIN STORAGE=0.1090E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 1.06

312E	MANE	4.62	128.65	251.72	0.64	6.00	128.64	252.00	0.64

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2444E+02 OUTFLOW=0.2405E+02 BASIN STORAGE=0.1031E+00 PERCENT ERROR= 1.2

FOR PLAN = 1 RATIO= 0.95

312E	MANE	5.27	91.07	311.86	0.50	6.00	91.06	312.00	0.50

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1915E+02 OUTFLOW=0.1879E+02 BASIN STORAGE=0.1079E+00 PERCENT ERROR= 1.3

FOR PLAN = 1 RATIO= 0.85

312E	MANE	5.80	72.33	313.83	0.39	6.00	71.93	312.00	0.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1471E+02 OUTFLOW=0.1440E+02 BASIN STORAGE=0.1024E+00 PERCENT ERROR= 1.4

FOR PLAN = 1 RATIO= 1.06

FC3	MANE	0.35	6517.77	444.72	0.83	6.00	6517.20	444.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3667E+04 EXCESS=0.0000E+00 OUTFLOW=0.3666E+04 BASIN STORAGE=0.9334E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC3	MANE	0.34	5452.75	450.71	0.69	6.00	5452.43	450.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3048E+04 EXCESS=0.0000E+00 OUTFLOW=0.3047E+04 BASIN STORAGE=0.8631E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC3	MANE	0.39	4514.23	462.64	0.57	6.00	4514.13	462.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2529E+04 EXCESS=0.0000E+00 OUTFLOW=0.2528E+04 BASIN STORAGE=0.8137E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC4/FC5	MANE	0.17	6517.16	444.31	0.83	6.00	6516.67	444.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3666E+04 EXCESS=0.0000E+00 OUTFLOW=0.3665E+04 BASIN STORAGE=0.7262E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC4/FC5	MANE	0.18	5452.38	450.31	0.69	6.00	5452.06	450.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3048E+04 EXCESS=0.0000E+00 OUTFLOW=0.3047E+04 BASIN STORAGE=0.6743E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC4/FC5	MANE	0.33	4514.03	462.42	0.57	6.00	4513.93	462.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2528E+04 EXCESS=0.0000E+00 OUTFLOW=0.2527E+04 BASIN STORAGE=0.6377E+00 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC6	MANE	1.49	6516.28	446.80	0.83	6.00	6515.14	450.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3665E+04 EXCESS=0.0000E+00 OUTFLOW=0.3659E+04 BASIN STORAGE=0.5918E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC6	MANE	1.50	5451.92	453.12	0.69	6.00	5450.35	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3047E+04 EXCESS=0.0000E+00 OUTFLOW=0.3042E+04 BASIN STORAGE=0.5480E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC6	MANE	1.54	4513.71	465.52	0.57	6.00	4512.52	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2528E+04 EXCESS=0.0000E+00 OUTFLOW=0.2523E+04 BASIN STORAGE=0.5174E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FC7	MANE	0.73	6514.79	450.94	0.83	6.00	6514.35	450.00	0.83

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3658E+04 EXCESS=0.0000E+00 OUTFLOW=0.3655E+04 BASIN STORAGE=0.2981E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FC7	MANE	0.74	5450.18	457.05	0.69	6.00	5449.93	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3041E+04 EXCESS=0.0000E+00 OUTFLOW=0.3038E+04 BASIN STORAGE=0.2765E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FC7	MANE	0.80	4512.45	468.49	0.57	6.00	4512.42	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2522E+04 EXCESS=0.0000E+00 OUTFLOW=0.2519E+04 BASIN STORAGE=0.2612E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

FCBC4/FC	MANE	1.05	6513.61	451.34	0.82	6.00	6512.39	450.00	0.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3655E+04 EXCESS=0.0000E+00 OUTFLOW=0.3651E+04 BASIN STORAGE=0.4077E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

FCBC4/FC	MANE	1.08	5449.59	457.93	0.69	6.00	5448.55	456.00	0.69

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3038E+04 EXCESS=0.0000E+00 OUTFLOW=0.3034E+04 BASIN STORAGE=0.3783E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

FCBC4/FC	MANE	1.13	4512.19	469.75	0.57	6.00	4511.79	468.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2519E+04 EXCESS=0.0000E+00 OUTFLOW=0.2516E+04 BASIN STORAGE=0.3570E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

RRCHANNL	MANE	5.97	0.16	463.63	0.87	6.00	0.16	462.00	0.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3397E-01 EXCESS=0.0000E+00 OUTFLOW=0.4643E-01 BASIN STORAGE=0.2761E-02 PERCENT ERROR= -44.8

FOR PLAN = 1 RATIO= 0.95

RRCHANNL	MANE	5.97	0.12	484.09	0.71	6.00	0.12	486.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2680E-01 EXCESS=0.0000E+00 OUTFLOW=0.3782E-01 BASIN STORAGE=0.2665E-02 PERCENT ERROR= -51.1

FOR PLAN = 1 RATIO= 0.85

RRCHANNL	MANE	6.00	0.09	550.79	0.57	6.00	0.09	552.00	0.57

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2076E-01 EXCESS=0.0000E+00 OUTFLOW=0.3018E-01 BASIN STORAGE=0.2656E-02 PERCENT ERROR= -58.2

FOR PLAN = 1 RATIO= 1.06

AC1/AC2	MANE	0.61	11748.12	463.51	1.25	6.00	11746.81	462.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7470E+04 EXCESS=0.0000E+00 OUTFLOW=0.7464E+04 BASIN STORAGE=0.5752E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC1/AC2	MANE	0.60	9883.45	457.59	1.04	6.00	9882.08	462.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6181E+04 EXCESS=0.0000E+00 OUTFLOW=0.6177E+04 BASIN STORAGE=0.4960E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.85

AC1/AC2	MANE	0.71	8274.14	468.63	0.86	6.00	8273.80	468.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5103E+04 EXCESS=0.0000E+00 OUTFLOW=0.5100E+04 BASIN STORAGE=0.3912E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.06

AC3	MANE	0.42	11746.67	462.80	1.25	6.00	11745.41	462.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7464E+04 EXCESS=0.0000E+00 OUTFLOW=0.7460E+04 BASIN STORAGE=0.4185E+01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.95

AC3	MANE	0.50	9881.93	462.08	1.04	6.00	9881.92	462.00	1.04

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6176E+04 EXCESS=0.0000E+00 OUTFLOW=0.6173E+04 BASIN STORAGE=0.3633E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               AC3  MANE          0.45   8273.59    468.97      0.86      6.00   8273.07    468.00         0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5099E+04 EXCESS=0.0000E+00 OUTFLOW=0.5097E+04 BASIN STORAGE=0.2892E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 1.06
               AC4  MANE          0.50  11745.37    463.40      1.25      6.00  11745.05    468.00         1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7460E+04 EXCESS=0.0000E+00 OUTFLOW=0.7454E+04 BASIN STORAGE=0.5067E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.95
               AC4  MANE          0.50   9881.65    462.63      1.04      6.00   9881.47    462.00         1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6172E+04 EXCESS=0.0000E+00 OUTFLOW=0.6168E+04 BASIN STORAGE=0.4404E+01 PERCENT ERROR=   0.0

          FOR PLAN = 1  RATIO= 0.85
               AC4  MANE          0.59   8272.78    469.34      0.86      6.00   8272.02    468.00         0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5096E+04 EXCESS=0.0000E+00 OUTFLOW=0.5093E+04 BASIN STORAGE=0.3520E+01 PERCENT ERROR=   0.0



*** NORMAL END OF HEC-1 ***
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Paper Copy C
Interbasin Storm

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/14/96  TIME  10:33:42   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
            1           ID          FEMA FLOOD INSURANCE STUDY, 1996
            2           ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
            3           ID          INTERBASIN  10-year . STORM
            4           ID
            5           ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
            6           ID          in 8/93 for the design of outlet modifications at the North Las Vegas
            7           ID          Detention Basin (NLVDB).  This storm centering generates the highest
            8           ID          100-year inflows to the NLVDB.
            9           ID
           10           ID          Modifications to the original B&V model were to adjust the outlet
           11           ID          rating for the NLVDB to reflect the four-foot high barrier wall in
           12           ID          front of the 3-pipe outlet.  Additional models were created to
           13           ID          represent 10, 50, and 500-year storms.
           14           ID
           15           ID          Remaining comments are from the original model dated 8/93.
           16           ID
           17           ID      This storm also known as "Gayles Storm" simulates a 54 square mile
           18           ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
           19           ID      but upstream of the North Las Vegas Detention Basin.  This model is based
           20           ID      original model developed by Black & Veatch during the predesign study for
           21           ID      Upper Las Vegas Wash Detention Basin.
           22           ID
           23           ID                  Storm Area:    54.37 sq. miles
           24           ID                  DARF:          0.66 (CCRFCD Drainage Manual)
           25           ID
           26           ID         10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
           27           ID         50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
           28           ID        100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
           29           ID
           30           ID        JR Card includes DARF for model
           31           ID        PB Cards are adjusted rainfall depth, NOAA Atas II amounts
           32           ID           times adjustment ratios given above.
           33           ID        PB Cards for 500-year storm based on frequency extrapolation of
           34           ID           10, 50, and 100-year data after precipitation ratio adjustments.
           35           ID
*** FREE ***
           36           IT       6       0       0     300
           37           IO       5       0       0
           38           IN       5       0       0
           39           JR    PREC    0.66

           40           KK     105
           41           KM     RUNOFF FROM SUBBASIN 105
           42           BA   6.898
           43           PB    2.23
           44           PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
           45           PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
           46           PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
           47           PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
           48           PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
           49           PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
           50           PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
           51           PC    .997    .999   1.00
           52           LS      0      86
```

1 HEC-1 INPUT PAGE 2

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           53           UD    .773
```

```
 54          KK    104R
 55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
 56          RM       1   0.157    0.15

 57          KK       V
 58          RM       2   0.295    0.15

 59          KK       V
 60          RM       1   0.139    0.15

 61          KK     104
 62          KM    RUNOFF FROM SUBBASIN 104
 63          BA   6.625
 64          PB    2.23
 65          LS       0      85
 66          UD    .628

 67          KK     103
 68          KM    RUNOFF FROM SUBBASIN 103
 69          BA   6.915
 70          PB    1.95
 71          LS       0      84
 72          UD    .324

 73          KK       .
 74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
 75          HC       3

 76          KK    102R
 77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
 78          RM       1   0.144    0.15

 79          KK       V
 80          RM       1   0.209    0.15

 81          KK     102
 82          KM    RUNOFF FROM SUBBASIN 102
 83          BA   8.455
 84          PB    1.71
 85          LS       0      83
 86          UD    .369

 87          KK       .
 88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
 89          HC       2

 90          KK    101R
 91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
 92          RM       2   0.401    0.15
1                                    HEC-1 INPUT                                    PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 93          KK     101
 94          KM    RUNOFF FROM SUBBASIN 101
 95          BA   9.082
 96          PB    1.58
 97          LS       0      77
 98          UD   1.505

 99          KK       .
100          KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101          HC       2

102          KK     111
103          KM    RUNOFF FROM SUBBASIN 111
104          BA   4.080
105          PB    1.71
106          LS       0      84
107          UD    .239

108          KK    116R
109          KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110          RM       1   0.191    0.15

111          KK       V
112          RM       2   0.400    0.15

113          KK     116
114          KM    RUNOFF FROM SUBBASIN 116
115          BA   5.189
116          PB    1.58
117          LS       0      78
118          UD   1.418

119          KK       .
120          KM    COMBINE SUBBASINS 111 & 116
121          HC       2

122          KK     110
123          KM    RUNOFF FROM SUBBASIN 110
124          BA   2.945
125          PB    1.71
126          LS       0      86
127          UD    .237

128          KK    109R
129          KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM        1   0.183    0.15

          131          KK        V
          132          RM        2   0.386    0.15
1                                          HEC-1 INPUT                                                    PAGE  4

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          133          KK      109
          134          KM     RUNOFF FROM SUBBASIN 109
          135          BA    4.183
          136          PB     1.58
          137          LS        0      78
          138          UD    1.281

          139          KK        .
          140          KM     COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC        3

          142          KK     109R
          143          KM     ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM        3   0.649    0.15

          145          KK     101R
          146          KM     ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM        3   0.821    0.15

          148          KK        .
          149          KM     COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC        2

          151          KK        .
          152          KM     DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI        0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI    17775   20135   23000
          156          DQ        0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ     6775    8635   11000

          158          KK    NLVIN
          159          KO        1
          160          KM     ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK     2000    .0076    .016       0    TRAP       35        2

          162          KK   NLVDET
          163          KO        1
          164          KM    ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM    OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS        1    STOR       -1
          167          SV        0      25     100     190     430     665    1095    1285    1435    1540
          168          SV     1650    1825    1920    2000    2110    2200    2310    2430
          169          SE        0       2       4       6      10      14      21      24      26      27
          170          SE       28      30      31      32      33      34      35      36
          171          SQ        0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ     3050    4630    5710    7090    8610   10140   11670   13200

          173          KK        .
          174          KM     RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                          HEC-1 INPUT                                                    PAGE  5

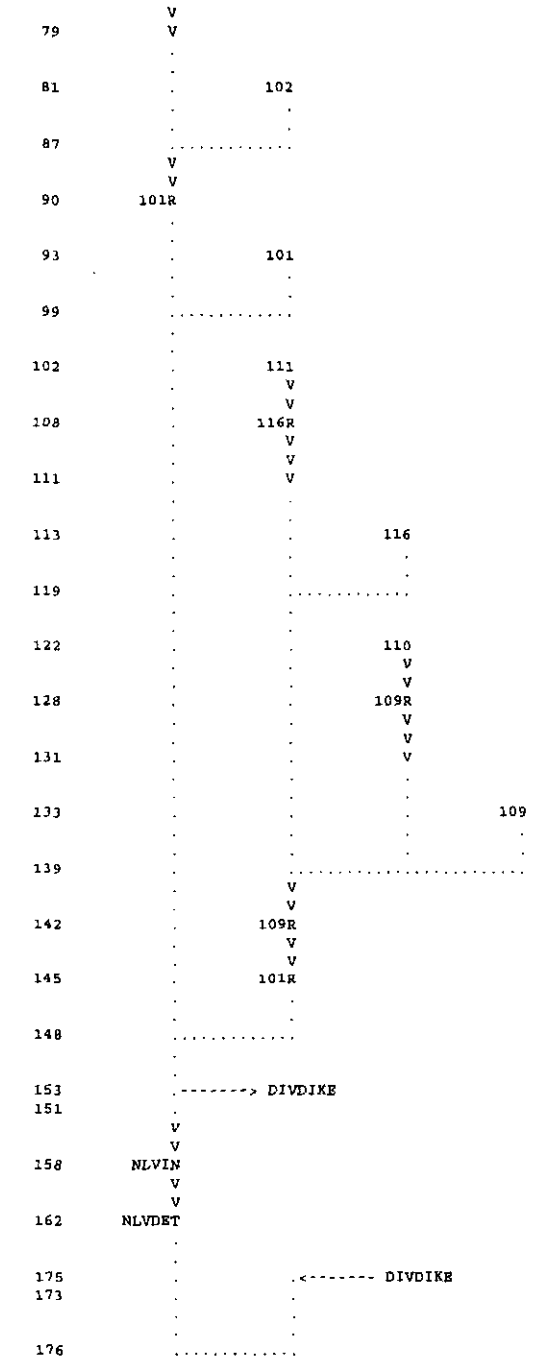
        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          176          KK        .
          177          KM     COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC        2
          179          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING           (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            ..........................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:33:42   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 551-1748          *
*                                   *
*************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 10-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts
times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of
10, 50, and 100-year data after precipitation ratio adjustments.

```
 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME         0554  ENDING TIME
                      ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     0.10 HOURS
                       TOTAL TIME BASE    29.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.66


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
158 KK    *     NLVIN  *
          *            *
          **************

159 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

                HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                         L       2000.  CHANNEL LENGTH
                         S     0.0076  SLOPE
                         N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA       0.00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      35.00  BOTTOM WIDTH OR DIAMETER
                         Z       2.00  SIDE SLOPE
                    NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS

                                                  ***
                                    COMPUTED KINEMATIC PARAMETERS
                                         VARIABLE TIME STEP
                                      (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                   CELERITY
                                                   (MIN)     (FT)     (CFS)    (MIN)        (IN)      (FPS)

                    MAIN         1.01     1.55      0.45    666.67   2938.91   336.84        0.23      26.85
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6698E+03 EXCESS=0.0000E+00 OUTFLOW=0.6698E+03 BASIN STORAGE=0.3394E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	2938.17	336.00	0.23

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	877.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	783.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	696.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	617.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	544.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	479.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	420.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	368.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	321.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	280.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	243.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	211.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	183.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	159.	1		1618	164	0.	1		2348	239	0.
1		0124	15	0.	1		0854	90	138.	1		1624	165	0.	1		2354	240	0.
1		0130	16	0.	1		0900	91	119.	1		1630	166	0.	2		0000	241	0.
1		0136	17	0.	1		0906	92	104.	1		1636	167	0.	2		0006	242	0.
1		0142	18	0.	1		0912	93	90.	1		1642	168	0.	2		0012	243	0.
1		0148	19	0.	1		0918	94	78.	1		1648	169	0.	2		0018	244	0.
1		0154	20	0.	1		0924	95	68.	1		1654	170	0.	2		0024	245	0.
1		0200	21	0.	1		0930	96	59.	1		1700	171	0.	2		0030	246	0.
1		0206	22	0.	1		0936	97	52.	1		1706	172	0.	2		0036	247	0.
1		0212	23	0.	1		0942	98	45.	1		1712	173	0.	2		0042	248	0.
1		0218	24	0.	1		0948	99	40.	1		1718	174	0.	2		0048	249	0.
1		0224	25	0.	1		0954	100	35.	1		1724	175	0.	2		0054	250	0.
1		0230	26	0.	1		1000	101	30.	1		1730	176	0.	2		0100	251	0.
1		0236	27	0.	1		1006	102	27.	1		1736	177	0.	2		0106	252	0.
1		0242	28	2.	1		1012	103	24.	1		1742	178	0.	2		0112	253	0.
1		0248	29	5.	1		1018	104	21.	1		1748	179	0.	2		0118	254	0.
1		0254	30	9.	1		1024	105	18.	1		1754	180	0.	2		0124	255	0.
1		0300	31	14.	1		1030	106	16.	1		1800	181	0.	2		0130	256	0.
1		0306	32	20.	1		1036	107	14.	1		1806	182	0.	2		0136	257	0.
1		0312	33	28.	1		1042	108	13.	1		1812	183	0.	2		0142	258	0.
1		0318	34	40.	1		1048	109	11.	1		1818	184	0.	2		0148	259	0.
1		0324	35	61.	1		1054	110	10.	1		1824	185	0.	2		0154	260	0.
1		0330	36	99.	1		1100	111	9.	1		1830	186	0.	2		0200	261	0.
1		0336	37	167.	1		1106	112	8.	1		1836	187	0.	2		0206	262	0.
1		0342	38	279.	1		1112	113	7.	1		1842	188	0.	2		0212	263	0.
1		0348	39	444.	1		1118	114	6.	1		1848	189	0.	2		0218	264	0.
1		0354	40	660.	1		1124	115	6.	1		1854	190	0.	2		0224	265	0.
1		0400	41	906.	1		1130	116	5.	1		1900	191	0.	2		0230	266	0.
1		0406	42	1160.	1		1136	117	4.	1		1906	192	0.	2		0236	267	0.
1		0412	43	1400.	1		1142	118	4.	1		1912	193	0.	2		0242	268	0.
1		0418	44	1610.	1		1148	119	4.	1		1918	194	0.	2		0248	269	0.
1		0424	45	1785.	1		1154	120	3.	1		1924	195	0.	2		0254	270	0.
1		0430	46	1921.	1		1200	121	3.	1		1930	196	0.	2		0300	271	0.
1		0436	47	2026.	1		1206	122	2.	1		1936	197	0.	2		0306	272	0.
1		0442	48	2109.	1		1212	123	2.	1		1942	198	0.	2		0312	273	0.
1		0448	49	2186.	1		1218	124	2.	1		1948	199	0.	2		0318	274	0.
1		0454	50	2270.	1		1224	125	2.	1		1954	200	0.	2		0324	275	0.
1		0500	51	2372.	1		1230	126	1.	1		2000	201	0.	2		0330	276	0.
1		0506	52	2496.	1		1236	127	1.	1		2006	202	0.	2		0336	277	0.
1		0512	53	2631.	1		1242	128	1.	1		2012	203	0.	2		0342	278	0.
1		0518	54	2759.	1		1248	129	1.	1		2018	204	0.	2		0348	279	0.
1		0524	55	2861.	1		1254	130	1.	1		2024	205	0.	2		0354	280	0.
1		0530	56	2923.	1		1300	131	1.	1		2030	206	0.	2		0400	281	0.
1		0536	57	2938.	1		1306	132	1.	1		2036	207	0.	2		0406	282	0.
1		0542	58	2909.	1		1312	133	1.	1		2042	208	0.	2		0412	283	0.
1		0548	59	2843.	1		1318	134	0.	1		2048	209	0.	2		0418	284	0.
1		0554	60	2750.	1		1324	135	0.	1		2054	210	0.	2		0424	285	0.
1		0600	61	2641.	1		1330	136	0.	1		2100	211	0.	2		0430	286	0.
1		0606	62	2523.	1		1336	137	0.	1		2106	212	0.	2		0436	287	0.
1		0612	63	2402.	1		1342	138	0.	1		2112	213	0.	2		0442	288	0.
1		0618	64	2283.	1		1348	139	0.	1		2118	214	0.	2		0448	289	0.
1		0624	65	2166.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	2049.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	1932.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	1814.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	1692.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	1569.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	1446.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	1323.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	1203.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	1088.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	979.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	29.90-HR

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+    2938.      5.60                1340.       338.       271.       271.
                          (INCHES)   0.229      0.231      0.231      0.231
                          (AC-FT)     664.       670.       670.       670.

                          CUMULATIVE AREA =   54.37 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              **************
              *            *
162 KK .      *    NLVDET  *
              *            *
              **************

163 KO              OUTPUT CONTROL VARIABLES
                          IPRNT          1  PRINT CONTROL
                          IPLOT          0  PLOT CONTROL
                          QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
                              OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

                    HYDROGRAPH ROUTING DATA

166 RS              STORAGE ROUTING
                          NSTPS          1  NUMBER OF SUBREACHES
                           ITYP       STOR  TYPE OF INITIAL CONDITION
                         RSVRIC      -1.00  INITIAL CONDITION
                              X       0.00 WORKING R AND D COEFFICIENT

167 SV                 STORAGE        0.0       25.0      100.0      190.0      430.0      665.0     1095.0     1285.0     1435.0     1540.0
                                    1650.0     1825.0     1920.0     2000.0     2110.0     2200.0     2310.0     2430.0

169 SE                 ELEVATION      0.00       2.00       4.00       6.00      10.00      14.00      21.00      24.00      26.00      27.00
                                    28.00      30.00      31.00      32.00      33.00      34.00      35.00      36.00

171 SQ                 DISCHARGE        0.        77.       117.       597.      1310.      1660.      2110.      2260.      2360.      2690.
                                    3050.      4630.      5710.      7090.      8610.     10140.     11670.     13200.

                                                                      ***

**********************************************************************************************************************************************

                                                    HYDROGRAPH AT STATION   NLVDET
                                                        PLAN 1,    RATIO =  0.66

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DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
 1   0000   1       0.       0.0     0.0 *  1   1000 101     757.     243.9     6.9 *  1   2000 201      93.      54.4     2.8
 1   0006   2       0.       0.0     0.0 *  1   1006 102     739.     237.9     6.8 *  1   2006 202      92.      53.6     2.8
 1   0012   3       0.       0.0     0.0 *  1   1012 103     722.     232.1     6.7 *  1   2012 203      92.      52.8     2.7
 1   0018   4       0.       0.0     0.0 *  1   1018 104     705.     226.4     6.6 *  1   2018 204      91.      52.1     2.7
 1   0024   5       0.       0.0     0.0 *  1   1024 105     688.     220.8     6.5 *  1   2024 205      91.      51.3     2.7
 1   0030   6       0.       0.0     0.0 *  1   1030 106     672.     215.3     6.4 *  1   2030 206      91.      50.6     2.7
 1   0036   7       0.       0.0     0.0 *  1   1036 107     656.     209.9     6.3 *  1   2036 207      90.      49.8     2.7
 1   0042   8       0.       0.0     0.0 *  1   1042 108     641.     204.7     6.2 *  1   2042 208      90.      49.1     2.6
 1   0048   9       0.       0.0     0.0 *  1   1048 109     625.     199.6     6.2 *  1   2048 209      89.      48.3     2.6
 1   0054  10       0.       0.0     0.0 *  1   1054 110     611.     194.5     6.1 *  1   2054 210      89.      47.6     2.6
 1   0100  11       0.       0.0     0.0 *  1   1100 111     595.     189.6     6.0 *  1   2100 211      89.      46.9     2.6
 1   0106  12       0.       0.0     0.0 *  1   1106 112     570.     184.9     5.9 *  1   2106 212      88.      46.1     2.6
 1   0112  13       0.       0.0     0.0 *  1   1112 113     546.     180.4     5.8 *  1   2112 213      88.      45.4     2.5
 1   0118  14       0.       0.0     0.0 *  1   1118 114     522.     176.0     5.7 *  1   2118 214      87.      44.7     2.5
 1   0124  15       0.       0.0     0.0 *  1   1124 115     500.     171.8     5.6 *  1   2124 215      87.      44.0     2.5
 1   0130  16       0.       0.0     0.0 *  1   1130 116     479.     167.8     5.5 *  1   2130 216      87.      43.2     2.5
 1   0136  17       0.       0.0     0.0 *  1   1136 117     458.     164.0     5.4 *  1   2136 217      86.      42.5     2.5
 1   0142  18       0.       0.0     0.0 *  1   1142 118     439.     160.3     5.3 *  1   2142 218      86.      41.8     2.4
 1   0148  19       0.       0.0     0.0 *  1   1148 119     420.     156.8     5.3 *  1   2148 219      86.      41.1     2.4
 1   0154  20       0.       0.0     0.0 *  1   1154 120     402.     153.4     5.2 *  1   2154 220      85.      40.4     2.4
 1   0200  21       0.       0.0     0.0 *  1   1200 121     385.     150.2     5.1 *  1   2200 221      85.      39.7     2.4
 1   0206  22       0.       0.0     0.0 *  1   1206 122     368.     147.1     5.0 *  1   2206 222      84.      39.0     2.4
 1   0212  23       0.       0.0     0.0 *  1   1212 123     353.     144.2     5.0 *  1   2212 223      84.      38.3     2.4
 1   0218  24       0.       0.0     0.0 *  1   1218 124     337.     141.3     4.9 *  1   2218 224      84.      37.6     2.3
 1   0224  25       0.       0.0     0.0 *  1   1224 125     323.     138.6     4.9 *  1   2224 225      83.      36.9     2.3
 1   0230  26       0.       0.0     0.0 *  1   1230 126     309.     136.0     4.8 *  1   2230 226      83.      36.2     2.3
 1   0236  27       0.       0.0     0.0 *  1   1236 127     296.     133.5     4.7 *  1   2236 227      83.      35.5     2.3
 1   0242  28       0.       0.0     0.0 *  1   1242 128     283.     131.1     4.7 *  1   2242 228      82.      34.9     2.3
 1   0248  29       0.       0.0     0.0 *  1   1248 129     271.     128.9     4.6 *  1   2248 229      82.      34.2     2.2
 1   0254  30       0.       0.1     0.0 *  1   1254 130     259.     126.7     4.6 *  1   2254 230      82.      33.5     2.2
 1   0300  31       1.       0.2     0.0 *  1   1300 131     248.     124.6     4.5 *  1   2300 231      81.      32.8     2.2
 1   0306  32       1.       0.3     0.0 *  1   1306 132     237.     122.6     4.5 *  1   2306 232      81.      32.2     2.2
 1   0312  33       2.       0.5     0.0 *  1   1312 133     227.     120.7     4.5 *  1   2312 233      80.      31.5     2.2
 1   0318  34       2.       0.8     0.1 *  1   1318 134     217.     118.8     4.4 *  1   2318 234      80.      30.8     2.2
 1   0324  35       4.       1.2     0.1 *  1   1324 135     208.     117.1     4.4 *  1   2324 235      80.      30.2     2.1
 1   0330  36       5.       1.8     0.1 *  1   1330 136     199.     115.4     4.3 *  1   2330 236      79.      29.5     2.1
 1   0336  37       9.       2.8     0.2 *  1   1336 137     191.     113.8     4.3 *  1   2336 237      79.      28.9     2.1
 1   0342  38      14.       4.6     0.4 *  1   1342 138     182.     112.3     4.3 *  1   2342 238      79.      28.2     2.1
 1   0348  39      23.       7.4     0.6 *  1   1348 139     175.     110.8     4.2 *  1   2348 239      78.      27.6     2.1
 1   0354  40      36.      11.7     0.9 *  1   1354 140     167.     109.4     4.2 *  1   2354 240      78.      26.9     2.1
 1   0400  41      55.      17.8     1.4 *  1   1400 141     160.     108.0     4.2 *  2   0000 241      78.      26.3     2.0
 1   0406  42      77.      25.8     2.0 *  1   1406 142     153.     106.7     4.1 *  2   0006 242      77.      25.6     2.0
 1   0412  43      83.      35.7     2.3 *  1   1412 143     146.     105.5     4.1 *  2   0012 243      77.      25.0     2.0
 1   0418  44      89.      47.4     2.6 *  1   1418 144     140.     104.3     4.1 *  2   0018 244      75.      24.4     1.9
 1   0424  45      96.      60.7     3.0 *  1   1424 145     134.     103.2     4.1 *  2   0024 245      73.      23.8     1.9
 1   0430  46     104.      75.2     3.3 *  1   1430 146     128.     102.1     4.0 *  2   0030 246      71.      23.2     1.9
```

1	0436	47	112.	90.6	3.7	*	1	1436	147	123.	101.1	4.0	*	2	0036	247	70.	22.6	1.8
1	0442	48	152.	106.6	4.1	*	1	1442	148	117.	100.1	4.0	*	2	0042	248	68.	22.0	1.8
1	0448	49	238.	122.7	4.5	*	1	1448	149	117.	99.1	4.0	*	2	0048	249	66.	21.5	1.7
1	0454	50	324.	138.8	4.9	*	1	1454	150	116.	98.1	4.0	*	2	0054	250	64.	20.9	1.7
1	0500	51	410.	155.0	5.2	*	1	1500	151	116.	97.2	3.9	*	2	0100	251	63.	20.4	1.6
1	0506	52	498.	171.4	5.6	*	1	1506	152	115.	96.2	3.9	*	2	0106	252	61.	19.9	1.6
1	0512	53	587.	188.1	6.0	*	1	1512	153	114.	95.3	3.9	*	2	0112	253	60.	19.4	1.6
1	0518	54	642.	205.3	6.3	*	1	1518	154	114.	94.3	3.8	*	2	0118	254	58.	18.9	1.5
1	0524	55	695.	223.0	6.5	*	1	1524	155	113.	93.4	3.8	*	2	0124	255	57.	18.4	1.5
1	0530	56	748.	240.9	6.8	*	1	1530	156	113.	92.5	3.8	*	2	0130	256	55.	18.0	1.4
1	0536	57	801.	258.7	7.1	*	1	1536	157	112.	91.5	3.8	*	2	0136	257	54.	17.5	1.4
1	0542	58	853.	276.0	7.4	*	1	1542	158	112.	90.6	3.7	*	2	0142	258	53.	17.1	1.4
1	0548	59	902.	292.6	7.7	*	1	1548	159	112.	89.7	3.7	*	2	0148	259	51.	16.6	1.3
1	0554	60	948.	308.0	8.0	*	1	1554	160	111.	88.8	3.7	*	2	0154	260	50.	16.2	1.3
1	0600	61	990.	322.3	8.2	*	1	1600	161	111.	87.9	3.7	*	2	0200	261	49.	15.8	1.3
1	0606	62	1029.	335.3	8.4	*	1	1606	162	110.	86.9	3.7	*	2	0206	262	47.	15.4	1.2
1	0612	63	1063.	347.0	8.6	*	1	1612	163	110.	86.0	3.6	*	2	0212	263	46.	15.0	1.2
1	0618	64	1094.	357.4	8.8	*	1	1618	164	109.	85.1	3.6	*	2	0218	264	45.	14.6	1.2
1	0624	65	1122.	366.7	8.9	*	1	1624	165	109.	84.2	3.6	*	2	0224	265	44.	14.3	1.1
1	0630	66	1146.	374.7	9.1	*	1	1630	166	108.	83.3	3.6	*	2	0230	266	43.	13.9	1.1
1	0636	67	1166.	381.6	9.2	*	1	1636	167	108.	82.4	3.5	*	2	0236	267	42.	13.6	1.1
1	0642	68	1183.	387.4	9.3	*	1	1642	168	107.	81.6	3.5	*	2	0242	268	41.	13.2	1.1
1	0648	69	1197.	392.0	9.4	*	1	1648	169	107.	80.7	3.5	*	2	0248	269	40.	12.9	1.0
1	0654	70	1208.	395.6	9.4	*	1	1654	170	106.	79.8	3.5	*	2	0254	270	39.	12.6	1.0
1	0700	71	1215.	398.0	9.5	*	1	1700	171	106.	78.9	3.4	*	2	0300	271	38.	12.3	1.0
1	0706	72	1219.	399.4	9.5	*	1	1706	172	105.	78.0	3.4	*	2	0306	272	37.	11.9	1.0
1	0712	73	1220.	399.8	9.5	*	1	1712	173	105.	77.2	3.4	*	2	0312	273	36.	11.6	0.9
1	0718	74	1218.	399.2	9.5	*	1	1718	174	104.	76.3	3.4	*	2	0318	274	35.	11.4	0.9
1	0724	75	1214.	397.6	9.5	*	1	1724	175	104.	75.5	3.3	*	2	0324	275	34.	11.1	0.9
1	0730	76	1207.	395.3	9.4	*	1	1730	176	103.	74.6	3.3	*	2	0330	276	33.	10.8	0.9
1	0736	77	1198.	392.2	9.4	*	1	1736	177	103.	73.7	3.3	*	2	0336	277	32.	10.5	0.8
1	0742	78	1187.	388.5	9.3	*	1	1742	178	103.	72.9	3.3	*	2	0342	278	32.	10.3	0.8
1	0748	79	1174.	384.2	9.2	*	1	1748	179	102.	72.1	3.3	*	2	0348	279	31.	10.0	0.8
1	0754	80	1159.	379.3	9.2	*	1	1754	180	102.	71.2	3.2	*	2	0354	280	30.	9.7	0.8
1	0800	81	1144.	374.0	9.1	*	1	1800	181	101.	70.4	3.2	*	2	0400	281	29.	9.5	0.8
1	0806	82	1127.	368.4	9.0	*	1	1806	182	101.	69.5	3.2	*	2	0406	282	29.	9.3	0.7
1	0812	83	1109.	362.4	8.9	*	1	1812	183	100.	68.7	3.2	*	2	0412	283	28.	9.0	0.7
1	0818	84	1091.	356.1	8.8	*	1	1818	184	100.	67.9	3.1	*	2	0418	284	27.	8.8	0.7
1	0824	85	1071.	349.7	8.7	*	1	1824	185	99.	67.1	3.1	*	2	0424	285	26.	8.6	0.7
1	0830	86	1052.	343.1	8.6	*	1	1830	186	99.	66.2	3.1	*	2	0430	286	26.	8.4	0.7
1	0836	87	1032.	336.3	8.4	*	1	1836	187	99.	65.4	3.1	*	2	0436	287	25.	8.2	0.7
1	0842	88	1012.	329.5	8.3	*	1	1842	188	98.	64.6	3.1	*	2	0442	288	24.	8.0	0.6
1	0848	89	991.	322.7	8.2	*	1	1848	189	98.	63.8	3.0	*	2	0448	289	24.	7.8	0.6
1	0854	90	971.	315.8	8.1	*	1	1854	190	97.	63.0	3.0	*	2	0454	290	23.	7.6	0.6
1	0900	91	950.	308.9	8.0	*	1	1900	191	97.	62.2	3.0	*	2	0500	291	23.	7.4	0.6
1	0906	92	930.	302.1	7.9	*	1	1906	192	96.	61.4	3.0	*	2	0506	292	22.	7.2	0.6
1	0912	93	910.	295.3	7.8	*	1	1912	193	96.	60.6	2.9	*	2	0512	293	22.	7.0	0.6
1	0918	94	890.	288.5	7.6	*	1	1918	194	96.	59.8	2.9	*	2	0518	294	21.	6.8	0.5
1	0924	95	870.	281.9	7.5	*	1	1924	195	95.	59.0	2.9	*	2	0524	295	20.	6.7	0.5
1	0930	96	850.	275.3	7.4	*	1	1930	196	95.	58.2	2.9	*	2	0530	296	20.	6.5	0.5
1	0936	97	831.	268.8	7.3	*	1	1936	197	94.	57.4	2.9	*	2	0536	297	19.	6.3	0.5
1	0942	98	812.	262.4	7.2	*	1	1942	198	94.	56.7	2.8	*	2	0542	298	19.	6.2	0.5
1	0948	99	793.	256.1	7.1	*	1	1948	199	93.	55.9	2.8	*	2	0548	299	19.	6.0	0.5
1	0954	100	775.	249.9	7.0	*	1	1954	200	93.	55.1	2.8	*	2	0554	300	18.	5.9	0.5
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1220.	7.20		943.	333.	269.	269.
		(INCHES)	0.161	0.227	0.229	0.229
		(AC-FT)	467.	660.	664.	664.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
400.	7.20	306.	127.	102.	102.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
9.50	7.20	7.94	4.22	3.43	3.43

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					0.66
HYDROGRAPH AT					
+	105	6.90	1	FLOW	933.
				TIME	4.20
ROUTED TO					
+	104R	6.90	1	FLOW	910.
				TIME	4.40
ROUTED TO					
+	V	6.90	1	FLOW	871.
				TIME	4.70

ROUTED TO					
+	V	6.90	1	FLOW	855.
				TIME	4.90
HYDROGRAPH AT					
+	104	6.63	1	FLOW	917.
				TIME	4.10
HYDROGRAPH AT					
+	103	6.91	1	FLOW	867.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	2204.
				TIME	5.00
ROUTED TO					
+	102R	20.44	1	FLOW	2148.
				TIME	5.10
ROUTED TO					
+	V	20.44	1	FLOW	2083.
				TIME	5.30
HYDROGRAPH AT					
+	102	8.45	1	FLOW	599.
				TIME	3.80
2 COMBINED AT					
+	.	28.89	1	FLOW	2544.
				TIME	5.10
ROUTED TO					
+	101R	28.89	1	FLOW	2432.
				TIME	5.50
HYDROGRAPH AT					
+	101	9.08	1	FLOW	130.
				TIME	6.00
2 COMBINED AT					
+	.	37.97	1	FLOW	2541.
				TIME	5.50
HYDROGRAPH AT					
+	111	4.08	1	FLOW	405.
				TIME	3.70
ROUTED TO					
+	116R	4.08	1	FLOW	346.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	285.
				TIME	4.30
HYDROGRAPH AT					
+	116	5.19	1	FLOW	91.
				TIME	5.90
2 COMBINED AT					
+	.	9.27	1	FLOW	335.
				TIME	5.40
HYDROGRAPH AT					
+	110	2.94	1	FLOW	385.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	333.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	273.
				TIME	4.20
HYDROGRAPH AT					
+	109	4.18	1	FLOW	77.
				TIME	5.80
3 COMBINED AT					
+	.	16.40	1	FLOW	623.
				TIME	5.40
ROUTED TO					
+	109R	16.40	1	FLOW	560.
				TIME	5.90
ROUTED TO					
+	101R	16.40	1	FLOW	525.
				TIME	6.60
2 COMBINED AT					
+	.	54.37	1	FLOW	2939.
				TIME	5.60
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	0.
				TIME	0.10

```
 HYDROGRAPH AT
+                    .     54.37     1   FLOW        2939.
                                         TIME         5.60

 ROUTED TO
+                 NLVIN    54.37     1   FLOW        2938.
                                         TIME         5.60

 ROUTED TO
+                 NLVDET   54.37     1   FLOW        1220.
                                         TIME         7.20

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE        9.50
                                         TIME         7.20

 HYDROGRAPH AT
+                    .      0.00     1   FLOW           0.
                                         TIME         0.10

  2 COMBINED AT
+                    .     54.37     1   FLOW        1220.
                                         TIME         7.20

1
                                     SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                         (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                    PEAK                                    PEAK

                                (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)      (IN)

        FOR PLAN = 1  RATIO= 0.66
           NLVIN  MANE          0.45   2938.91    336.84      0.23      6.00   2938.17    336.00      0.23

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6698E+03 EXCESS=0.0000E+00 OUTFLOW=0.6698E+03 BASIN STORAGE=0.3394E-04 PERCENT ERROR=   0.0


*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/14/96  TIME  10:33:54   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID          FEMA FLOOD INSURANCE STUDY, 1996
              2     ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3     ID          INTERBASIN 50-year STORM
              4     ID
              5     ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
              6     ID          in 8/93 for the design of outlet modifications at the North Las Vegas
              7     ID          Detention Basin (NLVDB).  This storm centering generates the highest
              8     ID          100-year inflows to the NLVDB.
              9     ID
             10     ID          Modifications to the original B&V model were to adjust the outlet
             11     ID          rating for the NLVDB to reflect the four-foot high barrier wall in
             12     ID          front of the 3-pipe outlet.  Additional models were created to
             13     ID          represent 10, 50, and 500-year storms.
             14     ID
             15     ID          Remaining comments are from the original model dated 8/93.
             16     ID
             17     ID      This storm also known as "Gayles Storm" simulates a 54 square mile
             18     ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
             19     ID      but upstream of the North Las Vegas Detention Basin.  This model is based
             20     ID      original model developed by Black & Veatch during the predesign study for
             21     ID      Upper Las Vegas Wash Detention Basin.
             22     ID
             23     ID              Storm Area:    54.37 sq. miles
             24     ID              DARF:          0.66 (CCRFCD Drainage Manual)
             25     ID
             26     ID         10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
             27     ID         50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
             28     ID        100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
             29     ID
             30     ID        JR Card includes DARF for model
             31     ID        PB Cards are adjusted rainfall depth, NOAA Atas II amounts
             32     ID           times adjustment ratios given above.
             33     ID        PB Cards for 500-year storm based on frequency extrapolation of
             34     ID           10, 50, and 100-year data after precipitation ratio adjustments.
             35     ID
*** FREE ***
             36     IT       6       0       0     300
             37     IO       5       0       0
             38     IN       5       0       0
             39     JR    PREC    0.66

             40     KK     105
             41     KM     RUNOFF FROM SUBBASIN 105
             42     BA   6.898
             43     PB    3.33
             44     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             45     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             46     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
             47     PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
             48     PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
             49     PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
             50     PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
             51     PC    .997    .999   1.00
             52     LS      0      86
```

1 HEC-1 INPUT PAGE 2

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             53     UD    .773
```

```
54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    3.33
65          LS       0      85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    2.87
71          LS       0      84
72          UD    .324

73          KK       .
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    2.60
85          LS       0      83
86          UD    .369

87          KK       .
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    2.32
97          LS       0      77
98          UD   1.505

99          KK       .
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    2.73
106         LS       0      84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    2.32
117         LS       0      78
118         UD   1.418

119         KK       .
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    2.60
126         LS       0      86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM       1   0.183    0.15

          131          KK       V
          132          RM       2   0.386    0.15
1                                        HEC-1 INPUT                                                    PAGE  4

          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          133          KK     109
          134          KM    RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    2.32
          137          LS       0      78
          138          UD   1.281

          139          KK       .
          140          KM    COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK    109R
          143          KM    ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM       3   0.649    0.15

          145          KK    101R
          146          KM    ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM       3   0.821    0.15

          148          KK       .
          149          KM    COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK   NLVIN
          159          KO       1
          160          KM    ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM    ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM    OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

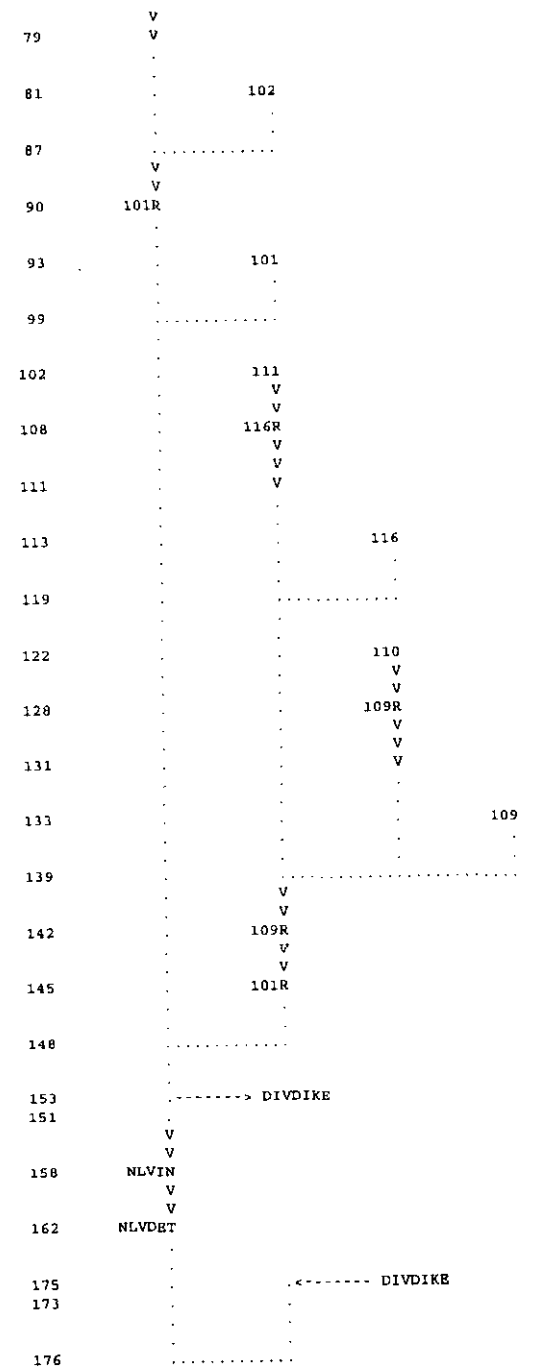
          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          176          KK       .
          177          KM    COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
                  SCHEMATIC DIAGRAM OF STREAM NETWORK

          INPUT
           LINE      (V) ROUTING           (<---) DIVERSION OR PUMP FLOW

            NO.      (.) CONNECTOR         (<----) RETURN OF DIVERTED OR PUMPED FLOW

             40          105
                          V
                          V
             54          104R
                          V
                          V
             57           V
                          V
                          V
             59           V
                          .
                          .
             61           .          104
                          .           .
                          .           .
             67           .           .          103
                          .           .           .
                          .           .           .
             73           ..........................
                          V
                          V
             76          102R
                          V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           FEBRUARY  1991              *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/14/96  TIME  10:33:54   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 50-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper *Las Vegas Wash Detention Basin* but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of 10, 50, and 100-year data after precipitation ratio adjustments.

```
37 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN           6  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                       NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME       0554  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.10 HOURS
                       TOTAL TIME BASE   29.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  0.66
```

*** ***

```
          **************
          *            *
158 KK    *     NLVIN  *
          *            *
          **************

159 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                          ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

             HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                       L       2000.  CHANNEL LENGTH
                       S     0.0076  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.00  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      35.00  BOTTOM WIDTH OR DIAMETER
                       Z       2.00  SIDE SLOPE
                  NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS
```

***

COMPUTED KINEMATIC PARAMETERS
VARIABLE TIME STEP
(DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.01	1.55	0.40	666.67	6749.70	330.78	0.57	36.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1642E+04 EXCESS=0.0000E+00 OUTFLOW=0.1642E+04 BASIN STORAGE=0.3451E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	6744.21	330.00	0.57

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	1950.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	1747.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	1560.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	1389.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	1233.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	1091.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	963.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	848.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	745.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	653.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	572.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	500.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	437.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	382.	1		1618	164	0.	1		2348	239	0.
1		0124	15	0.	1		0854	90	334.	1		1624	165	0.	1		2354	240	0.
1		0130	16	0.	1		0900	91	292.	1		1630	166	0.	2		0000	241	0.
1		0136	17	0.	1		0906	92	256.	1		1636	167	0.	2		0006	242	0.
1		0142	18	1.	1		0912	93	224.	1		1642	168	0.	2		0012	243	0.
1		0148	19	3.	1		0918	94	196.	1		1648	169	0.	2		0018	244	0.
1		0154	20	7.	1		0924	95	172.	1		1654	170	0.	2		0024	245	0.
1		0200	21	13.	1		0930	96	151.	1		1700	171	0.	2		0030	246	0.
1		0206	22	24.	1		0936	97	133.	1		1706	172	0.	2		0036	247	0.
1		0212	23	40.	1		0942	98	117.	1		1712	173	0.	2		0042	248	0.
1		0218	24	64.	1		0948	99	103.	1		1718	174	0.	2		0048	249	0.
1		0224	25	97.	1		0954	100	91.	1		1724	175	0.	2		0054	250	0.
1		0230	26	135.	1		1000	101	80.	1		1730	176	0.	2		0100	251	0.
1		0236	27	176.	1		1006	102	71.	1		1736	177	0.	2		0106	252	0.
1		0242	28	220.	1		1012	103	62.	1		1742	178	0.	2		0112	253	0.
1		0248	29	262.	1		1018	104	55.	1		1748	179	0.	2		0118	254	0.
1		0254	30	303.	1		1024	105	49.	1		1754	180	0.	2		0124	255	0.
1		0300	31	345.	1		1030	106	43.	1		1800	181	0.	2		0130	256	0.
1		0306	32	390.	1		1036	107	39.	1		1806	182	0.	2		0136	257	0.
1		0312	33	448.	1		1042	108	34.	1		1812	183	0.	2		0142	258	0.
1		0318	34	528.	1		1048	109	30.	1		1818	184	0.	2		0148	259	0.
1		0324	35	644.	1		1054	110	27.	1		1824	185	0.	2		0154	260	0.
1		0330	36	816.	1		1100	111	24.	1		1830	186	0.	2		0200	261	0.
1		0336	37	1069.	1		1106	112	21.	1		1836	187	0.	2		0206	262	0.
1		0342	38	1425.	1		1112	113	19.	1		1842	188	0.	2		0212	263	0.
1		0348	39	1895.	1		1118	114	17.	1		1848	189	0.	2		0218	264	0.
1		0354	40	2451.	1		1124	115	15.	1		1854	190	0.	2		0224	265	0.
1		0400	41	3039.	1		1130	116	13.	1		1900	191	0.	2		0230	266	0.
1		0406	42	3604.	1		1136	117	12.	1		1906	192	0.	2		0236	267	0.
1		0412	43	4103.	1		1142	118	10.	1		1912	193	0.	2		0242	268	0.
1		0418	44	4513.	1		1148	119	9.	1		1918	194	0.	2		0248	269	0.
1		0424	45	4827.	1		1154	120	8.	1		1924	195	0.	2		0254	270	0.
1		0430	46	5056.	1		1200	121	7.	1		1930	196	0.	2		0300	271	0.
1		0436	47	5217.	1		1206	122	6.	1		1936	197	0.	2		0306	272	0.
1		0442	48	5338.	1		1212	123	6.	1		1942	198	0.	2		0312	273	0.
1		0448	49	5455.	1		1218	124	5.	1		1948	199	0.	2		0318	274	0.
1		0454	50	5598.	1		1224	125	4.	1		1954	200	0.	2		0324	275	0.
1		0500	51	5787.	1		1230	126	4.	1		2000	201	0.	2		0330	276	0.
1		0506	52	6021.	1		1236	127	3.	1		2006	202	0.	2		0336	277	0.
1		0512	53	6273.	1		1242	128	3.	1		2012	203	0.	2		0342	278	0.
1		0518	54	6502.	1		1248	129	2.	1		2018	204	0.	2		0348	279	0.
1		0524	55	6669.	1		1254	130	2.	1		2024	205	0.	2		0354	280	0.
1		0530	56	6744.	1		1300	131	2.	1		2030	206	0.	2		0400	281	0.
1		0536	57	6719.	1		1306	132	1.	1		2036	207	0.	2		0406	282	0.
1		0542	58	6601.	1		1312	133	1.	1		2042	208	0.	2		0412	283	0.
1		0548	59	6409.	1		1318	134	1.	1		2048	209	0.	2		0418	284	0.
1		0554	60	6167.	1		1324	135	1.	1		2054	210	0.	2		0424	285	0.
1		0600	61	5896.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	5612.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	5329.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	5051.	1		1348	139	0.	1		2118	214	0.	2		0448	289	0.
1		0624	65	4781.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	4515.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	4250.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	3984.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	3715.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	3444.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	3174.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	2907.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	2649.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	2402.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	2168.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	29.90-HR
+					

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+    6744.      5.50                3249.       828.       665.       665.
                          (INCHES)   0.556      0.566      0.566      0.566
                           (AC-FT)   1611.      1642.      1642.      1642.

                          CUMULATIVE AREA =   54.37 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              **************
              *            *
162 KK        *    NLVDET  *
              *            *
              **************

163 KO            OUTPUT CONTROL VARIABLES
                       IPRNT          1  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
                           OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

                  HYDROGRAPH ROUTING DATA

166 RS            STORAGE ROUTING
                       NSTPS          1  NUMBER OF SUBREACHES
                        ITYP       STOR  TYPE OF INITIAL CONDITION
                      RSVRIC      -1.00  INITIAL CONDITION
                           X       0.00 WORKING R AND D COEFFICIENT

167 SV              STORAGE        0.0       25.0      100.0      190.0      430.0      665.0     1095.0     1285.0     1435.0     1540.0
                                1650.0     1825.0     1920.0     2000.0     2110.0     2200.0     2310.0     2430.0

169 SE              ELEVATION      0.00       2.00       4.00       6.00      10.00      14.00      21.00      24.00      26.00      27.00
                                  28.00      30.00      31.00      32.00      33.00      34.00      35.00      36.00

171 SQ              DISCHARGE        0.         77.       117.       597.      1310.      1660.      2110.      2260.      2360.      2690.
                                 3050.      4630.      5710.      7090.      8610.     10140.     11670.     13200.

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                                                  HYDROGRAPH AT STATION   NLVDET
                                                    PLAN 1,   RATIO =  0.66

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 DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE
  1   0000   1       0.       0.0     0.0 *   1   1000 101    1783.    782.9    15.9 *   1   2000 201     115.     97.0      3.9
  1   0006   2       0.       0.0     0.0 *   1   1006 102    1769.    768.9    15.7 *   1   2006 202     115.     96.1      3.9
  1   0012   3       0.       0.0     0.0 *   1   1012 103    1754.    754.9    15.5 *   1   2012 203     114.     95.1      3.9
  1   0018   4       0.       0.0     0.0 *   1   1018 104    1739.    740.9    15.2 *   1   2018 204     114.     94.2      3.8
  1   0024   5       0.       0.0     0.0 *   1   1024 105    1725.    727.0    15.0 *   1   2024 205     113.     93.2      3.8
  1   0030   6       0.       0.0     0.0 *   1   1030 106    1710.    713.2    14.8 *   1   2030 206     113.     92.3      3.8
  1   0036   7       0.       0.0     0.0 *   1   1036 107    1696.    699.5    14.6 *   1   2036 207     112.     91.4      3.8
  1   0042   8       0.       0.0     0.0 *   1   1042 108    1682.    685.8    14.3 *   1   2042 208     112.     90.5      3.7
  1   0048   9       0.       0.0     0.0 *   1   1048 109    1668.    672.3    14.1 *   2   2048 209     111.     89.5      3.7
  1   0054  10       0.       0.0     0.0 *   1   1054 110    1651.    658.8    13.9 *   1   2054 210     111.     88.6      3.7
  1   0100  11       0.       0.0     0.0 *   1   1100 111    1631.    645.4    13.7 *   1   2100 211     110.     87.7      3.7
  1   0106  12       0.       0.0     0.0 *   1   1106 112    1611.    632.2    13.4 *   1   2106 212     110.     86.8      3.6
  1   0112  13       0.       0.0     0.0 *   1   1112 113    1592.    619.2    13.2 *   1   2112 213     109.     85.9      3.6
  1   0118  14       0.       0.0     0.0 *   1   1118 114    1572.    606.2    13.0 *   1   2118 214     109.     85.0      3.6
  1   0124  15       0.       0.0     0.0 *   1   1124 115    1553.    593.5    12.8 *   1   2124 215     109.     84.1      3.6
  1   0130  16       0.       0.0     0.0 *   1   1130 116    1535.    580.8    12.6 *   1   2130 216     108.     83.2      3.6
  1   0136  17       0.       0.0     0.0 *   1   1136 117    1516.    568.3    12.4 *   1   2136 217     108.     82.3      3.5
  1   0142  18       0.       0.0     0.0 *   1   1142 118    1498.    555.9    12.1 *   1   2142 218     107.     81.4      3.5
  1   0148  19       0.       0.0     0.0 *   1   1148 119    1479.    543.7    11.9 *   1   2148 219     107.     80.5      3.5
  1   0154  20       0.       0.1     0.0 *   1   1154 120    1461.    531.6    11.7 *   1   2154 220     106.     79.6      3.5
  1   0200  21       0.       0.1     0.0 *   1   1200 121    1444.    519.7    11.5 *   1   2200 221     106.     78.8      3.4
  1   0206  22       1.       0.3     0.0 *   1   1206 122    1426.    507.9    11.3 *   1   2206 222     105.     77.9      3.4
  1   0212  23       2.       0.5     0.0 *   1   1212 123    1409.    496.2    11.1 *   1   2212 223     105.     77.0      3.4
  1   0218  24       3.       1.0     0.1 *   1   1218 124    1391.    484.7    10.9 *   1   2218 224     104.     76.2      3.4
  1   0224  25       5.       1.6     0.1 *   1   1224 125    1375.    473.3    10.7 *   1   2224 225     104.     75.3      3.3
  1   0230  26       8.       2.5     0.2 *   1   1230 126    1358.    462.1    10.5 *   1   2230 226     103.     74.4      3.3
  1   0236  27      11.       3.7     0.3 *   1   1236 127    1341.    450.9    10.4 *   1   2236 227     103.     73.6      3.3
  1   0242  28      16.       5.2     0.4 *   1   1242 128    1325.    439.9    10.2 *   1   2242 228     102.     72.7      3.3
  1   0248  29      22.       7.1     0.6 *   1   1248 129    1307.    429.1    10.0 *   1   2248 229     102.     71.9      3.3
  1   0254  30      28.       9.2     0.7 *   1   1254 130    1276.    418.4     9.8 *   1   2254 230     102.     71.1      3.2
  1   0300  31      36.      11.6     0.9 *   1   1300 131    1245.    408.0     9.6 *   1   2300 231     101.     70.2      3.2
  1   0306  32      44.      14.3     1.1 *   1   1306 132    1215.    397.9     9.5 *   1   2306 232     101.     69.4      3.2
  1   0312  33      53.      17.4     1.4 *   1   1312 133    1185.    388.0     9.3 *   1   2312 233     100.     68.6      3.2
  1   0318  34      64.      20.9     1.7 *   1   1318 134    1156.    378.3     9.1 *   1   2318 234     100.     67.7      3.1
  1   0324  35      77.      25.2     2.0 *   1   1324 135    1128.    368.9     9.0 *   1   2324 235      99.     66.9      3.1
  1   0330  36      80.      30.5     2.1 *   1   1330 136    1101.    359.7     8.8 *   1   2330 236      99.     66.1      3.1
  1   0336  37      84.      37.7     2.3 *   1   1336 137    1074.    350.7     8.7 *   1   2336 237      98.     65.3      3.1
  1   0342  38      89.      47.3     2.6 *   1   1342 138    1048.    341.9     8.5 *   1   2342 238      98.     64.5      3.1
  1   0348  39      96.      60.2     2.9 *   1   1348 139    1023.    333.4     8.4 *   1   2348 239      98.     63.7      3.0
  1   0354  40     105.      77.3     3.4 *   1   1354 140     998.    325.0     8.3 *   1   2354 240      97.     62.8      3.0
  1   0400  41     117.      99.1     4.0 *   1   1400 141     974.    316.9     8.1 *   2   0000 241      97.     62.0      3.0
  1   0406  42     251.     125.0     4.6 *   1   1406 142     950.    308.9     8.0 *   2   0006 242      96.     61.2      3.0
  1   0412  43     406.     154.2     5.2 *   1   1412 143     927.    301.2     7.9 *   2   0012 243      96.     60.5      2.9
  1   0418  44     574.     185.7     5.9 *   1   1418 144     905.    293.6     7.7 *   2   0018 244      95.     59.7      2.9
  1   0424  45     684.     219.1     6.5 *   1   1424 145     883.    286.2     7.6 *   2   0024 245      95.     58.9      2.9
  1   0430  46     787.     253.9     7.1 *   1   1430 146     861.    279.0     7.5 *   2   0030 246      95.     58.1      2.9
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1	0436	47	892.	289.4	7.7	*	1	1436	147	841.	272.0	7.4	*	2	0036	247	94.	57.3	2.9
1	0442	48	999.	325.2	8.3	*	1	1442	148	820.	265.1	7.3	*	2	0042	248	94.	56.5	2.8
1	0448	49	1105.	361.1	8.9	*	1	1448	149	800.	258.4	7.1	*	2	0048	249	93.	55.8	2.8
1	0454	50	1213.	397.2	9.5	*	1	1454	150	781.	251.9	7.0	*	2	0054	250	93.	55.0	2.8
1	0500	51	1316.	433.8	10.1	*	1	1500	151	762.	245.5	6.9	*	2	0100	251	93.	54.2	2.8
1	0506	52	1372.	471.5	10.7	*	1	1506	152	743.	239.3	6.8	*	2	0106	252	92.	53.5	2.8
1	0512	53	1430.	510.7	11.4	*	1	1512	153	725.	233.2	6.7	*	2	0112	253	92.	52.7	2.7
1	0518	54	1491.	551.4	12.1	*	1	1518	154	708.	227.3	6.6	*	2	0118	254	91.	51.9	2.7
1	0524	55	1553.	593.3	12.8	*	1	1524	155	691.	221.5	6.5	*	2	0124	255	91.	51.2	2.7
1	0530	56	1616.	635.6	13.5	*	1	1530	156	674.	215.9	6.4	*	2	0130	256	91.	50.4	2.7
1	0536	57	1673.	677.7	14.2	*	1	1536	157	658.	210.4	6.3	*	2	0136	257	90.	49.7	2.7
1	0542	58	1716.	718.7	14.9	*	1	1542	158	642.	205.0	6.3	*	2	0142	258	90.	48.9	2.6
1	0548	59	1757.	758.1	15.5	*	1	1548	159	626.	199.8	6.2	*	2	0148	259	89.	48.2	2.6
1	0554	60	1796.	795.4	16.1	*	1	1554	160	611.	194.7	6.1	*	2	0154	260	89.	47.5	2.6
1	0600	61	1833.	830.2	16.7	*	1	1600	161	595.	189.7	6.0	*	2	0200	261	89.	46.7	2.6
1	0606	62	1867.	862.5	17.2	*	1	1606	162	570.	184.9	5.9	*	2	0206	262	88.	46.0	2.6
1	0612	63	1898.	892.1	17.7	*	1	1612	163	545.	180.3	5.8	*	2	0212	263	88.	45.3	2.5
1	0618	64	1926.	919.2	18.1	*	1	1618	164	522.	175.9	5.7	*	2	0218	264	87.	44.6	2.5
1	0624	65	1952.	943.8	18.5	*	1	1624	165	499.	171.6	5.6	*	2	0224	265	87.	43.8	2.5
1	0630	66	1975.	966.0	18.9	*	1	1630	166	478.	167.6	5.5	*	2	0230	266	87.	43.1	2.5
1	0636	67	1996.	985.8	19.2	*	1	1636	167	457.	163.7	5.4	*	2	0236	267	86.	42.4	2.5
1	0642	68	2014.	1003.3	19.5	*	1	1642	168	437.	160.0	5.3	*	2	0242	268	86.	41.7	2.4
1	0648	69	2030.	1018.4	19.8	*	1	1648	169	418.	156.5	5.3	*	2	0248	269	86.	41.0	2.4
1	0654	70	2043.	1031.1	20.0	*	1	1654	170	400.	153.1	5.2	*	2	0254	270	85.	40.3	2.4
1	0700	71	2054.	1041.6	20.1	*	1	1700	171	383.	149.9	5.1	*	2	0300	271	85.	39.6	2.4
1	0706	72	2063.	1049.7	20.3	*	1	1706	172	367.	146.8	5.0	*	2	0306	272	84.	38.9	2.4
1	0712	73	2069.	1055.6	20.4	*	1	1712	173	351.	143.8	5.0	*	2	0312	273	84.	38.2	2.4
1	0718	74	2073.	1059.3	20.4	*	1	1718	174	336.	141.0	4.9	*	2	0318	274	84.	37.5	2.3
1	0724	75	2074.	1061.1	20.4	*	1	1724	175	321.	138.3	4.9	*	2	0324	275	83.	36.8	2.3
1	0730	76	2074.	1060.9	20.4	*	1	1730	176	307.	135.7	4.8	*	2	0330	276	83.	36.1	2.3
1	0736	77	2072.	1059.1	20.4	*	1	1736	177	294.	133.2	4.7	*	2	0336	277	83.	35.4	2.3
1	0742	78	2069.	1055.6	20.4	*	1	1742	178	281.	130.8	4.7	*	2	0342	278	82.	34.7	2.3
1	0748	79	2064.	1050.7	20.3	*	1	1748	179	269.	128.5	4.6	*	2	0348	279	82.	34.1	2.2
1	0754	80	2057.	1044.5	20.2	*	1	1754	180	258.	126.4	4.6	*	2	0354	280	81.	33.4	2.2
1	0800	81	2049.	1037.2	20.1	*	1	1800	181	247.	124.3	4.5	*	2	0400	281	81.	32.7	2.2
1	0806	82	2041.	1028.8	19.9	*	1	1806	182	236.	122.3	4.5	*	2	0406	282	81.	32.1	2.2
1	0812	83	2031.	1019.4	19.8	*	1	1812	183	226.	120.4	4.5	*	2	0412	283	80.	31.4	2.2
1	0818	84	2020.	1009.3	19.6	*	1	1818	184	216.	118.6	4.4	*	2	0418	284	80.	30.7	2.2
1	0824	85	2009.	998.4	19.4	*	1	1824	185	207.	116.8	4.4	*	2	0424	285	80.	30.1	2.1
1	0830	86	1997.	986.9	19.2	*	1	1830	186	198.	115.1	4.3	*	2	0430	286	79.	29.4	2.1
1	0836	87	1984.	974.9	19.0	*	1	1836	187	189.	113.5	4.3	*	2	0436	287	79.	28.8	2.1
1	0842	88	1971.	962.4	18.8	*	1	1842	188	181.	112.0	4.3	*	2	0442	288	79.	28.1	2.1
1	0848	89	1958.	949.6	18.6	*	1	1848	189	173.	110.5	4.2	*	2	0448	289	78.	27.5	2.1
1	0854	90	1944.	936.4	18.4	*	1	1854	190	166.	109.1	4.2	*	2	0454	290	78.	26.8	2.0
1	0900	91	1930.	923.0	18.2	*	1	1900	191	159.	107.8	4.2	*	2	0500	291	78.	26.2	2.0
1	0906	92	1916.	909.3	18.0	*	1	1906	192	152.	106.5	4.1	*	2	0506	292	77.	25.5	2.0
1	0912	93	1901.	895.6	17.8	*	1	1912	193	145.	105.3	4.1	*	2	0512	293	77.	24.9	2.0
1	0918	94	1887.	881.6	17.5	*	1	1918	194	139.	104.1	4.1	*	2	0518	294	75.	24.3	1.9
1	0924	95	1872.	867.6	17.3	*	1	1924	195	133.	103.0	4.1	*	2	0524	295	73.	23.7	1.9
1	0930	96	1857.	853.6	17.1	*	1	1930	196	127.	101.9	4.0	*	2	0530	296	71.	23.1	1.8
1	0936	97	1843.	839.4	16.8	*	1	1936	197	122.	100.9	4.0	*	2	0536	297	69.	22.5	1.8
1	0942	98	1828.	825.3	16.6	*	1	1942	198	117.	99.9	4.0	*	2	0542	298	67.	21.9	1.8
1	0948	99	1813.	811.2	16.4	*	1	1948	199	116.	98.9	4.0	*	2	0548	299	66.	21.4	1.7
1	0954	100	1798.	797.0	16.1	*	1	1954	200	116.	98.0	3.9	*	2	0554	300	64.	20.8	1.7
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2074.	7.40		1876.	808.	656.	656.
		(INCHES)	0.321	0.553	0.559	0.559
		(AC-FT)	930.	1603.	1621.	1621.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
1061.	7.40	873.	350.	283.	283.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
20.45	7.40	17.38	8.32	6.88	6.88

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					0.66
HYDROGRAPH AT					
+	105	6.90	1	FLOW	1979.
				TIME	4.20
ROUTED TO					
+	104R	6.90	1	FLOW	1921.
				TIME	4.40
ROUTED TO					
+	V	6.90	1	FLOW	1840.
				TIME	4.70

ROUTED TO					
+	V	6.90	1	FLOW	1811.
				TIME	4.80
HYDROGRAPH AT					
+	104	6.63	1	FLOW	1999.
				TIME	4.00
HYDROGRAPH AT					
+	103	6.91	1	FLOW	2062.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	4391.
				TIME	5.00
ROUTED TO					
+	102R	20.44	1	FLOW	4302.
				TIME	5.10
ROUTED TO					
+	V	20.44	1	FLOW	4183.
				TIME	5.30
HYDROGRAPH AT					
+	102	8.45	1	FLOW	1777.
				TIME	3.80
2 COMBINED AT					
+	.	28.89	1	FLOW	5308.
				TIME	5.10
ROUTED TO					
+	101R	28.89	1	FLOW	5100.
				TIME	5.40
HYDROGRAPH AT					
+	101	9.08	1	FLOW	459.
				TIME	5.70
2 COMBINED AT					
+	.	37.97	1	FLOW	5530.
				TIME	5.40
HYDROGRAPH AT					
+	111	4.08	1	FLOW	1247.
				TIME	3.60
ROUTED TO					
+	116R	4.08	1	FLOW	1071.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	874.
				TIME	4.20
HYDROGRAPH AT					
+	116	5.19	1	FLOW	296.
				TIME	5.60
2 COMBINED AT					
+	.	9.27	1	FLOW	988.
				TIME	4.30
HYDROGRAPH AT					
+	110	2.94	1	FLOW	955.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	824.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	675.
				TIME	4.20
HYDROGRAPH AT					
+	109	4.18	1	FLOW	247.
				TIME	5.60
3 COMBINED AT					
+	.	16.40	1	FLOW	1775.
				TIME	4.20
ROUTED TO					
+	109R	16.40	1	FLOW	1521.
				TIME	4.90
ROUTED TO					
+	101R	16.40	1	FLOW	1436.
				TIME	6.40
2 COMBINED AT					
+	.	54.37	1	FLOW	6751.
				TIME	5.50
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	0.
				TIME	0.10

```
 HYDROGRAPH AT
+                .          54.37      1   FLOW          6751.
                                          TIME          5.50

 ROUTED TO
+                NLVIN      54.37      1   FLOW          6744.
                                          TIME          5.50

 ROUTED TO
+                NLVDET     54.37      1   FLOW          2074.
                                          TIME          7.40

                                       ** PEAK STAGES IN FEET **
                                       1  STAGE         20.45
                                          TIME          7.40

 HYDROGRAPH AT
+                .           0.00      1   FLOW             0.
                                          TIME          0.10

  2 COMBINED AT
+                .          54.37      1   FLOW          2074.
                                          TIME          7.40

1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ   ELEMENT      DT        PEAK     TIME TO PEAK     VOLUME     DT        PEAK     TIME TO PEAK     VOLUME
                                                                                                    PEAK
                               (MIN)     (CFS)      (MIN)          (IN)     (MIN)     (CFS)      (MIN)            (IN)

        FOR PLAN = 1  RATIO= 0.66
           NLVIN  MANB          0.40   6749.70     330.78          0.57      6.00   6744.21     330.00           0.57

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1642E+04 EXCESS=0.0000E+00 OUTFLOW=0.1642E+04 BASIN STORAGE=0.3451E-04 PERCENT ERROR=    0.0


 *** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*            VERSION 4.0.1 (LOCAL)      *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:05   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM *REPLACES* ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
               1    ID        FEMA FLOOD INSURANCE STUDY, 1996
               2    ID        UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
               3    ID        INTERBASIN 100-YEAR STORM
               4    ID
               5    ID        Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
               6    ID        in 8/93 for the design of outlet modifications at the North Las Vegas
               7    ID        Detention Basin (NLVDB).  This storm centering generates the highest
               8    ID        100-year inflows to the NLVDB.
               9    ID
              10    ID        Modifications to the original B&V model were to adjust the outlet
              11    ID        rating for the NLVDB to reflect the four-foot high barrier wall in
              12    ID        front of the 3-pipe outlet.  Additional models were created to
              13    ID        represent 10, 50, and 500-year storms.
              14    ID
              15    ID        Remaining comments are from the original model dated 8/93.
              16    ID
              17    ID     This storm also known as "Gayles Storm" simulates a 54 square mile
              18    ID     storm centered downstream of the Upper Las Vegas Wash Detention Basin
              19    ID     but upstream of the North Las Vegas Detention Basin.  This model is based
              20    ID     original model developed by Black & Veatch during the predesign study for
              21    ID     Upper Las Vegas Wash Detention Basin.
              22    ID
              23    ID               Storm Area:    54.37 sq. miles
              24    ID               DARF:          0.66 (CCRFCD Drainage Manual)
              25    ID
              26    ID       10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
              27    ID       50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
              28    ID      100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
              29    ID
              30    ID     JR Card includes DARF for model
              31    ID     PB Cards are adjusted rainfall depth, NOAA Atas II amounts
              32    ID        times adjustment ratios given above.
              33    ID     PB Cards for 500-year storm based on frequency extrapolation of
              34    ID        10, 50, and 100-year data after precipitation ratio adjustments.
              35    ID
*** FREE ***
              36    IT      6       0       0     300
              37    IO      5       0       0
              38    IN      5       0       0
              39    JR   PREC    0.66

              40    KK    105
              41    KM   RUNOFF FROM SUBBASIN 105
              42    BA  6.898
              43    PB  3.72
              44    PC  .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
              45    PC  .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
              46    PC  .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
              47    PC  .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
              48    PC  .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
              49    PC  .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
              50    PC  .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
              51    PC  .997    .999   1.00
              52    LS    0      86
```



```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              53    UD   .773
```

```
54          KK    104R
55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
56          RM       1   0.157    0.15

57          KK       V
58          RM       2   0.295    0.15

59          KK       V
60          RM       1   0.139    0.15

61          KK     104
62          KM    RUNOFF FROM SUBBASIN 104
63          BA   6.625
64          PB    3.72
65          LS       0       85
66          UD    .628

67          KK     103
68          KM    RUNOFF FROM SUBBASIN 103
69          BA   6.915
70          PB    3.29
71          LS       0       84
72          UD    .324

73          KK       .
74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
75          HC       3

76          KK    102R
77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
78          RM       1   0.144    0.15

79          KK       V
80          RM       1   0.209    0.15

81          KK     102
82          KM    RUNOFF FROM SUBBASIN 102
83          BA   8.455
84          PB    3.00
85          LS       0       83
86          UD    .369

87          KK       .
88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
89          HC       2

90          KK    101R
91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
92          RM       2   0.401    0.15
1                                    HEC-1 INPUT                                    PAGE  3

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

93          KK     101
94          KM    RUNOFF FROM SUBBASIN 101
95          BA   9.082
96          PB    2.72
97          LS       0       77
98          UD   1.505

99          KK       .
100         KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
101         HC       2

102         KK     111
103         KM    RUNOFF FROM SUBBASIN 111
104         BA   4.080
105         PB    3.15
106         LS       0       84
107         UD    .239

108         KK    116R
109         KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
110         RM       1   0.191    0.15

111         KK       V
112         RM       2   0.400    0.15

113         KK     116
114         KM    RUNOFF FROM SUBBASIN 116
115         BA   5.189
116         PB    2.52
117         LS       0       78
118         UD   1.418

119         KK       .
120         KM    COMBINE SUBBASINS 111 & 116
121         HC       2

122         KK     110
123         KM    RUNOFF FROM SUBBASIN 110
124         BA   2.945
125         PB    3.00
126         LS       0       86
127         UD    .237

128         KK    109R
129         KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM        1   0.183    0.15

          131          KK        V
          132          RM        2   0.386    0.15
1                                        HEC-1 INPUT                                                    PAGE  4

          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          133          KK     109
          134          KM    RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    2.72
          137          LS       0       78
          138          UD   1.281

          139          KK        .
          140          KM    COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC        3

          142          KK    109R
          143          KM    ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM        3   0.649    0.15

          145          KK    101R
          146          KM    ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM        3   0.821    0.15

          148          KK        .
          149          KM    COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC        2

          151          KK        .
          152          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI        0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI    17775   20135   23000
          156          DQ        0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ     6775    8635   11000

          158          KK    NLVIN
          159          KO        1
          160          KM    ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK     2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO        1
          164          KM    ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM    OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS        1    STOR      -2
          167          SV        0      25     100     190     430     665    1095    1285    1435    1540
          168          SV     1650    1825    1920    2000    2110    2200    2310    2430
          169          SE        0       2       4       6      10      14      21      24      26      27
          170          SE       28      30      31      32      33      34      35      36
          171          SQ        0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ     3050    4630    5710    7090    8610   10140   11670   13200

          173          KK        .
          174          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

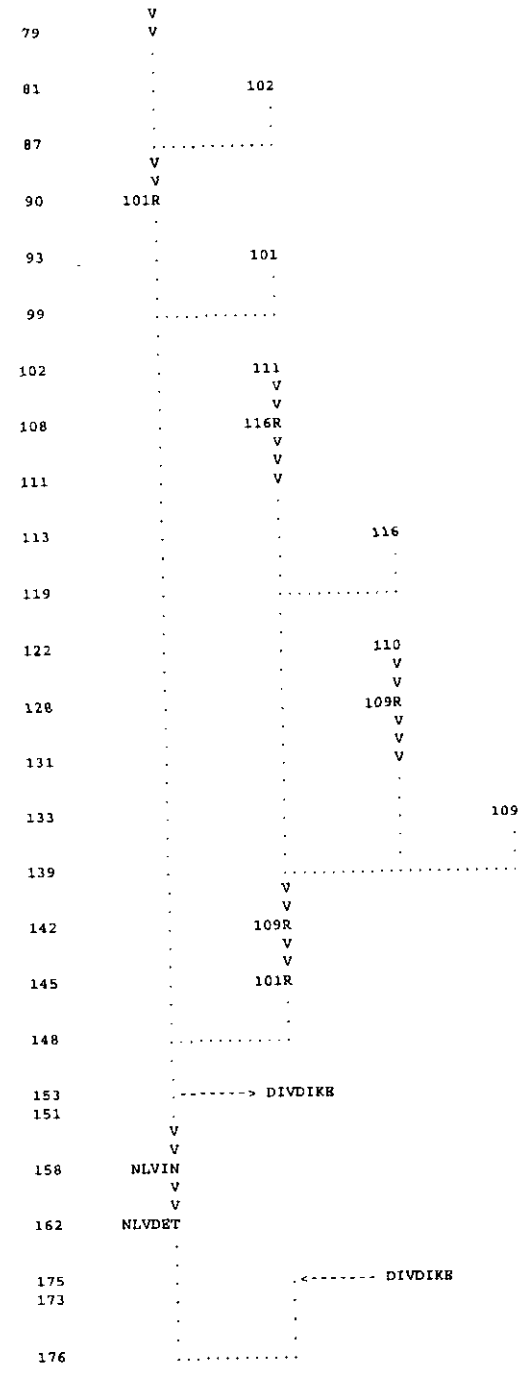
          LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10


          176          KK        .
          177          KM    COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC        2
          179          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            ..............................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:05   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 551-1748             *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 100-YEAR STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

```
                    rating for the NLVDB to reflect the four-foot high barrier wall in
                    front of the 3-pipe outlet.  Additional models were created to
                    represent 10, 50, and 500-year storms.

                    Remaining comments are from the original model dated 8/93.

                  This storm also known as "Gayles Storm" simulates a 54 square mile
                  storm centered downstream of the Upper Las Vegas Wash Detention Basin
                  but upstream of the North Las Vegas Detention Basin.  This model is based
                  original model developed by Black & Veatch during the predesign study for
                  Upper Las Vegas Wash Detention Basin.

                            Storm Area:     54.37 sq. miles
                            DARF:           0.66 (CCRFCD Drainage Manual)

                     10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
                     50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
                    100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

                  JR Card includes DARF for model
                  PB Cards are adjusted rainfall depth, NOAA Atas II amounts
                     times adjustment ratios given above.
                  PB Cards for 500-year storm based on frequency extrapolation of
                     10, 50, and 100-year data after precipitation ratio adjustments.

 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           6  MINUTES IN COMPUTATION INTERVAL
                     IDATE       1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE       2    0  ENDING DATE
                    NDTIME         0554  ENDING TIME
                     ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL     0.10 HOURS
                        TOTAL TIME BASE    29.90 HOURS

               ENGLISH UNITS
                    DRAINAGE AREA          SQUARE MILES
                    PRECIPITATION DEPTH    INCHES
                    LENGTH, ELEVATION      FEET
                    FLOW                   CUBIC FEET PER SECOND
                    STORAGE VOLUME         ACRE-FEET
                    SURFACE AREA           ACRES
                    TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.66


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


               **************
               *            *
158 KK         *     NLVIN  *
               *            *
               **************

159 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

               HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                        L       2000.  CHANNEL LENGTH
                        S     0.0076  SLOPE
                        N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                       CA       0.00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      35.00  BOTTOM WIDTH OR DIAMETER
                        Z       2.00  SIDE SLOPE
                   NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS

                                                    ***
                                  COMPUTED KINEMATIC PARAMETERS
                                      VARIABLE TIME STEP
                                    (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO PEAK   VOLUME    MAXIMUM CELERITY
                                                  (MIN)     (FT)     (CFS)      (MIN)        (IN)        (FPS)

                  MAIN         1.01      1.55      0.39    666.67   8341.18     330.45       0.73       38.92
```

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+04 EXCESS=0.0000E+00 OUTFLOW=0.2110E+04 BASIN STORAGE=0.3481E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	8339.62	330.00	0.73

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	2431.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	2180.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	1948.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	1736.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	1543.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	1367.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	1208.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	1065.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	937.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	822.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	721.	1		1600	161	0.	1		2330	236	0.
1		0106	12	0.	1		0836	87	632.	1		1606	162	0.	1		2336	237	0.
1		0112	13	0.	1		0842	88	554.	1		1612	163	0.	1		2342	238	0.
1		0118	14	0.	1		0848	89	485.	1		1618	164	0.	1		2348	239	0.
1		0124	15	1.	1		0854	90	424.	1		1624	165	0.	1		2354	240	0.
1		0130	16	3.	1		0900	91	372.	1		1630	166	0.	2		0000	241	0.
1		0136	17	7.	1		0906	92	326.	1		1636	167	0.	2		0006	242	0.
1		0142	18	13.	1		0912	93	285.	1		1642	168	0.	2		0012	243	0.
1		0148	19	23.	1		0918	94	250.	1		1648	169	0.	2		0018	244	0.
1		0154	20	38.	1		0924	95	220.	1		1654	170	0.	2		0024	245	0.
1		0200	21	61.	1		0930	96	193.	1		1700	171	0.	2		0030	246	0.
1		0206	22	92.	1		0936	97	170.	1		1706	172	0.	2		0036	247	0.
1		0212	23	132.	1		0942	98	150.	1		1712	173	0.	2		0042	248	0.
1		0218	24	182.	1		0948	99	132.	1		1718	174	0.	2		0048	249	0.
1		0224	25	240.	1		0954	100	117.	1		1724	175	0.	2		0054	250	0.
1		0230	26	302.	1		1000	101	103.	1		1730	176	0.	2		0100	251	0.
1		0236	27	366.	1		1006	102	91.	1		1736	177	0.	2		0106	252	0.
1		0242	28	427.	1		1012	103	81.	1		1742	178	0.	2		0112	253	0.
1		0248	29	483.	1		1018	104	71.	1		1748	179	0.	2		0118	254	0.
1		0254	30	536.	1		1024	105	63.	1		1754	180	0.	2		0124	255	0.
1		0300	31	589.	1		1030	106	56.	1		1800	181	0.	2		0130	256	0.
1		0306	32	649.	1		1036	107	50.	1		1806	182	0.	2		0136	257	0.
1		0312	33	727.	1		1042	108	44.	1		1812	183	0.	2		0142	258	0.
1		0318	34	839.	1		1048	109	39.	1		1818	184	0.	2		0148	259	0.
1		0324	35	1003.	1		1054	110	35.	1		1824	185	0.	2		0154	260	0.
1		0330	36	1244.	1		1100	111	31.	1		1830	186	0.	2		0200	261	0.
1		0336	37	1591.	1		1106	112	27.	1		1836	187	0.	2		0206	262	0.
1		0342	38	2072.	1		1112	113	24.	1		1842	188	0.	2		0212	263	0.
1		0348	39	2695.	1		1118	114	22.	1		1848	189	0.	2		0218	264	0.
1		0354	40	3419.	1		1124	115	19.	1		1854	190	0.	2		0224	265	0.
1		0400	41	4172.	1		1130	116	17.	1		1900	191	0.	2		0230	266	0.
1		0406	42	4881.	1		1136	117	15.	1		1906	192	0.	2		0236	267	0.
1		0412	43	5496.	1		1142	118	13.	1		1912	193	0.	2		0242	268	0.
1		0418	44	5988.	1		1148	119	12.	1		1918	194	0.	2		0248	269	0.
1		0424	45	6354.	1		1154	120	10.	1		1924	195	0.	2		0254	270	0.
1		0430	46	6611.	1		1200	121	9.	1		1930	196	0.	2		0300	271	0.
1		0436	47	6782.	1		1206	122	8.	1		1936	197	0.	2		0306	272	0.
1		0442	48	6908.	1		1212	123	7.	1		1942	198	0.	2		0312	273	0.
1		0448	49	7031.	1		1218	124	6.	1		1948	199	0.	2		0318	274	0.
1		0454	50	7191.	1		1224	125	5.	1		1954	200	0.	2		0324	275	0.
1		0500	51	7412.	1		1230	126	4.	1		2000	201	0.	2		0330	276	0.
1		0506	52	7691.	1		1236	127	4.	1		2006	202	0.	2		0336	277	0.
1		0512	53	7992.	1		1242	128	3.	1		2012	203	0.	2		0342	278	0.
1		0518	54	8217.	1		1248	129	3.	1		2018	204	0.	2		0348	279	0.
1		0524	55	8308.	1		1254	130	2.	1		2024	205	0.	2		0354	280	0.
1		0530	56	8340.	1		1300	131	2.	1		2030	206	0.	2		0400	281	0.
1		0536	57	8318.	1		1306	132	2.	1		2036	207	0.	2		0406	282	0.
1		0542	58	8248.	1		1312	133	2.	1		2042	208	0.	2		0412	283	0.
1		0548	59	8053.	1		1318	134	1.	1		2048	209	0.	2		0418	284	0.
1		0554	60	7741.	1		1324	135	1.	1		2054	210	0.	2		0424	285	0.
1		0600	61	7390.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	7026.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	6664.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	6311.	1		1348	139	1.	1		2118	214	0.	2		0448	289	0.
1		0624	65	5968.	1		1354	140	0.	1		2124	215	0.	2		0454	290	0.
1		0630	66	5631.	1		1400	141	0.	1		2130	216	0.	2		0500	291	0.
1		0636	67	5298.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	4963.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	4626.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	4287.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	3950.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	3618.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	3297.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	2991.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	2701.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
		(CFS)			

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+    8340.      5.50                4157.       1064.        854.        854.
                        (INCHES)     0.711       0.728       0.728       0.728
                        (AC-FT)      2062.       2110.       2110.       2110.

                        CUMULATIVE AREA =   54.37 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              **************
              *            *
162 KK        *    NLVDET  *
              *            *
              **************

163 KO              OUTPUT CONTROL VARIABLES
                         IPRNT          1  PRINT CONTROL
                         IPLOT          0  PLOT CONTROL
                         QSCAL          0.  HYDROGRAPH PLOT SCALE
                             ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
                             OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

                    HYDROGRAPH ROUTING DATA

166 RS              STORAGE ROUTING
                         NSTPS          1  NUMBER OF SUBREACHES
                          ITYP       STOR  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT

167 SV                STORAGE        0.0        25.0       100.0       190.0       430.0       665.0      1095.0      1285.0      1435.0      1540.0
                                  1650.0      1825.0      1920.0      2000.0      2110.0      2200.0      2310.0      2430.0

169 SE                ELEVATION      0.00        2.00        4.00        6.00       10.00       14.00       21.00       24.00       26.00       27.00
                                    28.00       30.00       31.00       32.00       33.00       34.00       35.00       36.00

171 SQ                DISCHARGE        0.         77.        117.        597.       1310.       1660.       2110.       2260.       2360.       2690.
                                  3050.       4630.       5710.       7090.       8610.      10140.      11670.      13200.

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                                                    HYDROGRAPH AT STATION   NLVDET
                                                      PLAN 1,   RATIO =  0.66

*****************************************************************************************************************************************************

 DA MON HRMN ORD  OUTFLOW  STORAGE  STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE  STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE  STAGE
                                          *                                          *
  1   0000   1       0.       0.     0.0 *   1  1000 101    2117.    1103.6    21.1 *   1  2000 201     246.     124.2    4.5
  1   0006   2       0.       0.     0.0 *   1  1006 102    2102.    1086.9    20.9 *   1  2006 202     235.     122.2    4.5
  1   0012   3       0.       0.     0.0 *   1  1012 103    2084.    1070.3    20.6 *   1  2012 203     225.     120.3    4.5
  1   0018   4       0.       0.     0.0 *   1  1018 104    2067.    1053.8    20.3 *   1  2018 204     216.     118.5    4.4
  1   0024   5       0.       0.     0.0 *   1  1024 105    2050.    1037.4    20.1 *   1  2024 205     206.     116.7    4.4
  1   0030   6       0.       0.     0.0 *   1  1030 106    2033.    1021.0    19.8 *   1  2030 206     197.     115.1    4.3
  1   0036   7       0.       0.     0.0 *   1  1036 107    2015.    1004.7    19.5 *   1  2036 207     189.     113.5    4.3
  1   0042   8       0.       0.     0.0 *   1  1042 108    1999.     988.5    19.3 *   1  2042 208     181.     111.9    4.3
  1   0048   9       0.       0.     0.0 *   1  1048 109    1982.     972.4    19.0 *   1  2048 209     173.     110.5    4.2
  1   0054  10       0.       0.     0.0 *   1  1054 110    1965.     956.4    18.7 *   1  2054 210     165.     109.1    4.2
  1   0100  11       0.       0.     0.0 *   1  1100 111    1948.     940.5    18.5 *   1  2100 211     158.     107.7    4.2
  1   0106  12       0.       0.     0.0 *   1  1106 112    1932.     924.7    18.2 *   1  2106 212     152.     106.5    4.1
  1   0112  13       0.       0.     0.0 *   1  1112 113    1915.     909.0    18.0 *   1  2112 213     145.     105.2    4.1
  1   0118  14       0.       0.     0.0 *   1  1118 114    1899.     893.4    17.7 *   1  2118 214     139.     104.1    4.1
  1   0124  15       0.       0.     0.0 *   1  1124 115    1883.     878.0    17.5 *   1  2124 215     133.     103.0    4.1
  1   0130  16       0.       0.     0.0 *   1  1130 116    1867.     862.6    17.2 *   1  2130 216     127.     101.9    4.0
  1   0136  17       0.       0.     0.0 *   1  1136 117    1851.     847.4    17.0 *   1  2136 217     122.     100.8    4.0
  1   0142  18       0.       0.     0.0 *   1  1142 118    1835.     832.3    16.7 *   1  2142 218     117.      99.9    4.0
  1   0148  19       1.       0.     0.0 *   1  1148 119    1819.     817.3    16.5 *   1  2148 219     116.      98.9    4.0
  1   0154  20       2.       0.     0.0 *   1  1154 120    1804.     802.4    16.2 *   1  2154 220     116.      97.9    3.9
  1   0200  21       3.       0.9    0.1 *   1  1200 121    1788.     787.6    16.0 *   1  2200 221     115.      97.0    3.9
  1   0206  22       5.       1.5    0.1 *   1  1206 122    1773.     773.0    15.8 *   1  2206 222     115.      96.0    3.9
  1   0212  23       7.       2.4    0.2 *   1  1212 123    1758.     758.5    15.5 *   1  2212 223     114.      95.1    3.9
  1   0218  24      11.       3.6    0.3 *   1  1218 124    1743.     744.1    15.3 *   1  2218 224     114.      94.1    3.8
  1   0224  25      16.       5.2    0.4 *   1  1224 125    1728.     729.8    15.1 *   1  2224 225     113.      93.2    3.8
  1   0230  26      23.       7.3    0.6 *   1  1230 126    1713.     715.6    14.8 *   1  2230 226     113.      92.3    3.8
  1   0236  27      30.       9.8    0.8 *   1  1236 127    1698.     701.5    14.6 *   1  2236 227     112.      91.3    3.8
  1   0242  28      40.      12.8    1.0 *   1  1242 128    1684.     687.6    14.4 *   1  2242 228     112.      90.4    3.7
  1   0248  29      50.      16.2    1.3 *   1  1248 129    1669.     673.8    14.1 *   1  2248 229     111.      89.5    3.7
  1   0254  30      62.      20.0    1.6 *   1  1254 130    1653.     660.0    13.9 *   1  2254 230     111.      88.6    3.7
  1   0300  31      74.      24.1    1.9 *   1  1300 131    1632.     646.5    13.7 *   1  2300 231     110.      87.7    3.7
  1   0306  32      79.      28.6    2.1 *   1  1306 132    1612.     633.1    13.5 *   1  2306 232     110.      86.7    3.6
  1   0312  33      82.      33.6    2.2 *   1  1312 133    1593.     619.9    13.2 *   1  2312 233     109.      85.8    3.6
  1   0318  34      85.      39.4    2.4 *   1  1318 134    1573.     606.8    13.0 *   1  2318 234     109.      84.9    3.6
  1   0324  35      88.      46.3    2.6 *   1  1324 135    1554.     593.9    12.8 *   1  2324 235     108.      84.0    3.6
  1   0330  36      93.      54.8    2.8 *   1  1330 136    1535.     581.1    12.6 *   1  2330 236     108.      83.1    3.6
  1   0336  37      99.      65.7    3.1 *   1  1336 137    1516.     568.5    12.4 *   1  2336 237     108.      82.3    3.5
  1   0342  38     106.      80.0    3.5 *   1  1342 138    1498.     556.1    12.1 *   1  2342 238     107.      81.4    3.5
  1   0348  39     116.      98.8    4.0 *   1  1348 139    1479.     543.8    11.9 *   1  2348 239     107.      80.5    3.5
  1   0354  40     237.     122.6    4.5 *   1  1354 140    1461.     531.6    11.7 *   1  2354 240     106.      79.6    3.5
  1   0400  41     391.     151.4    5.1 *   1  1400 141    1443.     519.6    11.5 *   2  0000 241     106.      78.7    3.4
  1   0406  42     569.     184.8    5.9 *   1  1406 142    1426.     507.8    11.3 *   2  0006 242     105.      77.9    3.4
  1   0412  43     693.     222.5    6.5 *   1  1412 143    1408.     496.1    11.1 *   2  0012 243     105.      77.0    3.4
  1   0418  44     816.     263.7    7.2 *   1  1418 144    1391.     484.5    10.9 *   2  0018 244     104.      76.1    3.4
  1   0424  45     946.     307.4    8.0 *   1  1424 145    1374.     473.1    10.7 *   2  0024 245     104.      75.3    3.3
  1   0430  46    1080.     352.6    8.7 *   1  1430 146    1357.     461.8    10.5 *   2  0030 246     103.      74.4    3.3
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1	0436	47	1216.	398.5	9.5	*	1	1436	147	1341.	450.6	10.4	*	2	0036	247	103.	73.6	3.3
1	0442	48	1332.	444.5	10.2	*	1	1442	148	1324.	439.6	10.2	*	2	0042	248	102.	72.7	3.3
1	0448	49	1401.	490.8	11.0	*	1	1448	149	1306.	428.8	10.0	*	2	0048	249	102.	71.9	3.2
1	0454	50	1470.	537.7	11.8	*	1	1454	150	1275.	418.1	9.8	*	2	0054	250	102.	71.0	3.2
1	0500	51	1542.	585.6	12.6	*	1	1500	151	1244.	407.7	9.6	*	2	0100	251	101.	70.2	3.2
1	0506	52	1615.	635.0	13.5	*	1	1506	152	1214.	397.5	9.5	*	2	0106	252	101.	69.4	3.2
1	0512	53	1682.	686.2	14.3	*	1	1512	153	1184.	387.6	9.3	*	2	0112	253	100.	68.5	3.2
1	0518	54	1737.	739.0	15.2	*	1	1518	154	1155.	378.0	9.1	*	2	0118	254	100.	67.7	3.1
1	0524	55	1794.	792.7	16.1	*	1	1524	155	1127.	368.5	9.0	*	2	0124	255	99.	66.9	3.1
1	0530	56	1850.	846.4	17.0	*	1	1530	156	1100.	359.3	8.8	*	2	0130	256	99.	66.1	3.1
1	0536	57	1906.	899.8	17.8	*	1	1536	157	1073.	350.3	8.7	*	2	0136	257	98.	65.2	3.1
1	0542	58	1961.	952.2	18.7	*	1	1542	158	1047.	341.6	8.5	*	2	0142	258	98.	64.4	3.1
1	0548	59	2014.	1003.2	19.5	*	1	1548	159	1022.	333.0	8.4	*	2	0148	259	98.	63.6	3.0
1	0554	60	2065.	1051.6	20.3	*	1	1554	160	997.	324.7	8.2	*	2	0154	260	97.	62.8	3.0
1	0600	61	2111.	1096.8	21.0	*	1	1600	161	973.	316.5	8.1	*	2	0200	261	97.	62.0	3.0
1	0606	62	2145.	1138.8	21.7	*	1	1606	162	949.	308.6	8.0	*	2	0206	262	96.	61.2	3.0
1	0612	63	2175.	1177.5	22.3	*	1	1612	163	926.	300.9	7.8	*	2	0212	263	96.	60.4	2.9
1	0618	64	2203.	1213.1	22.9	*	1	1618	164	904.	293.3	7.7	*	2	0218	264	95.	59.6	2.9
1	0624	65	2229.	1245.5	23.4	*	1	1624	165	882.	285.9	7.6	*	2	0224	265	95.	58.8	2.9
1	0630	66	2252.	1274.9	23.8	*	1	1630	166	861.	278.7	7.5	*	2	0230	266	95.	58.1	2.9
1	0636	67	2271.	1301.4	24.2	*	1	1636	167	840.	271.7	7.4	*	2	0236	267	94.	57.3	2.9
1	0642	68	2287.	1324.9	24.5	*	1	1642	168	819.	264.8	7.2	*	2	0242	268	94.	56.5	2.8
1	0648	69	2300.	1345.6	24.8	*	1	1648	169	799.	258.1	7.1	*	2	0248	269	93.	55.7	2.8
1	0654	70	2312.	1363.4	25.0	*	1	1654	170	780.	251.6	7.0	*	2	0254	270	93.	55.0	2.8
1	0700	71	2322.	1378.3	25.2	*	1	1700	171	761.	245.2	6.9	*	2	0300	271	93.	54.2	2.8
1	0706	72	2330.	1390.3	25.4	*	1	1706	172	743.	239.0	6.8	*	2	0306	272	92.	53.4	2.8
1	0712	73	2336.	1399.6	25.5	*	1	1712	173	725.	233.0	6.7	*	2	0312	273	92.	52.7	2.7
1	0718	74	2341.	1406.3	25.6	*	1	1718	174	707.	227.1	6.6	*	2	0318	274	91.	51.9	2.7
1	0724	75	2344.	1410.4	25.7	*	1	1724	175	690.	221.3	6.5	*	2	0324	275	91.	51.2	2.7
1	0730	76	2345.	1412.3	25.7	*	1	1730	176	673.	215.6	6.4	*	2	0330	276	91.	50.4	2.7
1	0736	77	2345.	1411.9	25.7	*	1	1736	177	657.	210.2	6.3	*	2	0336	277	90.	49.7	2.7
1	0742	78	2343.	1409.6	25.7	*	1	1742	178	641.	204.8	6.2	*	2	0342	278	90.	48.9	2.6
1	0748	79	2340.	1405.5	25.6	*	1	1748	179	625.	199.6	6.2	*	2	0348	279	89.	48.2	2.6
1	0754	80	2336.	1399.7	25.5	*	1	1754	180	610.	194.5	6.1	*	2	0354	280	89.	47.4	2.6
1	0800	81	2332.	1392.5	25.4	*	1	1800	181	594.	189.5	6.0	*	2	0400	281	89.	46.7	2.6
1	0806	82	2326.	1383.8	25.3	*	1	1806	182	569.	184.7	5.9	*	2	0406	282	88.	46.0	2.6
1	0812	83	2319.	1374.0	25.2	*	1	1812	183	544.	180.1	5.8	*	2	0412	283	88.	45.2	2.5
1	0818	84	2312.	1363.2	25.0	*	1	1818	184	521.	175.7	5.7	*	2	0418	284	87.	44.5	2.5
1	0824	85	2304.	1351.4	24.9	*	1	1824	185	498.	171.5	5.6	*	2	0424	285	87.	43.8	2.5
1	0830	86	2296.	1338.7	24.7	*	1	1830	186	477.	167.4	5.5	*	2	0430	286	87.	43.1	2.5
1	0836	87	2287.	1325.4	24.5	*	1	1836	187	456.	163.6	5.4	*	2	0436	287	86.	42.4	2.5
1	0842	88	2278.	1311.4	24.4	*	1	1842	188	436.	159.9	5.3	*	2	0442	288	86.	41.7	2.4
1	0848	89	2268.	1296.9	24.2	*	1	1848	189	418.	156.4	5.3	*	2	0448	289	86.	41.0	2.4
1	0854	90	2258.	1282.0	24.0	*	1	1854	190	400.	153.0	5.2	*	2	0454	290	85.	40.2	2.4
1	0900	91	2246.	1266.7	23.7	*	1	1900	191	382.	149.8	5.1	*	2	0500	291	85.	39.5	2.4
1	0906	92	2233.	1251.0	23.5	*	1	1906	192	366.	146.7	5.0	*	2	0506	292	84.	38.8	2.4
1	0912	93	2221.	1235.2	23.2	*	1	1912	193	350.	143.7	5.0	*	2	0512	293	84.	38.2	2.4
1	0918	94	2208.	1219.1	23.0	*	1	1918	194	335.	140.9	4.9	*	2	0518	294	84.	37.5	2.3
1	0924	95	2195.	1202.8	22.7	*	1	1924	195	321.	138.2	4.8	*	2	0524	295	83.	36.8	2.3
1	0930	96	2182.	1186.5	22.4	*	1	1930	196	307.	135.6	4.8	*	2	0530	296	83.	36.1	2.3
1	0936	97	2169.	1170.0	22.2	*	1	1936	197	293.	133.1	4.7	*	2	0536	297	83.	35.4	2.3
1	0942	98	2156.	1153.4	21.9	*	1	1942	198	281.	130.7	4.7	*	2	0542	298	82.	34.7	2.3
1	0948	99	2143.	1136.8	21.7	*	1	1948	199	269.	128.4	4.6	*	2	0548	299	82.	34.0	2.2
1	0954	100	2130.	1120.2	21.4	*	1	1954	200	257.	126.3	4.6	*	2	0554	300	81.	33.4	2.2

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2345.	7.50		2172.	1036.	840.	840.
		(INCHES)	0.371	0.708	0.716	0.716
		(AC-FT)	1077.	2054.	2077.	2077.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
1412.	7.50	1191.	494.	401.	401.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
25.70	7.50	22.42	10.76	8.90	8.90

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					0.66
HYDROGRAPH AT					
+	105	6.90	1	FLOW	2376.
				TIME	4.20
ROUTED TO					
+	104R	6.90	1	FLOW	2304.
				TIME	4.30
ROUTED TO					
+	V	6.90	1	FLOW	2207.
				TIME	4.70

ROUTED TO					
+	V	6.90	1	FLOW	2174.
				TIME	4.80
HYDROGRAPH AT					
+	104	6.63	1	FLOW	2418.
				TIME	4.00
HYDROGRAPH AT					
+	103	6.91	1	FLOW	2668.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	5276.
				TIME	5.00
ROUTED TO					
+	102R	20.44	1	FLOW	5172.
				TIME	5.10
ROUTED TO					
+	V	20.44	1	FLOW	5033.
				TIME	5.20
HYDROGRAPH AT					
+	102	8.45	1	FLOW	2386.
				TIME	3.80
2 COMBINED AT					
+	.	28.89	1	FLOW	6476.
				TIME	5.10
ROUTED TO					
+	101R	28.89	1	FLOW	6236.
				TIME	5.40
HYDROGRAPH AT					
+	101	9.08	1	FLOW	694.
				TIME	5.70
2 COMBINED AT					
+	.	37.97	1	FLOW	6905.
				TIME	5.40
HYDROGRAPH AT					
+	111	4.08	1	FLOW	1644.
				TIME	3.60
ROUTED TO					
+	116R	4.08	1	FLOW	1412.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	1152.
				TIME	4.20
HYDROGRAPH AT					
+	116	5.19	1	FLOW	366.
				TIME	5.60
2 COMBINED AT					
+	.	9.27	1	FLOW	1305.
				TIME	4.20
HYDROGRAPH AT					
+	110	2.94	1	FLOW	1239.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	1068.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	875.
				TIME	4.20
HYDROGRAPH AT					
+	109	4.18	1	FLOW	364.
				TIME	5.50
3 COMBINED AT					
+	.	16.40	1	FLOW	2379.
				TIME	4.20
ROUTED TO					
+	109R	16.40	1	FLOW	2042.
				TIME	4.90
ROUTED TO					
+	101R	16.40	1	FLOW	1887.
				TIME	6.30
2 COMBINED AT					
+	.	54.37	1	FLOW	8537.
				TIME	5.50
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	194.
				TIME	5.50

```
 HYDROGRAPH AT
+                    .      54.37     1   FLOW          8342.
                                          TIME          5.50

 ROUTED TO
+                  NLVIN    54.37     1   FLOW          8340.
                                          TIME          5.50

 ROUTED TO
+                  NLVDET   54.37     1   FLOW          2345.
                                          TIME          7.50

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE         25.70
                                         TIME          7.50

 HYDROGRAPH AT
+                    .       0.00     1   FLOW           194.
                                          TIME          5.50

  2 COMBINED AT
+                    .      54.37     1   FLOW          2345.
                                          TIME          7.50

1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK    TIME TO        VOLUME     DT        PEAK    TIME TO      VOLUME
                                                    PEAK                                          PEAK

                                (MIN)      (CFS)     (MIN)       (IN)     (MIN)      (CFS)     (MIN)       (IN)

        FOR PLAN = 1  RATIO= 0.66
           NLVIN  MANE          0.39    8341.18    330.45       0.73      6.00    8339.62    330.00       0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2110E+04 EXCESS=0.0000E+00 OUTFLOW=0.2110E+04 BASIN STORAGE=0.3481E-04 PERCENT ERROR=   0.0


*** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          FEBRUARY  1991               *
*           VERSION 4.0.1 (LOCAL)       *
*                                       *
*  RUN DATE  05/14/96  TIME  10:34:16   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                *DIAGRAM
              1 ID          FEMA FLOOD INSURANCE STUDY, 1996
              2 ID          UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
              3 ID          INTERBASIN 500-year STORM
              4 ID
              5 ID          Current (05/96) model based on a HEC-1 model prepared by Black&Veatch
              6 ID          in 8/93 for the design of outlet modifications at the North Las Vegas
              7 ID          Detention Basin (NLVDB).  This storm centering generates the highest
              8 ID          100-year inflows to the NLVDB.
              9 ID
             10 ID          Modifications to the original B&V model were to adjust the outlet
             11 ID          rating for the NLVDB to reflect the four-foot high barrier wall in
             12 ID          front of the 3-pipe outlet.  Additional models were created to
             13 ID          represent 10, 50, and 500-year storms.
             14 ID
             15 ID          Remaining comments are from the original model dated 8/93.
             16 ID
             17 ID      This storm also known as "Gayles Storm" simulates a 54 square mile
             18 ID      storm centered downstream of the Upper Las Vegas Wash Detention Basin
             19 ID      but upstream of the North Las Vegas Detention Basin.  This model is based
             20 ID      original model developed by Black & Veatch during the predesign study for
             21 ID      Upper Las Vegas Wash Detention Basin.
             22 ID
             23 ID                Storm Area:     54.37 sq. miles
             24 ID                DARF:           0.66 (CCRFCD Drainage Manual)
             25 ID
             26 ID          10-yr  Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
             27 ID          50-yr  Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
             28 ID         100-yr  Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)
             29 ID
             30 ID        JR Card includes DARF for model
             31 ID        PB Cards are adjusted rainfall depth, NOAA Atas II amounts
             32 ID           times adjustment ratios given above.
             33 ID        PB Cards for 500-year storm based on frequency extrapolation of
             34 ID           10, 50, and 100-year data after precipitation ratio adjustments.
             35 ID
*** PREE ***
             36 IT       6       0       0     300
             37 IO       5       0       0
             38 IN       5       0       0
             39 JR    PREC    0.66

             40 KK     105
             41 KM    RUNOFF FROM SUBBASIN 105
             42 BA   6.898
             43 PB    4.80
             44 PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
             45 PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
             46 PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
             47 PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
             48 PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
             49 PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
             50 PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
             51 PC    .997    .999   1.00
             52 LS       0      86
```

1 HEC-1 INPUT PAGE 2

```
          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             53 UD    .773
```

```
                54          KK    104R
                55          KM    ROUTE SUBBASIN 105 THRU 104 (MTN)
                56          RM       1   0.157    0.15

                57          KK       V
                58          RM       2   0.295    0.15

                59          KK       V
                60          RM       1   0.139    0.15

                61          KK     104
                62          KM    RUNOFF FROM SUBBASIN 104
                63          BA   6.625
                64          PB    4.80
                65          LS       0      85
                66          UD    .628

                67          KK     103
                68          KM    RUNOFF FROM SUBBASIN 103
                69          BA   6.915
                70          PB    4.22
                71          LS       0      84
                72          UD    .324

                73          KK       .
                74          KM    COMBINE RUNOFF FROM SUBBASINS 103,104,105
                75          HC       3

                76          KK    102R
                77          KM    ROUTE SUBBASINS 103,104,105 THRU 102 (MTN)
                78          RM       1   0.144    0.15

                79          KK       V
                80          RM       1   0.209    0.15

                81          KK     102
                82          KM    RUNOFF FROM SUBBASIN 102
                83          BA   8.455
                84          PB    3.89
                85          LS       0      83
                86          UD    .369

                87          KK       .
                88          KM    COMBINE RUNOFF FROM SUBBASINS 102,103 104,105
                89          HC       2

                90          KK    101R
                91          KM    ROUTE SUBBASINS 102,103,104,105 THRU 101 (FAN)
                92          RM       2   0.401    0.15
1                                                HEC-1 INPUT                                                PAGE  3

              LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


                93          KK     101
                94          KM    RUNOFF FROM SUBBASIN 101
                95          BA   9.082
                96          PB    3.48
                97          LS       0      77
                98          UD   1.505

                99          KK       .
               100          KM    COMBINE RUNOFF FROM SUBBASINS 101,102,103,104,105
               101          HC       2

               102          KK     111
               103          KM    RUNOFF FROM SUBBASIN 111
               104          BA   4.080
               105          PB    4.16
               106          LS       0      84
               107          UD    .239

               108          KK    116R
               109          KM    ROUTE SUBBASIN 111 THRU 116 (FAN)
               110          RM       1   0.191    0.15

               111          KK       V
               112          RM       2   0.400    0.15

               113          KK     116
               114          KM    RUNOFF FROM SUBBASIN 116
               115          BA   5.189
               116          PB    3.23
               117          LS       0      78
               118          UD   1.418

               119          KK       .
               120          KM    COMBINE SUBBASINS 111 & 116
               121          HC       2

               122          KK     110
               123          KM    RUNOFF FROM SUBBASIN 110
               124          BA   2.945
               125          PB    3.89
               126          LS       0      86
               127          UD    .237

               128          KK    109R
               129          KM    ROUTE SUBBASIN 110 THRU 109 (FAN)
```

```
          130          RM       1   0.183    0.15

          131          KK       V
          132          RM       2   0.386    0.15
1                                        HEC-1 INPUT                                                    PAGE  4

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          133          KK     109
          134          KM    RUNOFF FROM SUBBASIN 109
          135          BA   4.183
          136          PB    3.48
          137          LS       0      78
          138          UD   1.281

          139          KK       .
          140          KM    COMBINE RUNOFF FROM SUBBASINS 109,110,111,116
          141          HC       3

          142          KK    109R
          143          KM    ROUTE SUBBASINS 109,110 111 & 116 THRU 109 (FAN)
          144          RM       3   0.649    0.15

          145          KK    101R
          146          KM    ROUTE SUBBASINS 109,110,111 & 106 THRU 101 (FAN)
          147          RM       3   0.821    0.15

          148          KK       .
          149          KM    COMBINE SUBBASINS 101,102,103,104,105,109,110,111,116
          150          HC       2

          151          KK       .
          152          KM    DIVERT FLOW FLOW AWAY FROM THE NORTH LAS VEGAS DETENTION BASIN
          153          DT DIVDIKE
          154          DI       0    2000    6000    8000    8200    8910   10225   11935   13565   15635
          155          DI   17775   20135   23000
          156          DQ       0       0       0       0       0     410    1225    2435    3565    5135
          157          DQ    6775    8635   11000

          158          KK   NLVIN
          159          KO       1
          160          KM    ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN
          161          RK    2000   .0076    .016       0    TRAP      35       2

          162          KK  NLVDET
          163          KO       1
          164          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
          165          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
          166          RS       1    STOR      -1
          167          SV       0      25     100     190     430     665    1095    1285    1435    1540
          168          SV    1650    1825    1920    2000    2110    2200    2310    2430
          169          SE       0       2       4       6      10      14      21      24      26      27
          170          SE      28      30      31      32      33      34      35      36
          171          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
          172          SQ    3050    4630    5710    7090    8610   10140   11670   13200

          173          KK       .
          174          KM    RECALL FLOW DIVERTED FROM THE NLV DETENTION BASIN AT THE DIVERSION DIKE
          175          DR DIVDIKE
1                                        HEC-1 INPUT                                                    PAGE  5

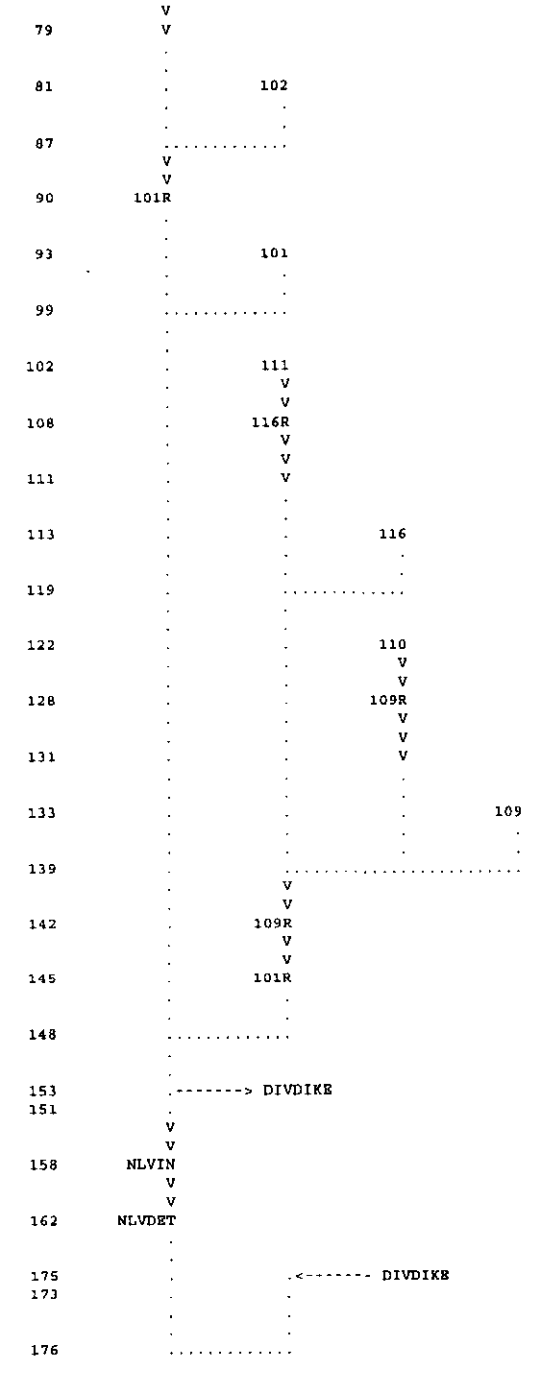
        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


          176          KK       .
          177          KM    COMBINE FLOW ROUTED THRU THE NLV DETENTION BASIN AND THE DIVERTED FLOW
          178          HC       2
          179          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

    40          105
                  V
                  V
    54          104R
                  V
                  V
    57            V
                  V
                  V
    59            V
                  .
                  .
    61            .          104
                  .            .
                  .            .
    67            .            .          103
                  .            .            .
                  .            .            .
    73            ..............................
                  V
                  V
    76          102R
                  V
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *           FEBRUARY  1991              *
 *            VERSION 4.0.1 (LOCAL)      *
 *                                       *
 *  RUN DATE  05/14/96  TIME  10:34:16   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*            (916) 551-1748             *
*                                       *
*****************************************
```

FEMA FLOOD INSURANCE STUDY, 1996
UPPER LAS VEGAS WASH, CLARK COUNTY, NEVADA
INTERBASIN 500-year STORM

Current (05/96) model based on a HEC-1 model prepared by Black&Veatch in 8/93 for the design of outlet modifications at the North Las Vegas Detention Basin (NLVDB). This storm centering generates the highest 100-year inflows to the NLVDB.

Modifications to the original B&V model were to adjust the outlet

rating for the NLVDB to reflect the four-foot high barrier wall in front of the 3-pipe outlet. Additional models were created to represent 10, 50, and 500-year storms.

Remaining comments are from the original model dated 8/93.

This storm also known as "Gayles Storm" simulates a 54 square mile storm centered downstream of the Upper Las Vegas Wash Detention Basin but upstream of the North Las Vegas Detention Basin. This model is based original model developed by Black & Veatch during the predesign study for Upper Las Vegas Wash Detention Basin.

Storm Area: 54.37 sq. miles
DARF: 0.66 (CCRFCD Drainage Manual)

10-yr Precipitation Adjustment Ratio: 1.24 (CCRFCD Drainage Manual)
50-yr Precipitation Adjustment Ratio: 1.39 (CCRFCD Drainage Manual)
100-yr Precipitation Adjustment Ratio: 1.43 (CCRFCD Drainage Manual)

JR Card includes DARF for model
PB Cards are adjusted rainfall depth, NOAA Atas II amounts times adjustment ratios given above.
PB Cards for 500-year storm based on frequency extrapolation of 10, 50, and 100-year data after precipitation ratio adjustments.

```
 37 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0554  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.10 HOURS
                      TOTAL TIME BASE   29.90 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   0.66


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
158 KK      *     NLVIN  *
            *            *
            **************

159 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                           ROUTE FLOW THRU INLET CHANNEL OF NORTH LAS VEGAS DETENTION BASIN

               HYDROGRAPH ROUTING DATA

161 RK          KINEMATIC WAVE STREAM ROUTING
                         L       2000.  CHANNEL LENGTH
                         S     0.0076  SLOPE
                         N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA       0.00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      35.00  BOTTOM WIDTH OR DIAMETER
                         Z       2.00  SIDE SLOPE
                    NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS

                                                ***
                                    COMPUTED KINEMATIC PARAMETERS
                                         VARIABLE TIME STEP
                                      (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO PEAK    VOLUME    MAXIMUM CELERITY
                                                   (MIN)     (FT)     (CFS)       (MIN)        (IN)        (FPS)

                   MAIN        1.01     1.55      0.43    666.67   9849.15      330.32        1.03       41.29
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2985E+04 EXCESS=0.0000E+00 OUTFLOW=0.2985E+04 BASIN STORAGE=0.3746E-04 PERCENT ERROR= 0.0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.01	1.55	6.00	9848.60	330.00	1.03

HYDROGRAPH AT STATION NLVIN
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0730	76	3673.	1		1500	151	0.	1		2230	226	0.
1		0006	2	0.	1		0736	77	3299.	1		1506	152	0.	1		2236	227	0.
1		0012	3	0.	1		0742	78	2953.	1		1512	153	0.	1		2242	228	0.
1		0018	4	0.	1		0748	79	2636.	1		1518	154	0.	1		2248	229	0.
1		0024	5	0.	1		0754	80	2347.	1		1524	155	0.	1		2254	230	0.
1		0030	6	0.	1		0800	81	2084.	1		1530	156	0.	1		2300	231	0.
1		0036	7	0.	1		0806	82	1846.	1		1536	157	0.	1		2306	232	0.
1		0042	8	0.	1		0812	83	1631.	1		1542	158	0.	1		2312	233	0.
1		0048	9	0.	1		0818	84	1438.	1		1548	159	0.	1		2318	234	0.
1		0054	10	0.	1		0824	85	1266.	1		1554	160	0.	1		2324	235	0.
1		0100	11	0.	1		0830	86	1113.	1		1600	161	0.	1		2330	236	0.
1		0106	12	4.	1		0836	87	978.	1		1606	162	0.	1		2336	237	0.
1		0112	13	16.	1		0842	88	858.	1		1612	163	0.	1		2342	238	0.
1		0118	14	35.	1		0848	89	754.	1		1618	164	0.	1		2348	239	0.
1		0124	15	60.	1		0854	90	661.	1		1624	165	0.	1		2354	240	0.
1		0130	16	90.	1		0900	91	581.	1		1630	166	0.	2		0000	241	0.
1		0136	17	126.	1		0906	92	510.	1		1636	167	0.	2		0006	242	0.
1		0142	18	168.	1		0912	93	448.	1		1642	168	0.	2		0012	243	0.
1		0148	19	221.	1		0918	94	394.	1		1648	169	0.	2		0018	244	0.
1		0154	20	284.	1		0924	95	347.	1		1654	170	0.	2		0024	245	0.
1		0200	21	359.	1		0930	96	306.	1		1700	171	0.	2		0030	246	0.
1		0206	22	447.	1		0936	97	270.	1		1706	172	0.	2		0036	247	0.
1		0212	23	547.	1		0942	98	238.	1		1712	173	0.	2		0042	248	0.
1		0218	24	658.	1		0948	99	210.	1		1718	174	0.	2		0048	249	0.
1		0224	25	777.	1		0954	100	186.	1		1724	175	0.	2		0054	250	0.
1		0230	26	897.	1		1000	101	164.	1		1730	176	0.	2		0100	251	0.
1		0236	27	1011.	1		1006	102	146.	1		1736	177	0.	2		0106	252	0.
1		0242	28	1114.	1		1012	103	129.	1		1742	178	0.	2		0112	253	0.
1		0248	29	1204.	1		1018	104	114.	1		1748	179	0.	2		0118	254	0.
1		0254	30	1285.	1		1024	105	101.	1		1754	180	0.	2		0124	255	0.
1		0300	31	1366.	1		1030	106	90.	1		1800	181	0.	2		0130	256	0.
1		0306	32	1462.	1		1036	107	80.	1		1806	182	0.	2		0136	257	0.
1		0312	33	1594.	1		1042	108	71.	1		1812	183	0.	2		0142	258	0.
1		0318	34	1786.	1		1048	109	63.	1		1818	184	0.	2		0148	259	0.
1		0324	35	2070.	1		1054	110	56.	1		1824	185	0.	2		0154	260	0.
1		0330	36	2482.	1		1100	111	49.	1		1830	186	0.	2		0200	261	0.
1		0336	37	3061.	1		1106	112	44.	1		1836	187	0.	2		0206	262	0.
1		0342	38	3847.	1		1112	113	39.	1		1842	188	0.	2		0212	263	0.
1		0348	39	4839.	1		1118	114	34.	1		1848	189	0.	2		0218	264	0.
1		0354	40	5968.	1		1124	115	30.	1		1854	190	0.	2		0224	265	0.
1		0400	41	7115.	1		1130	116	27.	1		1900	191	0.	2		0230	266	0.
1		0406	42	8135.	1		1136	117	24.	1		1906	192	0.	2		0236	267	0.
1		0412	43	8557.	1		1142	118	21.	1		1912	193	0.	2		0242	268	0.
1		0418	44	8823.	1		1148	119	18.	1		1918	194	0.	2		0248	269	0.
1		0424	45	9007.	1		1154	120	16.	1		1924	195	0.	2		0254	270	0.
1		0430	46	9108.	1		1200	121	14.	1		1930	196	0.	2		0300	271	0.
1		0436	47	9169.	1		1206	122	12.	1		1936	197	0.	2		0306	272	0.
1		0442	48	9211.	1		1212	123	11.	1		1942	198	0.	2		0312	273	0.
1		0448	49	9255.	1		1218	124	9.	1		1948	199	0.	2		0318	274	0.
1		0454	50	9315.	1		1224	125	8.	1		1954	200	0.	2		0324	275	0.
1		0500	51	9402.	1		1230	126	7.	1		2000	201	0.	2		0330	276	0.
1		0506	52	9515.	1		1236	127	6.	1		2006	202	0.	2		0336	277	0.
1		0512	53	9641.	1		1242	128	5.	1		2012	203	0.	2		0342	278	0.
1		0518	54	9753.	1		1248	129	4.	1		2018	204	0.	2		0348	279	0.
1		0524	55	9827.	1		1254	130	4.	1		2024	205	0.	2		0354	280	0.
1		0530	56	9849.	1		1300	131	3.	1		2030	206	0.	2		0400	281	0.
1		0536	57	9813.	1		1306	132	3.	1		2036	207	0.	2		0406	282	0.
1		0542	58	9725.	1		1312	133	2.	1		2042	208	0.	2		0412	283	0.
1		0548	59	9598.	1		1318	134	2.	1		2048	209	0.	2		0418	284	0.
1		0554	60	9447.	1		1324	135	2.	1		2054	210	0.	2		0424	285	0.
1		0600	61	9286.	1		1330	136	1.	1		2100	211	0.	2		0430	286	0.
1		0606	62	9121.	1		1336	137	1.	1		2106	212	0.	2		0436	287	0.
1		0612	63	8942.	1		1342	138	1.	1		2112	213	0.	2		0442	288	0.
1		0618	64	8738.	1		1348	139	1.	1		2118	214	0.	2		0448	289	0.
1		0624	65	8538.	1		1354	140	1.	1		2124	215	0.	2		0454	290	0.
1		0630	66	8324.	1		1400	141	1.	1		2130	216	0.	2		0500	291	0.
1		0636	67	7970.	1		1406	142	0.	1		2136	217	0.	2		0506	292	0.
1		0642	68	7475.	1		1412	143	0.	1		2142	218	0.	2		0512	293	0.
1		0648	69	6964.	1		1418	144	0.	1		2148	219	0.	2		0518	294	0.
1		0654	70	6453.	1		1424	145	0.	1		2154	220	0.	2		0524	295	0.
1		0700	71	5945.	1		1430	146	0.	1		2200	221	0.	2		0530	296	0.
1		0706	72	5447.	1		1436	147	0.	1		2206	222	0.	2		0536	297	0.
1		0712	73	4967.	1		1442	148	0.	1		2212	223	0.	2		0542	298	0.
1		0718	74	4509.	1		1448	149	0.	1		2218	224	0.	2		0548	299	0.
1		0724	75	4077.	1		1454	150	0.	1		2224	225	0.	2		0554	300	0.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	29.90-HR

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+    9849.      5.50                5806.       1505.       1208.       1208.
                          (INCHES)   0.993       1.030       1.030       1.030
                          (AC-FT)    2879.       2985.       2985.       2985.

                          CUMULATIVE AREA =   54.37 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


                ***************
                *               *
162 KK          *     NLVDET    *
                *               *
                ***************

163 KO              OUTPUT CONTROL VARIABLES
                          IPRNT          1  PRINT CONTROL
                          IPLOT          0  PLOT CONTROL
                          QSCAL          0.  HYDROGRAPH PLOT SCALE
                              ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
                              OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED

                    HYDROGRAPH ROUTING DATA

166 RS              STORAGE ROUTING
                          NSTPS          1  NUMBER OF SUBREACHES
                           ITYP       STOR  TYPE OF INITIAL CONDITION
                          RSVRIC      -1.00  INITIAL CONDITION
                              X        0.00 WORKING R AND D COEFFICIENT

167 SV                STORAGE        0.0        25.0       100.0      190.0      430.0      665.0     1095.0     1285.0     1435.0     1540.0
                                  1650.0      1825.0      1920.0     2000.0     2110.0     2200.0     2310.0     2430.0

169 SE                ELEVATION      0.00        2.00        4.00       6.00      10.00      14.00      21.00      24.00      26.00      27.00
                                    28.00       30.00       31.00      32.00      33.00      34.00      35.00      36.00

171 SQ                DISCHARGE        0.         77.        117.       597.      1310.      1660.      2110.      2260.      2360.      2690.
                                  3050.       4630.       5710.      7090.      8610.     10140.     11670.     13200.

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HYDROGRAPH AT STATION NLVDET
PLAN 1, RATIO = 0.66

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	*	1		1000	101	2342.	1408.0	25.6	*	1		2000	201	513.	174.3	5.7
1		0006	2	0.	0.0	0.0	*	1		1006	102	2330.	1389.9	25.4	*	1		2006	202	491.	170.2	5.6
1		0012	3	0.	0.0	0.0	*	1		1012	103	2318.	1371.9	25.2	*	1		2012	203	470.	166.2	5.5
1		0018	4	0.	0.0	0.0	*	1		1018	104	2306.	1353.8	24.9	*	1		2018	204	450.	162.4	5.4
1		0024	5	0.	0.0	0.0	*	1		1024	105	2294.	1335.7	24.7	*	1		2024	205	430.	158.7	5.3
1		0030	6	0.	0.0	0.0	*	1		1030	106	2282.	1317.5	24.4	*	1		2030	206	412.	155.3	5.2
1		0036	7	0.	0.0	0.0	*	1		1036	107	2270.	1299.4	24.2	*	1		2036	207	394.	151.9	5.2
1		0042	8	0.	0.0	0.0	*	1		1042	108	2257.	1281.4	23.9	*	1		2042	208	377.	148.7	5.1
1		0048	9	0.	0.0	0.0	*	1		1048	109	2243.	1263.3	23.7	*	1		2048	209	361.	145.7	5.0
1		0054	10	0.	0.0	0.0	*	1		1054	110	2229.	1245.3	23.4	*	1		2054	210	345.	142.8	5.0
1		0100	11	0.	0.0	0.0	*	1		1100	111	2215.	1227.4	23.1	*	1		2100	211	330.	140.0	4.9
1		0106	12	0.	0.0	0.0	*	1		1106	112	2200.	1209.5	22.8	*	1		2106	212	316.	137.3	4.8
1		0112	13	0.	0.1	0.0	*	1		1112	113	2186.	1191.7	22.5	*	1		2112	213	302.	134.8	4.8
1		0118	14	1.	0.3	0.0	*	1		1118	114	2172.	1174.0	22.2	*	1		2118	214	289.	132.3	4.7
1		0124	15	2.	0.7	0.1	*	1		1124	115	2158.	1156.4	22.0	*	1		2124	215	277.	130.0	4.7
1		0130	16	4.	1.3	0.1	*	1		1130	116	2145.	1138.9	21.7	*	1		2130	216	265.	127.7	4.6
1		0136	17	7.	2.1	0.2	*	1		1136	117	2131.	1121.4	21.4	*	1		2136	217	254.	125.6	4.6
1		0142	18	10.	3.3	0.3	*	1		1142	118	2117.	1104.0	21.1	*	1		2142	218	243.	123.5	4.5
1		0148	19	15.	4.8	0.4	*	1		1148	119	2101.	1086.8	20.9	*	1		2148	219	232.	121.6	4.5
1		0154	20	21.	6.7	0.5	*	1		1154	120	2083.	1069.6	20.6	*	1		2154	220	222.	119.7	4.4
1		0200	21	28.	9.2	0.7	*	1		1200	121	2066.	1052.6	20.3	*	1		2200	221	213.	117.9	4.4
1		0206	22	38.	12.2	1.0	*	1		1206	122	2048.	1035.7	20.0	*	1		2206	222	203.	116.2	4.4
1		0212	23	49.	16.0	1.3	*	1		1212	123	2030.	1019.0	19.8	*	1		2212	223	195.	114.6	4.3
1		0218	24	63.	20.5	1.6	*	1		1218	124	2013.	1002.3	19.5	*	1		2218	224	186.	113.0	4.3
1		0224	25	77.	25.8	2.0	*	1		1224	125	1996.	985.8	19.2	*	1		2224	225	178.	111.5	4.3
1		0230	26	81.	32.1	2.2	*	1		1230	126	1979.	969.5	19.0	*	1		2230	226	170.	110.0	4.2
1		0236	27	85.	39.3	2.4	*	1		1236	127	1962.	953.2	18.7	*	1		2236	227	163.	108.7	4.2
1		0242	28	89.	47.4	2.6	*	1		1242	128	1945.	937.1	18.4	*	1		2242	228	156.	107.3	4.2
1		0248	29	94.	56.2	2.8	*	1		1248	129	1928.	921.2	18.2	*	1		2248	229	149.	106.1	4.1
1		0254	30	99.	65.7	3.1	*	1		1254	130	1912.	905.3	17.9	*	1		2254	230	143.	104.9	4.1
1		0300	31	104.	75.8	3.4	*	1		1300	131	1895.	889.6	17.7	*	1		2300	231	137.	103.7	4.1
1		0306	32	110.	86.6	3.6	*	1		1306	132	1879.	874.1	17.4	*	1		2306	232	131.	102.6	4.1
1		0312	33	116.	98.3	4.0	*	1		1312	133	1863.	858.6	17.2	*	1		2312	233	125.	101.5	4.0
1		0318	34	176.	111.0	4.2	*	1		1318	134	1847.	843.3	16.9	*	1		2318	234	120.	100.5	4.0
1		0324	35	251.	125.2	4.6	*	1		1324	135	1831.	828.1	16.7	*	1		2324	235	117.	99.6	4.0
1		0330	36	339.	141.6	4.9	*	1		1330	136	1815.	813.1	16.4	*	1		2330	236	116.	98.6	4.0
1		0336	37	444.	161.3	5.4	*	1		1336	137	1799.	798.2	16.2	*	1		2336	237	116.	97.6	3.9
1		0342	38	574.	185.6	5.9	*	1		1342	138	1784.	783.4	15.9	*	1		2342	238	115.	96.7	3.9
1		0348	39	675.	216.3	6.4	*	1		1348	139	1769.	768.7	15.7	*	1		2348	239	115.	95.7	3.9
1		0354	40	790.	254.9	7.1	*	1		1354	140	1753.	754.1	15.5	*	1		2354	240	114.	94.8	3.9
1		0400	41	929.	301.9	7.9	*	1		1400	141	1738.	739.7	15.2	*	2		0000	241	114.	93.8	3.8
1		0406	42	1092.	356.6	8.8	*	1		1406	142	1723.	725.4	15.0	*	2		0006	242	113.	92.9	3.8
1		0412	43	1268.	415.8	9.8	*	1		1412	143	1708.	711.3	14.8	*	2		0012	243	113.	92.0	3.8
1		0418	44	1379.	476.7	10.8	*	1		1418	144	1694.	697.2	14.5	*	2		0018	244	112.	91.0	3.8
1		0424	45	1472.	538.6	11.8	*	1		1424	145	1679.	683.3	14.3	*	2		0024	245	112.	90.1	3.7
1		0430	46	1564.	600.9	12.9	*	1		1430	146	1665.	669.4	14.1	*	2		0030	246	111.	89.2	3.7

1	0436	47	1657.	663.1	14.0	*	1	1436	147	1646.	655.8	13.8	*	2	0036	247	111.	88.3	3.7
1	0442	48	1723.	725.1	15.0	*	1	1442	148	1626.	642.2	13.6	*	2	0042	248	110.	87.4	3.7
1	0448	49	1788.	786.9	16.0	*	1	1448	149	1606.	628.9	13.4	*	2	0048	249	110.	86.5	3.6
1	0454	50	1852.	848.5	17.0	*	1	1454	150	1587.	615.7	13.2	*	2	0054	250	109.	85.5	3.6
1	0500	51	1917.	910.3	18.0	*	1	1500	151	1567.	602.7	12.9	*	2	0100	251	109.	84.6	3.6
1	0506	52	1982.	972.4	19.0	*	1	1506	152	1548.	589.8	12.7	*	2	0106	252	108.	83.7	3.6
1	0512	53	2047.	1034.9	20.0	*	1	1512	153	1529.	577.1	12.5	*	2	0112	253	108.	82.9	3.5
1	0518	54	2112.	1097.8	21.0	*	1	1518	154	1510.	564.5	12.3	*	2	0118	254	107.	82.0	3.5
1	0524	55	2162.	1161.1	22.0	*	1	1524	155	1492.	552.1	12.1	*	2	0124	255	107.	81.1	3.5
1	0530	56	2212.	1224.3	23.0	*	1	1530	156	1474.	539.9	11.9	*	2	0130	256	106.	80.2	3.5
1	0536	57	2261.	1287.1	24.0	*	1	1536	157	1456.	527.8	11.7	*	2	0136	257	106.	79.3	3.4
1	0542	58	2303.	1349.0	24.9	*	1	1542	158	1438.	515.8	11.5	*	2	0142	258	106.	78.4	3.4
1	0548	59	2343.	1409.6	25.7	*	1	1548	159	1420.	504.0	11.3	*	2	0148	259	105.	77.6	3.4
1	0554	60	2465.	1468.4	26.3	*	1	1554	160	1403.	492.3	11.1	*	2	0154	260	105.	76.7	3.4
1	0600	61	2642.	1524.7	26.9	*	1	1600	161	1386.	480.8	10.9	*	2	0200	261	104.	75.8	3.4
1	0606	62	2815.	1578.3	27.3	*	1	1606	162	1369.	469.4	10.7	*	2	0206	262	104.	75.0	3.3
1	0612	63	2981.	1629.0	27.8	*	1	1612	163	1352.	458.2	10.5	*	2	0212	263	103.	74.1	3.3
1	0618	64	3286.	1676.1	28.3	*	1	1618	164	1335.	447.1	10.3	*	2	0218	264	103.	73.3	3.3
1	0624	65	3671.	1718.8	28.8	*	1	1624	165	1319.	436.1	10.1	*	2	0224	265	102.	72.4	3.3
1	0630	66	4013.	1756.7	29.2	*	1	1630	166	1296.	425.3	9.9	*	2	0230	266	102.	71.6	3.2
1	0636	67	4311.	1789.6	29.6	*	1	1636	167	1265.	414.7	9.7	*	2	0236	267	101.	70.8	3.2
1	0642	68	4556.	1816.8	29.9	*	1	1642	168	1234.	404.4	9.6	*	2	0242	268	101.	69.9	3.2
1	0648	69	4777.	1837.9	30.1	*	1	1648	169	1204.	394.3	9.4	*	2	0248	269	101.	69.1	3.2
1	0654	70	4950.	1853.1	30.3	*	1	1654	170	1175.	384.5	9.2	*	2	0254	270	100.	68.3	3.2
1	0700	71	5062.	1863.0	30.4	*	1	1700	171	1146.	374.9	9.1	*	2	0300	271	100.	67.4	3.1
1	0706	72	5119.	1868.0	30.5	*	1	1706	172	1119.	365.5	8.9	*	2	0306	272	99.	66.6	3.1
1	0712	73	5127.	1868.7	30.5	*	1	1712	173	1091.	356.4	8.8	*	2	0312	273	99.	65.8	3.1
1	0718	74	5092.	1865.6	30.4	*	1	1718	174	1065.	347.5	8.6	*	2	0318	274	98.	65.0	3.1
1	0724	75	5020.	1859.3	30.4	*	1	1724	175	1039.	338.8	8.5	*	2	0324	275	98.	64.2	3.0
1	0730	76	4918.	1850.3	30.3	*	1	1730	176	1014.	330.3	8.3	*	2	0330	276	97.	63.4	3.0
1	0736	77	4789.	1839.0	30.1	*	1	1736	177	989.	322.0	8.2	*	2	0336	277	97.	62.6	3.0
1	0742	78	4640.	1825.9	30.0	*	1	1742	178	965.	314.0	8.1	*	2	0342	278	97.	61.8	3.0
1	0748	79	4505.	1811.2	29.8	*	1	1748	179	942.	306.1	7.9	*	2	0348	279	96.	61.0	3.0
1	0754	80	4360.	1795.1	29.7	*	1	1754	180	919.	298.4	7.8	*	2	0354	280	96.	60.2	2.9
1	0800	81	4206.	1778.0	29.5	*	1	1800	181	897.	290.9	7.7	*	2	0400	281	95.	59.4	2.9
1	0806	82	4045.	1760.2	29.3	*	1	1806	182	875.	283.6	7.6	*	2	0406	282	95.	58.6	2.9
1	0812	83	3879.	1741.8	29.0	*	1	1812	183	854.	276.4	7.4	*	2	0412	283	94.	57.8	2.9
1	0818	84	3710.	1723.1	28.8	*	1	1818	184	833.	269.5	7.3	*	2	0418	284	94.	57.0	2.9
1	0824	85	3541.	1704.3	28.6	*	1	1824	185	813.	262.7	7.2	*	2	0424	285	94.	56.3	2.8
1	0830	86	3371.	1685.6	28.4	*	1	1830	186	793.	256.0	7.1	*	2	0430	286	93.	55.5	2.8
1	0836	87	3204.	1667.1	28.2	*	1	1836	187	774.	249.5	7.0	*	2	0436	287	93.	54.7	2.8
1	0842	88	3046.	1648.8	28.0	*	1	1842	188	755.	243.2	6.9	*	2	0442	288	92.	53.9	2.8
1	0848	89	2986.	1630.6	27.8	*	1	1848	189	737.	237.1	6.8	*	2	0448	289	92.	53.2	2.8
1	0854	90	2926.	1612.0	27.7	*	1	1854	190	719.	231.0	6.7	*	2	0454	290	92.	52.4	2.7
1	0900	91	2864.	1593.2	27.5	*	1	1900	191	702.	225.2	6.6	*	2	0500	291	91.	51.7	2.7
1	0906	92	2802.	1574.3	27.3	*	1	1906	192	684.	219.5	6.5	*	2	0506	292	91.	50.9	2.7
1	0912	93	2740.	1555.3	27.1	*	1	1912	193	668.	213.9	6.4	*	2	0512	293	90.	50.2	2.7
1	0918	94	2679.	1536.4	27.0	*	1	1918	194	652.	208.4	6.3	*	2	0518	294	90.	49.4	2.7
1	0924	95	2620.	1517.6	26.8	*	1	1924	195	636.	203.1	6.2	*	2	0524	295	90.	48.7	2.6
1	0930	96	2561.	1498.9	26.6	*	1	1930	196	620.	197.9	6.1	*	2	0530	296	89.	47.9	2.6
1	0936	97	2503.	1480.3	26.4	*	1	1936	197	605.	192.8	6.0	*	2	0536	297	89.	47.2	2.6
1	0942	98	2445.	1462.0	26.3	*	1	1942	198	586.	187.9	6.0	*	2	0542	298	88.	46.5	2.6
1	0948	99	2388.	1443.9	26.1	*	1	1948	199	561.	183.2	5.8	*	2	0548	299	88.	45.7	2.6
1	0954	100	2354.	1425.9	25.9	*	1	1954	200	536.	178.6	5.7	*	2	0554	300	88.	45.0	2.5
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 5127.	7.20		3215.	1468.	1190.	1190.
		(INCHES)	0.550	1.004	1.014	1.014
		(AC-FT)	1594.	2911.	2940.	2940.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
1869.	7.20	1561.	672.	546.	546.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
30.46	7.20	27.07	13.44	11.14	11.14

CUMULATIVE AREA = 54.37 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					0.66
HYDROGRAPH AT					
+	105	6.90	1	FLOW	3508.
				TIME	4.20
ROUTED TO					
+	104R	6.90	1	FLOW	3413.
				TIME	4.30
ROUTED TO					
+	V	6.90	1	FLOW	3266.
				TIME	4.60

ROUTED TO					
+	V	6.90	1	FLOW	3213.
				TIME	4.80
HYDROGRAPH AT					
+	104	6.63	1	FLOW	3623.
				TIME	4.00
HYDROGRAPH AT					
+	103	6.91	1	FLOW	4086.
				TIME	3.70
3 COMBINED AT					
+	.	20.44	1	FLOW	7907.
				TIME	3.90
ROUTED TO					
+	102R	20.44	1	FLOW	7711.
				TIME	4.00
ROUTED TO					
+	V	20.44	1	FLOW	7433.
				TIME	4.30
HYDROGRAPH AT					
+	102	8.45	1	FLOW	3847.
				TIME	3.70
2 COMBINED AT					
+	.	28.89	1	FLOW	9725.
				TIME	4.10
ROUTED TO					
+	101R	28.89	1	FLOW	9170.
				TIME	5.40
HYDROGRAPH AT					
+	101	9.08	1	FLOW	1213.
				TIME	5.60
2 COMBINED AT					
+	.	37.97	1	FLOW	10369.
				TIME	5.40
HYDROGRAPH AT					
+	111	4.08	1	FLOW	2662.
				TIME	3.60
ROUTED TO					
+	116R	4.08	1	FLOW	2285.
				TIME	3.80
ROUTED TO					
+	V	4.08	1	FLOW	1868.
				TIME	4.20
HYDROGRAPH AT					
+	116	5.19	1	FLOW	644.
				TIME	5.50
2 COMBINED AT					
+	.	9.27	1	FLOW	2201.
				TIME	4.20
HYDROGRAPH AT					
+	110	2.94	1	FLOW	1904.
				TIME	3.60
ROUTED TO					
+	109R	2.94	1	FLOW	1639.
				TIME	3.80
ROUTED TO					
+	V	2.94	1	FLOW	1346.
				TIME	4.10
HYDROGRAPH AT					
+	109	4.18	1	FLOW	622.
				TIME	5.30
3 COMBINED AT					
+	.	16.40	1	FLOW	3947.
				TIME	4.20
ROUTED TO					
+	109R	16.40	1	FLOW	3402.
				TIME	4.90
ROUTED TO					
+	101R	16.40	1	FLOW	3084.
				TIME	6.10
2 COMBINED AT					
+	.	54.37	1	FLOW	13077.
				TIME	5.50
DIVERSION TO					
+	DIVDIKE	54.37	1	FLOW	3226.
				TIME	5.50

```
 HYDROGRAPH AT
+                    .     54.37     1   FLOW         9850.
                                         TIME         5.50

 ROUTED TO
+                 NLVIN    54.37     1   FLOW         9849.
                                         TIME         5.50

 ROUTED TO
+                NLVDET    54.37     1   FLOW         5127.
                                         TIME         7.20

                                       ** PEAK STAGES IN FEET **
                                       1   STAGE        30.46
                                           TIME         7.20

 HYDROGRAPH AT
+                    .      0.00     1   FLOW         3226.
                                         TIME         5.50

  2 COMBINED AT
+                    .     54.37     1   FLOW         5438.
                                         TIME         5.50

1
                                       SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                           (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                               COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                             PEAK

                                (MIN)       (CFS)      (MIN)       (IN)      (MIN)       (CFS)      (MIN)        (IN)

       FOR PLAN = 1  RATIO= 0.66
          NLVIN  MANE          0.43    9849.15     330.32       1.03       6.00     9848.60     330.00        1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2985E+04 EXCESS=0.0000E+00 OUTFLOW=0.2985E+04 BASIN STORAGE=0.3746E-04 PERCENT ERROR=   0.0


 *** NORMAL END OF HEC-1 ***
```

Paper Copy D
Range Wash Storm

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*           VERSION 4.0.1E              *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  04/04/98  TIME  16:25:14   *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              * DIAGRAM
    1         ID        EAST AND WEST RANGE WASHES
    2         ID         500-YR,6-HR STORM
    3         ID        FUTURE CONDITIONS WITH ALTERNATIVE IV FACILITIES
    4         ID         BOYLE ENGINEERING CORPORATION
    5         ID        STORM A (DARF=0.68)
    6         ID        MODIFIED A4IN TO MATCH JMM'S FILE
    7         ID        NEW FUTURE DEVELOPMENT IN 306, 307, 310
    8         ID        DARF  JR CARD
    9         ID             .55    1.00
   10         ID             .64   1.164
   11         ID             .68   1.236
   12         ID             .71   1.291
   13         ID             .77   1.400
   14         ID             .83   1.509
   15         IT      05       0       0     200
   16         IO       5       0       0
   17         JR    PREC     1.0   1.164   1.236   1.291   1.400   1.509
   18         VS   NLVDP
   19         VV    2.13

   20         KK      41SUB-BASIN 41 HYDROGRAPH
   21         KM        SCS RUNOFF COMPUTATION, SUB-41
   22         BA    4.73
   23         PB    2.42
   24         PC     .00    2.00    5.90    8.00   11.00   14.40   15.00   16.00   16.80   17.10
   25         PC   18.00   18.20   18.70   19.00   19.70   20.20   21.00   22.00   23.00   24.00
   26         PC   25.00   25.90   26.50   28.00   29.00   30.00   30.50   30.90   31.00   31.70
   27         PC   32.10   32.70   33.30   34.60   36.10   38.10   40.80   43.00   47.70   51.40
   28         PC   56.10   63.00   71.00   72.00   73.10   75.20   77.90   79.00   79.50   80.40
   29         PC   81.00   82.00   82.60   84.00   85.90   88.90   91.00   93.80   96.60   97.00
   30         PC   97.90   98.10   98.30   98.50   98.90   99.00   99.20   99.30   99.60   99.70
   31         PC   99.90  100.00  100.00
   32         LS       0      79
   33         UD     .66

   34         KK     A-BROUTE FLOW TO NODE B
   35         RM       4     .36     .15

   36         KK     302SUB-BASIN 302 HYDROGRAPH
   37         KM        SCS RUNOFF CALCULATIONS
   38         BA    6.14
   39         PB    2.33
   40         LS       0      79
   41         UD     .82

   42         KK   NODEB         COMBINE FLOW AT NODE B
   43         HC       2

   44         KK     B-CROUTE FLOW TO NODE C
   45         RM       2     .18     .15
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1 HEC-1 INPUT PAGE 2

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   46         KK     303SUB-BASIN 303 HYDROGRAPH
   47         KM        SCS RUNOFF COMPUTATION
   48         BA    4.49
   49         PB    2.19
   50         LS       0      85
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          51          UD     .65

          52          KK     42BSUB-BASIN 42B HYDROGRAPH
          53          KM       SCS RUNOFF COMPUTATION
          54          BA    4.08
          55          PB    2.21
          56          LS       0      79
          57          UD     .65

          58          KK   NODEC         COMBINE FLOW AT NODE C
          59          HC       3

          60          KK     C-DROUTE FLOW TO NODE D
          61          RM       1     .10     .15

          62          KK     42ASUB-BASIN 42A HYDROGRAPH
          63          KM       SCS RUNOFF COMPUTATION
          64          BA    8.23
          65          PB    2.21
          66          LS       0      79
          67          UD     .81

          68          KK   NODED         COMBINE FLOW AT NODE D
          69          HC       2

          70          KK     D-EROUTE FLOW TO NODE E
          71          RM       4     .34     .15

          72          KK     305SUB-BASIN 305 HYDROGRAPH
          73          KM       SCS RUNOFF COMPUTATION
          74          BA    3.99
          75          PB    2.01
          76          LS       0      85
          77          UD     .76

          78          KK   NODEE         COMBINE FLOWS AT NODE E
          79          HC       2

          80          KK    F-F1         ROUTE FLOWS TO NODE F1
          81          RM       5     .46     .10

          82          KK    306ASUB-BASIN 306A HYDROGRAPH
          83          KM       SCS RUNOFF COMPUTATION
          84          BA     4.5
          85          PB    2.01
          86          LS       0      76
          87          UD    1.54
1                                        HEC-1 INPUT                                                    PAGE  3

        LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          88          KK  NODEF1        COMBINE FLOWS AT NODE F1
          89          HC       2

          90          KK      43SUB-BASIN 43 HYDROGRAPH
          91          KM        SCS RUNOFF COMPUTATION
          92          BA    6.40
          93          PB    2.01
          94          LS       0      79
          95          UD     .88

          96          KK    H-I1         ROUTE FLOWS TO NODE I1
          97          RM       7     .72     .10

          98          KK    309ASUB-BASIN 309A HYDROGRAPH
          99          KM       SCS RUNOFF COMPUTATION
         100          BA     5.6
         101          PB    2.01
         102          LS       0      79
         103          UD    1.51

         104          KK      I1         COMBINE FLOWS AT NODE I1
         105          HC       2

         106          KK   I1-F1         ROUTE FLOWS TO NODE F1
         107          RK   19360     .01    .022       0    TRAP     120       3

         108          KK   NLVDP
         109          HC       2

         110          KK   NLVDB
         111          KM   ROUTE NON-DIVERTED UPSTREAM FLOW THRU NLV DETENTION BASIN
         112          KM   OUTLET WORKS MODIFIED 3 PIPES OPEN (2 PIPES BLOCKED), BARRIER WALL INCLUDED
         113          KO       1
         114          RS       1    STOR      -1
         115          SV       0      25     100     190     430     665    1095    1285    1435    1540
         116          SV    1650    1825    1920    2000    2110    2200    2310    2430
         117          SE       0       2       4       6      10      14      21      24      26      27
         118          SE      28      30      31      32      33      34      35      36
                      *  *** lines from 1/91 model removed 5/96
                      * SQ 0 406 1328 1134 1751 2202 2822 3049 3192 3572
                      * SQ 4180 5968 7095 8334 9676 11101 12630 14294
         119          SQ       0      77     117     597    1310    1660    2110    2260    2360    2690
         120          SQ    3050    4630    5710    7090    8610   10140   11670   13200
         121          ZZ
1*****************************************                                  *****************************************
*                                         *                                  *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                                  *     U.S. ARMY CORPS OF ENGINEERS      *
```

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*             MAY   1991             *
*          VERSION 4.0.1E            *
*     Lahey F77L-EM/32 version 5.01  *
*       Dodson & Associates, Inc.    *
*  RUN DATE  04/04/98  TIME  16:25:14  *
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*          609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616       *
*           (916) 551-1748            *
*                                     *
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EAST AND WEST RANGE WASHES
500-YR,6-HR STORM
FUTURE CONDITIONS WITH ALTERNATIVE IV FACILITIES
BOYLE ENGINEERING CORPORATION
STORM A (DARF=0.68)
MODIFIED A4IN TO MATCH JMM'S FILE
NEW FUTURE DEVELOPMENT IN 306, 307, 310

DARF	JR CARD
.55	1.00
.64	1.164
.68	1.236
.71	1.291
.77	1.400
.83	1.509

16 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN		5	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0	STARTING DATE
ITIME		0000	STARTING TIME
NQ		200	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		1635	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 16.58 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

USER-DEFINED OUTPUT SPECIFICATIONS

TABLE 1

VS	STATION	NLVDP									
VV	VARIABLE CODE	2.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION

1.00	1.16	1.24	1.29	1.40	1.51

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*            *
*     NLVDB  *
*            *
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113 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

114 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

115 SV	STORAGE	0.0	25.0	100.0	190.0	430.0	665.0	1095.0	1285.0	1435.0	1540.0
		1650.0	1825.0	1920.0	2000.0	2110.0	2200.0	2310.0	2430.0		
117 SE	ELEVATION	0.00	2.00	4.00	6.00	10.00	14.00	21.00	24.00	26.00	27.00
		28.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00		
119 SQ	DISCHARGE	0.	77.	117.	597.	1310.	1660.	2110.	2260.	2360.	2690.
		3050.	4630.	5710.	7090.	8610.	10140.	11670.	13200.		

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HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	1585.	614.5	13.1	1		1110	135	1684.	687.6	14.4
1		0005	2	0.	0.0	0.0	1		0540	69	1645.	654.9	13.8	1		1115	136	1672.	676.2	14.2
1		0010	3	0.	0.0	0.0	1		0545	70	1691.	694.6	14.5	1		1120	137	1660.	664.9	14.0
1		0015	4	0.	0.0	0.0	1		0550	71	1732.	733.6	15.1	1		1125	138	1643.	653.8	13.8
1		0020	5	0.	0.0	0.0	1		0555	72	1772.	771.9	15.7	1		1130	139	1627.	642.7	13.6
1		0025	6	0.	0.0	0.0	1		0600	73	1811.	809.4	16.4	1		1135	140	1610.	631.7	13.4
1		0030	7	0.	0.0	0.0	1		0605	74	1849.	846.0	16.9	1		1140	141	1594.	620.8	13.2
1		0035	8	0.	0.0	0.0	1		0610	75	1887.	881.4	17.5	1		1145	142	1578.	610.0	13.1
1		0040	9	0.	0.0	0.0	1		0615	76	1922.	915.6	18.1	1		1150	143	1562.	599.3	12.9
1		0045	10	0.	0.0	0.0	1		0620	77	1956.	948.1	18.6	1		1155	144	1546.	588.7	12.7
1		0050	11	0.	0.0	0.0	1		0625	78	1988.	978.8	19.1	1		1200	145	1531.	578.3	12.5
1		0055	12	0.	0.0	0.0	1		0630	79	2018.	1007.3	19.6	1		1205	146	1515.	567.9	12.3
1		0100	13	0.	0.0	0.0	1		0635	80	2046.	1033.5	20.0	1		1210	147	1500.	557.6	12.2
1		0105	14	0.	0.0	0.0	1		0640	81	2071.	1057.3	20.4	1		1215	148	1485.	547.4	12.0
1		0110	15	0.	0.0	0.0	1		0645	82	2093.	1078.5	20.7	1		1220	149	1470.	537.3	11.8
1		0115	16	0.	0.0	0.0	1		0650	83	2112.	1097.0	21.0	1		1225	150	1455.	527.4	11.7
1		0120	17	0.	0.0	0.0	1		0655	84	2124.	1112.9	21.3	1		1230	151	1440.	517.5	11.5
1		0125	18	0.	0.0	0.0	1		0700	85	2135.	1126.2	21.5	1		1235	152	1426.	507.7	11.3
1		0130	19	0.	0.0	0.0	1		0705	86	2143.	1136.9	21.7	1		1240	153	1411.	498.0	11.2
1		0135	20	0.	0.0	0.0	1		0710	87	2150.	1145.3	21.8	1		1245	154	1397.	488.4	11.0
1		0140	21	0.	0.0	0.0	1		0715	88	2154.	1151.3	21.9	1		1250	155	1383.	478.9	10.8
1		0145	22	0.	0.0	0.0	1		0720	89	2158.	1155.3	22.0	1		1255	156	1369.	469.5	10.7
1		0150	23	0.	0.0	0.0	1		0725	90	2159.	1157.2	22.0	1		1300	157	1355.	460.1	10.5
1		0155	24	0.	0.1	0.0	1		0730	91	2159.	1157.4	22.0	1		1305	158	1341.	450.9	10.4
1		0200	25	0.	0.1	0.0	1		0735	92	2158.	1155.9	22.0	1		1310	159	1328.	441.8	10.2
1		0205	26	1.	0.2	0.0	1		0740	93	2156.	1153.0	21.9	1		1315	160	1314.	432.7	10.0
1		0210	27	1.	0.3	0.0	1		0745	94	2152.	1148.7	21.8	1		1320	161	1292.	423.8	9.9
1		0215	28	1.	0.5	0.0	1		0750	95	2148.	1143.3	21.8	1		1325	162	1266.	415.1	9.8
1		0220	29	2.	0.7	0.1	1		0755	96	2143.	1136.8	21.7	1		1330	163	1240.	406.5	9.6
1		0225	30	3.	0.9	0.1	1		0800	97	2137.	1129.4	21.5	1		1335	164	1215.	398.1	9.5
1		0230	31	4.	1.2	0.1	1		0805	98	2131.	1121.2	21.4	1		1340	165	1191.	389.8	9.3
1		0235	32	5.	1.6	0.1	1		0810	99	2124.	1112.3	21.3	1		1345	166	1167.	381.8	9.2
1		0240	33	7.	2.2	0.2	1		0815	100	2116.	1102.8	21.1	1		1350	167	1143.	373.8	9.1
1		0245	34	9.	2.8	0.2	1		0820	101	2108.	1092.7	21.0	1		1355	168	1120.	366.1	8.9
1		0250	35	11.	3.5	0.3	1		0825	102	2097.	1082.3	20.8	1		1400	169	1098.	358.5	8.8
1		0255	36	13.	4.4	0.4	1		0830	103	2085.	1071.4	20.6	1		1405	170	1075.	351.0	8.7
1		0300	37	17.	5.4	0.4	1		0835	104	2074.	1060.2	20.4	1		1410	171	1054.	343.7	8.6
1		0305	38	20.	6.5	0.5	1		0840	105	2062.	1048.8	20.2	1		1415	172	1032.	336.6	8.4
1		0310	39	24.	7.8	0.6	1		0845	106	2049.	1037.1	20.1	1		1420	173	1012.	329.6	8.3
1		0315	40	28.	9.2	0.7	1		0850	107	2037.	1025.3	19.9	1		1425	174	991.	322.7	8.2
1		0320	41	33.	10.9	0.9	1		0855	108	2025.	1013.3	19.7	1		1430	175	971.	316.0	8.1
1		0325	42	39.	12.7	1.0	1		0900	109	2012.	1001.2	19.5	1		1435	176	952.	309.4	8.0
1		0330	43	45.	14.7	1.2	1		0905	110	1999.	989.0	19.3	1		1440	177	932.	302.9	7.9
1		0335	44	52.	17.0	1.4	1		0910	111	1986.	976.7	19.1	1		1445	178	914.	296.6	7.8
1		0340	45	61.	19.8	1.6	1		0915	112	1973.	964.4	18.9	1		1450	179	895.	290.4	7.7
1		0345	46	71.	23.0	1.8	1		0920	113	1960.	952.1	18.7	1		1455	180	877.	284.3	7.6
1		0350	47	78.	27.0	2.1	1		0925	114	1947.	939.7	18.5	1		1500	181	859.	278.3	7.5
1		0355	48	81.	31.9	2.2	1		0930	115	1935.	927.3	18.3	1		1505	182	842.	272.5	7.4
1		0400	49	84.	38.2	2.4	1		0935	116	1922.	914.9	18.1	1		1510	183	825.	266.8	7.3
1		0405	50	88.	46.1	2.6	1		0940	117	1909.	902.6	17.9	1		1515	184	808.	261.2	7.2
1		0410	51	94.	56.1	2.8	1		0945	118	1896.	890.2	17.7	1		1520	185	792.	255.7	7.1
1		0415	52	100.	68.5	3.2	1		0950	119	1883.	877.9	17.5	1		1525	186	776.	250.3	7.0
1		0420	53	108.	83.7	3.6	1		0955	120	1870.	865.6	17.3	1		1530	187	760.	245.0	6.9
1		0425	54	127.	101.9	4.0	1		1000	121	1857.	853.3	17.1	1		1535	188	745.	239.9	6.8
1		0430	55	241.	123.3	4.5	1		1005	122	1844.	841.1	16.9	1		1540	189	730.	234.8	6.7
1		0435	56	371.	147.7	5.1	1		1010	123	1832.	829.0	16.7	1		1545	190	715.	229.8	6.7
1		0440	57	519.	175.4	5.7	1		1015	124	1819.	816.9	16.5	1		1550	191	701.	225.0	6.6
1		0445	58	646.	206.6	6.3	1		1020	125	1806.	804.8	16.3	1		1555	192	687.	220.2	6.5
1		0450	59	750.	241.4	6.9	1		1025	126	1794.	792.8	16.1	1		1600	193	673.	215.5	6.4
1		0455	60	862.	279.2	7.5	1		1030	127	1781.	780.8	15.9	1		1605	194	659.	211.0	6.3
1		0500	61	981.	319.3	8.2	1		1035	128	1769.	769.0	15.7	1		1610	195	646.	206.5	6.3
1		0505	62	1105.	361.0	8.9	1		1040	129	1756.	757.1	15.5	1		1615	196	633.	202.1	6.2
1		0510	63	1231.	403.5	9.6	1		1045	130	1744.	745.4	15.3	1		1620	197	620.	197.8	6.1
1		0515	64	1334.	446.2	10.3	1		1050	131	1732.	733.7	15.1	1		1625	198	608.	193.6	6.1
1		0520	65	1398.	488.9	11.0	1		1055	132	1720.	722.1	14.9	1		1630	199	594.	189.5	6.0
1		0525	66	1461.	531.4	11.7	1		1100	133	1708.	710.5	14.7	1		1635	200	573.	185.4	5.9
1		0530	67	1523.	573.3	12.4	1		1105	134	1696.	699.0	14.6							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	16.58-HR
(CFS)	(HR)					
		(CFS)				
2159.	7.50		1939.	1102.	1102.	1102.
		(INCHES)	0.374	0.588	0.588	0.588
		(AC-FT)	961.	1510.	1510.	1510.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	16.58-HR
(AC-FT)	(HR)				
1157.	7.50	935.	476.	476.	476.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	16.58-HR
(FEET)	(HR)				
21.99	7.50	18.38	10.12	10.12	10.12

CUMULATIVE AREA = 48.16 SQ MI

HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.16

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	1895.	889.7	17.7	1		1110	135	2050.	1037.7	20.1
1		0005	2	0.	0.0	0.0	1		0540	69	1953.	945.3	18.6	1		1115	136	2036.	1023.9	19.8
1		0010	3	0.	0.0	0.0	1		0545	70	2010.	999.7	19.4	1		1120	137	2021.	1010.1	19.6
1		0015	4	0.	0.0	0.0	1		0550	71	2066.	1053.0	20.3	1		1125	138	2007.	996.4	19.4
1		0020	5	0.	0.0	0.0	1		0555	72	2118.	1105.0	21.2	1		1130	139	1993.	982.9	19.2
1		0025	6	0.	0.0	0.0	1		0600	73	2158.	1155.8	22.0	1		1135	140	1979.	969.4	19.0
1		0030	7	0.	0.0	0.0	1		0605	74	2197.	1205.2	22.7	1		1140	141	1964.	956.0	18.7
1		0035	8	0.	0.0	0.0	1		0610	75	2235.	1253.0	23.5	1		1145	142	1951.	942.6	18.5
1		0040	9	0.	0.0	0.0	1		0615	76	2269.	1299.0	24.2	1		1150	143	1937.	929.4	18.3
1		0045	10	0.	0.0	0.0	1		0620	77	2299.	1342.9	24.8	1		1155	144	1923.	916.2	18.1
1		0050	11	0.	0.0	0.0	1		0625	78	2326.	1384.3	25.3	1		1200	145	1909.	903.2	17.9
1		0055	12	0.	0.0	0.0	1		0630	79	2352.	1422.9	25.8	1		1205	146	1896.	890.2	17.7
1		0100	13	0.	0.0	0.0	1		0635	80	2433.	1458.3	26.2	1		1210	147	1882.	877.3	17.5
1		0105	14	0.	0.0	0.0	1		0640	81	2533.	1490.0	26.5	1		1215	148	1869.	864.5	17.2
1		0110	15	0.	0.0	0.0	1		0645	82	2620.	1517.9	26.8	1		1220	149	1855.	851.8	17.0
1		0115	16	0.	0.0	0.0	1		0650	83	2696.	1541.9	27.0	1		1225	150	1842.	839.1	16.8
1		0120	17	0.	0.0	0.0	1		0655	84	2762.	1562.0	27.2	1		1230	151	1829.	826.6	16.6
1		0125	18	0.	0.0	0.0	1		0700	85	2816.	1578.5	27.4	1		1235	152	1816.	814.1	16.4
1		0130	19	0.	0.1	0.0	1		0705	86	2858.	1591.5	27.5	1		1240	153	1803.	801.7	16.2
1		0135	20	0.	0.1	0.0	1		0710	87	2890.	1601.1	27.6	1		1245	154	1790.	789.4	16.0
1		0140	21	1.	0.2	0.0	1		0715	88	2912.	1607.7	27.6	1		1250	155	1777.	777.2	15.8
1		0145	22	1.	0.3	0.0	1		0720	89	2924.	1611.4	27.6	1		1255	156	1765.	765.1	15.6
1		0150	23	1.	0.4	0.0	1		0725	90	2928.	1612.6	27.7	1		1300	157	1752.	753.0	15.4
1		0155	24	2.	0.6	0.0	1		0730	91	2924.	1611.4	27.6	1		1305	158	1740.	741.1	15.2
1		0200	25	2.	0.8	0.1	1		0735	92	2913.	1608.2	27.6	1		1310	159	1727.	729.2	15.0
1		0205	26	3.	1.1	0.1	1		0740	93	2897.	1603.2	27.6	1		1315	160	1715.	717.4	14.9
1		0210	27	4.	1.4	0.1	1		0745	94	2875.	1596.7	27.5	1		1320	161	1703.	705.7	14.7
1		0215	28	6.	1.8	0.1	1		0750	95	2850.	1588.7	27.4	1		1325	162	1690.	694.1	14.5
1		0220	29	7.	2.3	0.2	1		0755	96	2820.	1579.6	27.4	1		1330	163	1678.	682.5	14.3
1		0225	30	9.	3.0	0.2	1		0800	97	2787.	1569.5	27.3	1		1335	164	1666.	671.0	14.1
1		0230	31	11.	3.7	0.3	1		0805	98	2751.	1558.6	27.2	1		1340	165	1652.	659.7	13.9
1		0235	32	14.	4.7	0.4	1		0810	99	2713.	1547.0	27.1	1		1345	166	1635.	648.4	13.7
1		0240	33	18.	5.8	0.5	1		0815	100	2674.	1534.8	27.0	1		1350	167	1619.	637.2	13.5
1		0245	34	22.	7.1	0.6	1		0820	101	2634.	1522.1	26.8	1		1355	168	1602.	626.2	13.3
1		0250	35	27.	8.7	0.7	1		0825	102	2593.	1509.0	26.7	1		1400	169	1586.	615.2	13.2
1		0255	36	32.	10.5	0.8	1		0830	103	2551.	1495.7	26.6	1		1405	170	1570.	604.4	13.0
1		0300	37	39.	12.6	1.0	1		0835	104	2508.	1482.2	26.4	1		1410	171	1554.	593.7	12.8
1		0305	38	46.	15.0	1.2	1		0840	105	2465.	1468.5	26.3	1		1415	172	1538.	583.1	12.6
1		0310	39	54.	17.6	1.4	1		0845	106	2422.	1454.8	26.2	1		1420	173	1522.	572.6	12.4
1		0315	40	63.	20.6	1.6	1		0850	107	2379.	1441.0	26.1	1		1425	174	1507.	562.2	12.2
1		0320	41	73.	23.8	1.9	1		0855	108	2355.	1427.1	25.9	1		1430	175	1491.	551.9	12.1
1		0325	42	78.	27.3	2.1	1		0900	109	2345.	1413.1	25.7	1		1435	176	1476.	541.7	11.9
1		0330	43	80.	31.3	2.2	1		0905	110	2336.	1399.0	25.5	1		1440	177	1461.	531.6	11.7
1		0335	44	83.	35.8	2.3	1		0910	111	2326.	1384.7	25.3	1		1445	178	1446.	521.6	11.6
1		0340	45	85.	40.9	2.4	1		0915	112	2317.	1370.3	25.1	1		1450	179	1432.	511.7	11.4
1		0345	46	89.	46.8	2.6	1		0920	113	2307.	1355.8	24.9	1		1455	180	1417.	501.9	11.2
1		0350	47	92.	53.8	2.8	1		0925	114	2297.	1341.2	24.7	1		1500	181	1403.	492.2	11.1
1		0355	48	97.	62.2	3.0	1		0930	115	2288.	1326.6	24.6	1		1505	182	1388.	482.6	10.9
1		0400	49	102.	72.4	3.3	1		0935	116	2278.	1312.0	24.4	1		1510	183	1374.	473.1	10.7
1		0405	50	109.	85.0	3.6	1		0940	117	2268.	1297.3	24.2	1		1515	184	1360.	463.7	10.6
1		0410	51	119.	100.4	4.0	1		0945	118	2258.	1282.6	24.0	1		1520	185	1346.	454.4	10.4
1		0415	52	218.	119.0	4.4	1		0950	119	2246.	1267.9	23.7	1		1525	186	1333.	445.2	10.3
1		0420	53	337.	141.2	4.9	1		0955	120	2235.	1253.2	23.5	1		1530	187	1319.	436.1	10.1
1		0425	54	477.	167.5	5.5	1		1000	121	2223.	1238.5	23.3	1		1535	188	1301.	427.1	10.0
1		0430	55	621.	198.2	6.1	1		1005	122	2212.	1223.9	23.0	1		1540	189	1275.	418.3	9.8
1		0435	56	728.	234.0	6.7	1		1010	123	2200.	1209.3	22.8	1		1545	190	1249.	409.6	9.7
1		0440	57	849.	274.9	7.4	1		1015	124	2189.	1194.7	22.6	1		1550	191	1224.	401.1	9.5
1		0445	58	985.	320.6	8.2	1		1020	125	2177.	1180.2	22.3	1		1555	192	1199.	392.8	9.4
1		0450	59	1133.	370.5	9.0	1		1025	126	2166.	1165.7	22.1	1		1600	193	1175.	384.6	9.2
1		0455	60	1291.	423.7	9.9	1		1030	127	2154.	1151.2	21.9	1		1605	194	1151.	376.6	9.1
1		0500	61	1384.	479.7	10.8	1		1035	128	2143.	1136.8	21.7	1		1610	195	1128.	368.8	9.0
1		0505	62	1470.	537.8	11.8	1		1040	129	2132.	1122.5	21.4	1		1615	196	1105.	361.1	8.9
1		0510	63	1559.	597.0	12.8	1		1045	130	2120.	1108.2	21.2	1		1620	197	1083.	353.6	8.7
1		0515	64	1648.	656.7	13.9	1		1050	131	2109.	1093.9	21.0	1		1625	198	1061.	346.2	8.6
1		0520	65	1713.	716.1	14.8	1		1055	132	2094.	1079.7	20.8	1		1630	199	1040.	339.0	8.5
1		0525	66	1775.	775.0	15.8	1		1100	133	2079.	1065.6	20.5	1		1635	200	1019.	331.9	8.4
1		0530	67	1836.	832.9	16.7	1		1105	134	2065.	1051.6	20.3							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	16.58-HR
(CFS)	(HR)					
		(CFS)				
2928.	7.42		2391.	1434.	1434.	1434.
		(INCHES)	0.462	0.765	0.765	0.765
		(AC-FT)	1185.	1966.	1966.	1966.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	16.58-HR
(AC-FT)	(HR)				
1613.	7.42	1333.	709.	709.	709.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	16.58-HR
(FEET)	(HR)				
27.66	7.42	24.29	13.80	13.80	13.80

CUMULATIVE AREA = 48.16 SQ MI

HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.24

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	2032.	1020.6	19.8	1		1110	135	2128.	1117.6	21.4
1		0005	2	0.	0.0	0.0	1		0540	69	2098.	1083.1	20.8	1		1115	136	2116.	1103.2	21.1
1		0010	3	0.	0.0	0.0	1		0545	70	2149.	1144.2	21.8	1		1120	137	2104.	1088.9	20.9
1		0015	4	0.	0.0	0.0	1		0550	71	2196.	1204.0	22.7	1		1125	138	2089.	1074.7	20.7
1		0020	5	0.	0.0	0.0	1		0555	72	2242.	1262.4	23.6	1		1130	139	2074.	1060.5	20.4
1		0025	6	0.	0.0	0.0	1		0600	73	2283.	1319.4	24.5	1		1135	140	2059.	1046.5	20.2
1		0030	7	0.	0.0	0.0	1		0605	74	2320.	1374.8	25.2	1		1140	141	2045.	1032.5	20.0
1		0035	8	0.	0.0	0.0	1		0610	75	2356.	1428.5	25.9	1		1145	142	2030.	1018.7	19.8
1		0040	9	0.	0.0	0.0	1		0615	76	2501.	1479.7	26.4	1		1150	143	2016.	1004.9	19.5
1		0045	10	0.	0.0	0.0	1		0620	77	2651.	1527.7	26.9	1		1155	144	2001.	991.2	19.3
1		0050	11	0.	0.0	0.0	1		0625	78	2795.	1572.2	27.3	1		1200	145	1987.	977.6	19.1
1		0055	12	0.	0.0	0.0	1		0630	79	2928.	1612.8	27.7	1		1205	146	1973.	964.1	18.9
1		0100	13	0.	0.0	0.0	1		0635	80	3048.	1649.4	28.0	1		1210	147	1959.	950.7	18.7
1		0105	14	0.	0.0	0.0	1		0640	81	3331.	1681.1	28.4	1		1215	148	1945.	937.4	18.4
1		0110	15	0.	0.0	0.0	1		0645	82	3569.	1707.5	28.7	1		1220	149	1931.	924.1	18.2
1		0115	16	0.	0.0	0.0	1		0650	83	3761.	1728.8	28.9	1		1225	150	1917.	911.0	18.0
1		0120	17	0.	0.1	0.0	1		0655	84	3909.	1745.2	29.1	1		1230	151	1904.	897.9	17.8
1		0125	18	0.	0.1	0.0	1		0700	85	4017.	1757.1	29.2	1		1235	152	1890.	884.9	17.6
1		0130	19	0.	0.2	0.0	1		0705	86	4087.	1764.9	29.3	1		1240	153	1877.	872.0	17.4
1		0135	20	1.	0.2	0.0	1		0710	87	4124.	1768.9	29.4	1		1245	154	1863.	859.2	17.2
1		0140	21	1.	0.4	0.0	1		0715	88	4130.	1769.6	29.4	1		1250	155	1850.	846.5	17.0
1		0145	22	2.	0.5	0.0	1		0720	89	4110.	1767.4	29.3	1		1255	156	1837.	833.9	16.7
1		0150	23	2.	0.7	0.1	1		0725	90	4066.	1762.6	29.3	1		1300	157	1824.	821.4	16.5
1		0155	24	3.	1.0	0.1	1		0730	91	4004.	1755.6	29.2	1		1305	158	1811.	808.9	16.3
1		0200	25	4.	1.3	0.1	1		0735	92	3924.	1746.8	29.1	1		1310	159	1798.	796.6	16.1
1		0205	26	5.	1.7	0.1	1		0740	93	3832.	1736.6	29.0	1		1315	160	1785.	784.3	15.9
1		0210	27	7.	2.2	0.2	1		0745	94	3728.	1725.1	28.9	1		1320	161	1772.	772.1	15.7
1		0215	28	9.	2.8	0.2	1		0750	95	3616.	1712.7	28.7	1		1325	162	1759.	760.0	15.5
1		0220	29	11.	3.5	0.3	1		0755	96	3498.	1699.6	28.6	1		1330	163	1747.	748.0	15.4
1		0225	30	13.	4.3	0.3	1		0800	97	3375.	1686.0	28.4	1		1335	164	1734.	736.0	15.2
1		0230	31	17.	5.4	0.4	1		0805	98	3250.	1672.1	28.3	1		1340	165	1722.	724.2	15.0
1		0235	32	20.	6.6	0.5	1		0810	99	3122.	1658.0	28.1	1		1345	166	1710.	712.4	14.8
1		0240	33	25.	8.1	0.7	1		0815	100	3030.	1643.8	27.9	1		1350	167	1697.	700.7	14.6
1		0245	34	31.	9.9	0.8	1		0820	101	2982.	1629.2	27.8	1		1355	168	1685.	689.1	14.4
1		0250	35	37.	12.0	1.0	1		0825	102	2933.	1614.2	27.7	1		1400	169	1673.	677.6	14.2
1		0255	36	44.	14.4	1.2	1		0830	103	2883.	1599.0	27.5	1		1405	170	1661.	666.1	14.0
1		0300	37	53.	17.1	1.4	1		0835	104	2833.	1583.6	27.4	1		1410	171	1648.	654.8	13.8
1		0305	38	62.	20.2	1.6	1		0840	105	2782.	1568.0	27.3	1		1415	172	1628.	643.5	13.6
1		0310	39	73.	23.6	1.9	1		0845	106	2730.	1552.4	27.1	1		1420	173	1611.	632.4	13.4
1		0315	40	78.	27.4	2.1	1		0850	107	2680.	1536.7	27.0	1		1425	174	1595.	621.4	13.3
1		0320	41	81.	31.6	2.2	1		0855	108	2631.	1521.1	26.8	1		1430	175	1579.	610.5	13.1
1		0325	42	83.	36.2	2.3	1		0900	109	2582.	1505.5	26.7	1		1435	176	1563.	599.7	12.9
1		0330	43	86.	41.3	2.4	1		0905	110	2533.	1490.1	26.5	1		1440	177	1547.	589.0	12.7
1		0335	44	89.	47.0	2.6	1		0910	111	2485.	1474.7	26.4	1		1445	178	1531.	578.5	12.5
1		0340	45	92.	53.4	2.8	1		0915	112	2437.	1459.5	26.2	1		1450	179	1516.	568.0	12.3
1		0345	46	96.	60.7	3.0	1		0920	113	2390.	1444.4	26.1	1		1455	180	1500.	557.6	12.2
1		0350	47	101.	69.2	3.2	1		0925	114	2356.	1429.5	25.9	1		1500	181	1485.	547.4	12.0
1		0355	48	106.	79.4	3.4	1		0930	115	2346.	1414.6	25.7	1		1505	182	1470.	537.2	11.8
1		0400	49	113.	91.6	3.8	1		0935	116	2336.	1399.6	25.5	1		1510	183	1455.	527.2	11.7
1		0405	50	151.	106.5	4.1	1		0940	117	2326.	1384.6	25.3	1		1515	184	1440.	517.2	11.5
1		0410	51	247.	124.3	4.5	1		0945	118	2316.	1369.6	25.1	1		1520	185	1425.	507.4	11.3
1		0415	52	360.	145.6	5.0	1		0950	119	2306.	1354.5	24.9	1		1525	186	1411.	497.6	11.2
1		0420	53	496.	171.0	5.6	1		0955	120	2296.	1339.5	24.7	1		1530	187	1396.	488.0	11.0
1		0425	54	630.	201.1	6.2	1		1000	121	2286.	1324.4	24.5	1		1535	188	1382.	478.4	10.8
1		0430	55	735.	236.6	6.8	1		1005	122	2276.	1309.4	24.3	1		1540	189	1368.	469.0	10.7
1		0435	56	858.	277.8	7.5	1		1010	123	2266.	1294.4	24.1	1		1545	190	1354.	459.6	10.5
1		0440	57	997.	324.5	8.2	1		1015	124	2256.	1279.4	23.9	1		1550	191	1340.	450.4	10.3
1		0445	58	1151.	376.5	9.1	1		1020	125	2244.	1264.4	23.7	1		1555	192	1327.	441.2	10.2
1		0450	59	1314.	433.0	10.1	1		1025	126	2232.	1249.5	23.4	1		1600	193	1313.	432.1	10.0
1		0455	60	1404.	493.4	11.1	1		1030	127	2220.	1234.6	23.2	1		1605	194	1290.	423.2	9.9
1		0500	61	1499.	557.1	12.2	1		1035	128	2209.	1219.8	23.0	1		1610	195	1264.	414.4	9.7
1		0505	62	1597.	622.9	13.3	1		1040	129	2197.	1205.0	22.7	1		1615	196	1238.	405.8	9.6
1		0510	63	1686.	690.0	14.4	1		1045	130	2185.	1190.3	22.5	1		1620	197	1213.	397.4	9.5
1		0515	64	1757.	757.6	15.5	1		1050	131	2174.	1175.7	22.3	1		1625	198	1189.	389.1	9.3
1		0520	65	1827.	824.9	16.6	1		1055	132	2162.	1161.0	22.0	1		1630	199	1164.	381.0	9.2
1		0525	66	1897.	891.3	17.7	1		1100	133	2151.	1146.5	21.8	1		1635	200	1141.	373.1	9.1
1		0530	67	1965.	956.7	18.7	1		1105	134	2139.	1132.0	21.6							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	16.58-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4130.	7.25		2761.	1608.	1608.	1608.
		(INCHES)	0.533	0.858	0.858	0.858
		(AC-FT)	1369.	2203.	2203.	2203.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	16.58-HR
+ (AC-FT)	(HR)				
1770.	7.25	1451.	777.	777.	777.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	16.58-HR
+ (FEET)	(HR)				
29.37	7.25	25.74	14.77	14.77	14.77

CUMULATIVE AREA = 48.16 SQ MI

HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.29

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	2133.	1124.7	21.5	1		1110	135	2156.	1152.8	21.9
1		0005	2	0.	0.0	0.0	1		0540	69	2187.	1192.6	22.5	1		1115	136	2144.	1138.3	21.7
1		0010	3	0.	0.0	0.0	1		0545	70	2240.	1259.0	23.6	1		1120	137	2133.	1123.8	21.5
1		0015	4	0.	0.0	0.0	1		0550	71	2286.	1324.0	24.5	1		1125	138	2121.	1109.3	21.2
1		0020	5	0.	0.0	0.0	1		0555	72	2328.	1387.4	25.4	1		1130	139	2110.	1095.0	21.0
1		0025	6	0.	0.0	0.0	1		0600	73	2404.	1449.1	26.1	1		1135	140	2095.	1080.7	20.8
1		0030	7	0.	0.0	0.0	1		0605	74	2591.	1508.6	26.7	1		1140	141	2080.	1066.5	20.5
1		0035	8	0.	0.0	0.0	1		0610	75	2772.	1565.0	27.2	1		1145	142	2065.	1052.4	20.3
1		0040	9	0.	0.0	0.0	1		0615	76	2946.	1618.2	27.7	1		1150	143	2051.	1038.4	20.1
1		0045	10	0.	0.0	0.0	1		0620	77	3208.	1667.5	28.2	1		1155	144	2036.	1024.5	19.9
1		0050	11	0.	0.0	0.0	1		0625	78	3608.	1711.8	28.7	1		1200	145	2022.	1010.6	19.6
1		0055	12	0.	0.0	0.0	1		0630	79	3956.	1750.4	29.1	1		1205	146	2007.	996.9	19.4
1		0100	13	0.	0.0	0.0	1		0635	80	4253.	1783.3	29.5	1		1210	147	1993.	983.3	19.2
1		0105	14	0.	0.0	0.0	1		0640	81	4500.	1810.6	29.8	1		1215	148	1979.	969.7	19.0
1		0110	15	0.	0.0	0.0	1		0645	82	4716.	1832.6	30.1	1		1220	149	1965.	956.2	18.7
1		0115	16	0.	0.1	0.0	1		0650	83	4905.	1849.2	30.3	1		1225	150	1951.	942.8	18.5
1		0120	17	0.	0.1	0.0	1		0655	84	5036.	1860.8	30.4	1		1230	151	1937.	929.6	18.3
1		0125	18	0.	0.2	0.0	1		0700	85	5116.	1867.7	30.4	1		1235	152	1923.	916.4	18.1
1		0130	19	1.	0.3	0.0	1		0705	86	5147.	1870.5	30.5	1		1240	153	1909.	903.3	17.9
1		0135	20	1.	0.4	0.0	1		0710	87	5137.	1869.6	30.5	1		1245	154	1896.	890.2	17.7
1		0140	21	2.	0.6	0.0	1		0715	88	5090.	1865.5	30.4	1		1250	155	1882.	877.3	17.5
1		0145	22	2.	0.8	0.1	1		0720	89	5012.	1858.6	30.4	1		1255	156	1869.	864.5	17.2
1		0150	23	3.	1.1	0.1	1		0725	90	4907.	1849.4	30.3	1		1300	157	1855.	851.7	17.0
1		0155	24	4.	1.4	0.1	1		0730	91	4781.	1838.2	30.1	1		1305	158	1842.	839.0	16.8
1		0200	25	6.	1.8	0.1	1		0735	92	4637.	1825.6	30.0	1		1310	159	1829.	826.5	16.6
1		0205	26	7.	2.3	0.2	1		0740	93	4509.	1811.6	29.8	1		1315	160	1816.	814.0	16.4
1		0210	27	9.	3.0	0.2	1		0745	94	4374.	1796.6	29.7	1		1320	161	1803.	801.6	16.2
1		0215	28	11.	3.7	0.3	1		0750	95	4230.	1780.7	29.5	1		1325	162	1790.	789.3	16.0
1		0220	29	14.	4.6	0.4	1		0755	96	4081.	1764.2	29.3	1		1330	163	1777.	777.0	15.8
1		0225	30	17.	5.7	0.5	1		0800	97	3929.	1747.4	29.1	1		1335	164	1765.	764.9	15.6
1		0230	31	21.	6.9	0.6	1		0805	98	3775.	1730.3	28.9	1		1340	165	1752.	752.8	15.4
1		0235	32	26.	8.5	0.7	1		0810	99	3621.	1713.2	28.7	1		1345	166	1739.	740.8	15.2
1		0240	33	32.	10.3	0.8	1		0815	100	3467.	1696.2	28.5	1		1350	167	1727.	728.9	15.0
1		0245	34	38.	12.5	1.0	1		0820	101	3315.	1679.4	28.3	1		1355	168	1715.	717.1	14.8
1		0250	35	46.	15.0	1.2	1		0825	102	3166.	1662.8	28.1	1		1400	169	1702.	705.4	14.7
1		0255	36	55.	17.9	1.4	1		0830	103	3039.	1646.6	28.0	1		1405	170	1690.	693.8	14.5
1		0300	37	65.	21.2	1.7	1		0835	104	2986.	1630.3	27.8	1		1410	171	1678.	682.2	14.3
1		0305	38	77.	24.9	2.0	1		0840	105	2932.	1614.0	27.7	1		1415	172	1666.	670.7	14.1
1		0310	39	79.	29.0	2.1	1		0845	106	2878.	1597.5	27.5	1		1420	173	1652.	659.3	13.9
1		0315	40	82.	33.5	2.2	1		0850	107	2824.	1581.1	27.4	1		1425	174	1635.	648.0	13.7
1		0320	41	84.	38.5	2.4	1		0855	108	2771.	1564.6	27.2	1		1430	175	1618.	636.9	13.5
1		0325	42	87.	44.0	2.5	1		0900	109	2717.	1548.3	27.1	1		1435	176	1602.	625.8	13.3
1		0330	43	90.	50.1	2.7	1		0905	110	2665.	1532.0	26.9	1		1440	177	1585.	614.9	13.1
1		0335	44	94.	56.7	2.8	1		0910	111	2614.	1515.9	26.8	1		1445	178	1569.	604.0	13.0
1		0340	45	98.	64.2	3.0	1		0915	112	2564.	1499.9	26.6	1		1450	179	1553.	593.3	12.8
1		0345	46	102.	72.6	3.3	1		0920	113	2514.	1484.1	26.5	1		1455	180	1537.	582.7	12.6
1		0350	47	108.	82.5	3.5	1		0925	114	2465.	1468.5	26.3	1		1500	181	1522.	572.2	12.4
1		0355	48	114.	94.1	3.8	1		0930	115	2417.	1453.0	26.2	1		1505	182	1506.	561.8	12.2
1		0400	49	160.	108.0	4.2	1		0935	116	2369.	1437.8	26.0	1		1510	183	1491.	551.5	12.1
1		0405	50	248.	124.5	4.5	1		0940	117	2352.	1422.6	25.8	1		1515	184	1476.	541.3	11.9
1		0410	51	352.	144.1	5.0	1		0945	118	2342.	1407.5	25.6	1		1520	185	1461.	531.2	11.7
1		0415	52	478.	167.6	5.5	1		0950	119	2332.	1392.3	25.4	1		1525	186	1446.	521.2	11.6
1		0420	53	614.	195.6	6.1	1		0955	120	2321.	1377.2	25.2	1		1530	187	1431.	511.3	11.4
1		0425	54	713.	229.0	6.6	1		1000	121	2311.	1362.0	25.0	1		1535	188	1417.	501.5	11.2
1		0430	55	829.	268.2	7.3	1		1005	122	2301.	1346.8	24.8	1		1540	189	1402.	491.8	11.1
1		0435	56	964.	313.5	8.1	1		1010	123	2291.	1331.7	24.6	1		1545	190	1388.	482.2	10.9
1		0440	57	1116.	364.8	8.9	1		1015	124	2281.	1316.5	24.4	1		1550	191	1374.	472.8	10.7
1		0445	58	1285.	421.6	9.9	1		1020	125	2271.	1301.4	24.2	1		1555	192	1360.	463.4	10.6
1		0450	59	1390.	483.4	10.9	1		1025	126	2261.	1286.4	24.0	1		1600	193	1346.	454.1	10.4
1		0455	60	1488.	549.7	12.0	1		1030	127	2249.	1271.3	23.8	1		1605	194	1332.	444.8	10.3
1		0500	61	1592.	619.4	13.2	1		1035	128	2237.	1256.3	23.5	1		1610	195	1319.	435.7	10.1
1		0505	62	1688.	691.3	14.4	1		1040	129	2226.	1241.4	23.3	1		1615	196	1300.	426.7	9.9
1		0510	63	1764.	764.6	15.6	1		1045	130	2214.	1226.5	23.1	1		1620	197	1274.	417.9	9.8
1		0515	64	1841.	838.4	16.8	1		1050	131	2202.	1211.6	22.8	1		1625	198	1248.	409.2	9.7
1		0520	65	1918.	911.7	18.0	1		1055	132	2190.	1196.8	22.6	1		1630	199	1223.	400.7	9.5
1		0525	66	1994.	984.1	19.2	1		1100	133	2179.	1182.1	22.4	1		1635	200	1198.	392.4	9.4
1		0530	67	2068.	1055.2	20.4	1		1105	134	2167.	1167.4	22.1							

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
			6-HR	24-HR	72-HR	16.58-HR
+ (CFS)	(HR)					
		(CFS)				
+ 5147.	7.08		3104.	1753.	1753.	1753.
		(INCHES)	0.599	0.935	0.935	0.935
		(AC-FT)	1539.	2403.	2403.	2403.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	16.58-HR
+ (AC-FT)	(HR)				
1871.	7.08	1519.	816.	816.	816.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	16.58-HR
+ (FEET)	(HR)				
30.48	7.08	26.55	15.32	15.32	15.32

CUMULATIVE AREA = 48.16 SQ MI

HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.40

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	2297.	1340.2	24.7	1		1110	135	2187.	1192.2	22.5
1		0005	2	0.	0.0	0.0	1		0540	69	2349.	1419.2	25.8	1		1115	136	2175.	1177.4	22.3
1		0010	3	0.	0.0	0.0	1		0545	70	2552.	1495.9	26.6	1		1120	137	2163.	1162.8	22.1
1		0015	4	0.	0.0	0.0	1		0550	71	2787.	1569.7	27.3	1		1125	138	2152.	1148.1	21.8
1		0020	5	0.	0.0	0.0	1		0555	72	3018.	1640.3	27.9	1		1130	139	2140.	1133.6	21.6
1		0025	6	0.	0.0	0.0	1		0600	73	3562.	1706.7	28.6	1		1135	140	2129.	1119.1	21.4
1		0030	7	0.	0.0	0.0	1		0605	74	4111.	1767.5	29.3	1		1140	141	2118.	1104.7	21.2
1		0035	8	0.	0.0	0.0	1		0610	75	4610.	1822.7	30.0	1		1145	142	2105.	1090.3	20.9
1		*0040*	9	*0.*	*0.0*	0.0	1		*0615*	76	5163.	1871.9	30.5	1		1150	143	2090.	1076.1	20.7
1		0045	10	0.	0.0	0.0	1		0620	77	5650.	1914.7	30.9	1		1155	144	2075.	1061.9	20.5
1		0050	11	0.	0.0	0.0	1		0625	78	6238.	1950.6	31.4	1		1200	145	2061.	1047.8	20.2
1		0055	12	0.	0.0	0.0	1		0630	79	6731.	1979.2	31.7	1		1205	146	2046.	1033.8	20.0
1		0100	13	0.	0.0	0.0	1		0635	80	7101.	2000.8	32.0	1		1210	147	2031.	1019.9	19.8
1		0105	14	0.	0.0	0.0	1		0640	81	7314.	2016.2	32.1	1		1215	148	2017.	1006.1	19.6
1		0110	15	0.	0.1	0.0	1		0645	82	7450.	2026.1	32.2	1		1220	149	2003.	992.4	19.3
1		0115	16	0.	0.1	0.0	1		0650	83	7515.	2030.8	32.3	1		1225	150	1988.	978.7	19.1
1		0120	17	1.	0.2	0.0	1		0655	84	7515.	2030.7	32.3	1		1230	151	1974.	965.2	18.9
1		0125	18	1.	0.3	0.0	1		0700	85	7456.	2026.5	32.2	1		1235	152	1960.	951.7	18.7
1		0130	19	2.	0.5	0.0	1		0705	86	7346.	2018.6	32.2	1		1240	153	1946.	938.4	18.5
1		0135	20	2.	0.8	0.1	1		0710	87	7192.	2007.4	32.1	1		1245	154	1932.	925.1	18.2
1		0140	21	3.	1.1	0.1	1		0715	88	6981.	1993.7	31.9	1		1250	155	1918.	911.9	18.0
1		0145	22	4.	1.4	0.1	1		0720	89	6710.	1977.9	31.7	1		1255	156	1905.	898.9	17.8
1		0150	23	6.	1.9	0.2	1		0725	90	6415.	1960.8	31.5	1		1300	157	*1891.*	*885.9*	*17.6*
1		0155	24	8.	2.5	0.2	1		0730	91	6103.	1942.8	31.3	1		1305	158	1878.	872.9	17.4
1		0200	25	10.	3.2	0.3	1		0735	92	5781.	1924.1	31.1	1		1310	159	1864.	860.1	17.2
1		0205	26	12.	4.0	0.3	1		0740	93	5538.	1904.8	30.8	1		1315	160	1851.	847.4	17.0
1		0210	27	15.	4.9	0.4	1		0745	94	5312.	1885.0	30.6	1		1320	161	1838.	834.8	16.8
1		0215	28	19.	6.1	0.5	1		0750	95	5080.	1864.6	30.4	1		1325	162	1825.	822.2	16.6
1		0220	29	23.	7.4	0.6	1		0755	96	4847.	1844.1	30.2	1		1330	163	1811.	809.7	16.4
1		0225	30	28.	9.0	0.7	1		0800	97	4617.	1823.6	30.0	1		1335	164	1799.	797.4	16.2
1		0230	31	34.	10.9	0.9	1		0805	98	4432.	1803.0	29.7	1		1340	165	1786.	785.1	16.0
1		0235	32	41.	13.2	1.1	1		0810	99	4247.	1782.6	29.5	1		1345	166	1773.	772.9	15.8
1		0240	33	49.	15.8	1.3	1		0815	100	4063.	1762.2	29.3	1		1350	167	1760.	760.7	15.6
1		0245	34	58.	18.9	1.5	1		0820	101	3882.	1742.2	29.1	1		1355	168	1748.	748.7	15.4
1		0250	35	69.	22.4	1.8	1		0825	102	3705.	1722.5	28.8	1		1400	169	1735.	736.8	15.2
1		0255	36	78.	26.4	2.0	1		0830	103	3531.	1703.3	28.6	1		1405	170	1723.	724.9	15.0
1		0300	37	80.	31.0	2.2	1		0835	104	3363.	1684.6	28.4	1		1410	171	1710.	713.1	14.8
1		0305	38	83.	36.1	2.3	1		0840	105	3199.	1666.5	28.2	1		1415	172	1698.	701.4	14.6
1		0310	39	86.	41.8	2.4	1		0845	106	3047.	1649.0	28.0	1		1420	173	1686.	689.8	14.4
1		0315	40	89.	48.1	2.6	1		0850	107	2990.	1631.8	27.8	1		1425	174	1674.	678.3	14.2
1		0320	41	93.	54.9	2.8	1		0855	108	2934.	1614.5	27.7	1		1430	175	1662.	666.8	14.0
1		0325	42	97.	62.3	3.0	1		0900	109	2878.	1597.3	27.5	1		1435	176	1646.	655.4	13.8
1		0330	43	101.	70.4	3.2	1		0905	110	2822.	1580.2	27.4	1		1440	177	1629.	644.2	13.6
1		0335	44	106.	79.2	3.4	1		0910	111	2766.	1563.3	27.2	1		1445	178	1612.	633.1	13.5
1		0340	45	111.	89.0	3.7	1		0915	112	2711.	1546.4	27.1	1		1450	179	1596.	622.0	13.3
1		0345	46	118.	100.1	4.0	1		0920	113	2658.	1529.8	26.9	1		1455	180	1580.	611.1	13.1
1		0350	47	185.	112.7	4.3	1		0925	114	2606.	1513.3	26.7	1		1500	181	1564.	600.3	12.9
1		0355	48	262.	127.1	4.6	1		0930	115	2555.	1497.1	26.6	1		1505	182	1548.	589.6	12.7
1		0400	49	351.	143.9	5.0	1		0935	116	2505.	1481.0	26.4	1		1510	183	1532.	579.1	12.5
1		*0405*	*50*	457.	163.7	5.4	2		*0940*	117	2455.	1465.2	26.3	1		1515	184	1516.	568.6	12.4
1		0410	51	582.	187.2	5.9	1		0945	118	2406.	1449.5	26.1	1		1520	185	1501.	558.2	12.2
1		0415	52	672.	215.3	6.4	1		0950	119	2359.	1434.2	26.0	1		1525	186	1486.	547.9	12.0
1		0420	53	772.	249.1	7.0	1		0955	120	2349.	1418.9	25.8	1		1530	187	1471.	537.8	11.8
1		0425	54	891.	289.0	7.7	1		1000	121	2339.	1403.6	25.6	1		1535	188	1456.	527.7	11.7
1		0430	55	1030.	335.8	8.4	1		1005	122	2329.	1388.3	25.4	1		1540	189	1441.	517.8	11.5
1		0435	56	1189.	389.4	9.3	1		1010	123	2319.	1373.1	25.2	1		1545	190	1426.	507.9	11.3
1		0440	57	1340.	449.8	10.3	1		1015	124	2309.	1357.8	25.0	1		1550	191	1412.	498.2	11.2
1		0445	58	1439.	516.9	11.5	1		1020	125	2298.	1342.5	24.8	1		1555	192	1397.	488.5	11.0
1		0450	59	1548.	590.0	12.7	1		1025	126	2288.	1327.3	24.6	1		1600	193	1383.	478.9	10.8
1		0455	60	1663.	668.1	14.0	1		1030	127	2278.	1312.1	24.4	1		1605	194	1369.	469.5	10.7
1		0500	61	1749.	749.9	15.4	1		1035	128	2268.	1297.0	24.2	1		1610	195	1355.	460.1	10.5
1		0505	62	1837.	834.4	16.8	1		1040	129	2258.	1281.8	24.0	1		1615	196	1341.	450.9	10.4
1		0510	63	1927.	920.4	18.2	1		1045	130	2246.	1266.8	23.7	1		1620	197	1327.	441.7	10.2
1		0515	64	2017.	1006.5	19.6	1		1050	131	2234.	1251.7	23.5	1		*1625*	*198*	*1314.*	*432.6*	*10.0*
1		0520	65	2107.	1092.1	21.0	1		1055	132	2222.	1236.8	23.2	1		1630	199	1291.	423.6	9.9
1		0525	66	2174.	1176.5	22.3	1		1100	133	2210.	1221.8	23.0	1		1635	200	1265.	414.8	9.7
1		0530	67	2240.	1259.2	23.6	1		1105	134	2198.	1207.0	22.8							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	16.58-HR
(CFS)	(HR)	(CFS)				
7515.	6.83		3868.	2061.	2061.	2061.
		(INCHES)	0.747	1.100	1.100	1.100
		(AC-FT)	1918.	2824.	2824.	2824.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	16.58-HR
(AC-FT)	(HR)				
2031.	6.83	1622.	873.	873.	873.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	16.58-HR
(FEET)	(HR)				
32.28	6.83	27.76	16.12	16.12	16.12

CUMULATIVE AREA = 48.16 SQ MI

HYDROGRAPH AT STATION NLVDB
PLAN 1, RATIO = 1.51

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	0.0	1		0535	68	2772.	1565.1	27.2	1		1110	135	2207.	1218.5	22.9
1		0005	2	0.	0.0	0.0	1		0540	69	3073.	1652.5	28.0	1		1115	136	2196.	1203.6	22.7
1		0010	3	0.	0.0	0.0	1		0545	70	3813.	1734.5	29.0	1		1120	137	2184.	1188.8	22.5
1		0015	4	0.	0.0	0.0	1		0550	71	4493.	1809.8	29.8	1		1125	138	2172.	1174.1	22.2
1		0020	5	0.	0.0	0.0	1		0555	72	5237.	1878.4	30.6	1		1130	139	2161.	1159.4	22.0
1		0025	6	0.	0.0	0.0	1		0600	73	6049.	1939.7	31.2	1		1135	140	2149.	1144.8	21.8
1		0030	7	0.	0.0	0.0	1		0605	74	6968.	1992.9	31.9	1		1140	141	2138.	1130.3	21.6
1		0035	8	0.	0.0	0.0	1		0610	75	7620.	2038.4	32.3	1		1145	142	2126.	1115.8	21.3
1		0040	9	0.	0.0	0.0	1		0615	76	8153.	2077.0	32.7	1		1150	143	2115.	1101.4	21.1
1		0045	10	0.	0.0	0.0	1		0620	77	8596.	2109.0	33.0	1		1155	144	2102.	1087.0	20.9
1		0050	11	0.	0.0	0.0	1		0625	78	9023.	2134.3	33.3	1		1200	145	2087.	1072.8	20.6
1		0055	12	0.	0.0	0.0	1		0630	79	9341.	2153.0	33.5	1		1205	146	2072.	1058.6	20.4
1		0100	13	0.	0.0	0.0	1		0635	80	9552.	2165.4	33.6	1		1210	147	2057.	1044.5	20.2
1		0105	14	0.	0.1	0.0	1		0640	81	9663.	2171.9	33.7	1		1215	148	2043.	1030.5	20.0
1		0110	15	0.	0.1	0.0	1		0645	82	9682.	2173.1	33.7	1		1220	149	2028.	1016.7	19.7
1		0115	16	1.	0.2	0.0	1		0650	83	9619.	2169.4	33.7	1		1225	150	2014.	1002.9	19.5
1		0120	17	1.	0.4	0.0	1		0655	84	9482.	2161.3	33.6	1		1230	151	1999.	989.1	19.3
1		0125	18	2.	0.6	0.0	1		0700	85	9281.	2149.4	33.4	1		1235	152	1985.	975.5	19.1
1		0130	19	3.	0.9	0.1	1		0705	86	9024.	2134.4	33.3	1		1240	153	1971.	962.0	18.8
1		0135	20	4.	1.3	0.1	1		0710	87	8723.	2116.6	33.1	1		1245	154	1957.	948.6	18.6
1		0140	21	5.	1.8	0.1	1		0715	88	8425.	2096.6	32.9	1		1250	155	1943.	935.2	18.4
1		0145	22	7.	2.4	0.2	1		0720	89	8121.	2074.6	32.7	1		1255	156	1929.	922.0	18.2
1		0150	23	10.	3.1	0.2	1		0725	90	7796.	2051.1	32.5	1		1300	157	1915.	908.8	18.0
1		0155	24	12.	4.0	0.3	1		0730	91	7455.	2026.4	32.2	1		1305	158	1902.	895.8	17.8
1		0200	25	15.	5.0	0.4	1		0735	92	7104.	2001.0	32.0	1		1310	159	1888.	882.8	17.5
1		0205	26	19.	6.2	0.5	1		0740	93	6668.	1975.5	31.7	1		1315	160	1874.	869.9	17.3
1		0210	27	24.	7.6	0.6	1		0745	94	6236.	1950.5	31.4	1		1320	161	1861.	857.1	17.1
1		0215	28	29.	9.3	0.7	1		0750	95	5816.	1926.2	31.1	1		1325	162	1848.	844.4	16.9
1		0220	29	35.	11.2	0.9	1		0755	96	5509.	1902.3	30.8	1		1330	163	1835.	831.8	16.7
1		0225	30	42.	13.5	1.1	1		0800	97	5241.	1878.7	30.6	1		1335	164	1821.	819.2	16.5
1		0230	31	50.	16.2	1.3	1		0805	98	4975.	1855.4	30.3	1		1340	165	1808.	806.8	16.3
1		0235	32	59.	19.3	1.5	1		0810	99	4714.	1832.4	30.1	1		1345	166	1795.	794.4	16.1
1		0240	33	70.	22.9	1.8	1		0815	100	4494.	1809.9	29.8	1		1350	167	1783.	782.2	15.9
1		0245	34	78.	27.0	2.1	1		0820	101	4294.	1787.7	29.6	1		1355	168	1770.	770.0	15.7
1		0250	35	81.	31.8	2.2	1		0825	102	4097.	1766.0	29.3	1		1400	169	1757.	757.9	15.5
1		0255	36	84.	37.3	2.3	1		0830	103	3906.	1744.8	29.1	1		1405	170	1745.	745.9	15.3
1		0300	37	87.	43.4	2.5	1		0835	104	3719.	1724.1	28.8	1		1410	171	1732.	733.9	15.1
1		0305	38	90.	50.2	2.7	1		0840	105	3538.	1704.1	28.6	1		1415	172	1720.	722.1	14.9
1		0310	39	94.	57.7	2.9	1		0845	106	3364.	1684.7	28.4	1		1420	173	1707.	710.3	14.7
1		0315	40	99.	65.9	3.1	1		0850	107	3195.	1666.1	28.2	1		1425	174	1695.	698.6	14.5
1		0320	41	104.	74.7	3.3	1		0855	108	3044.	1648.1	28.0	1		1430	175	1683.	687.0	14.4
1		0325	42	109.	84.3	3.6	1		0900	109	2986.	1630.4	27.8	1		1435	176	1671.	675.5	14.2
1		0330	43	114.	94.7	3.9	1		0905	110	2928.	1612.9	27.7	1		1440	177	1659.	664.1	14.0
1		0335	44	149.	106.0	4.1	1		0910	111	2871.	1595.4	27.5	1		1445	178	1642.	652.7	13.8
1		0340	45	214.	118.2	4.4	1		0915	112	2815.	1578.1	27.3	1		1450	179	1625.	641.5	13.6
1		0345	46	286.	131.7	4.7	1		0920	113	2758.	1560.9	27.2	1		1455	180	1608.	630.4	13.4
1		0350	47	366.	146.7	5.0	1		0925	114	2703.	1543.9	27.0	1		1500	181	1592.	619.4	13.2
1		0355	48	457.	163.8	5.4	1		0930	115	2650.	1527.2	26.9	1		1505	182	1576.	608.5	13.0
1		0400	49	563.	183.6	5.9	1		0935	116	2598.	1510.6	26.7	1		1510	183	1560.	597.7	12.9
1		0405	50	647.	206.9	6.3	1		0940	117	2546.	1494.2	26.6	1		1515	184	1544.	587.1	12.7
1		0410	51	730.	234.8	6.7	1		0945	118	2495.	1478.1	26.4	1		1520	185	1528.	576.5	12.5
1		0415	52	829.	268.1	7.3	1		0950	119	2446.	1462.2	26.3	1		1525	186	1513.	566.1	12.3
1		0420	53	947.	307.7	8.0	1		0955	120	2396.	1446.6	26.1	1		1530	187	1497.	555.7	12.1
1		0425	54	1086.	354.5	8.7	1		1000	121	2357.	1431.2	25.9	1		1535	188	1482.	545.5	12.0
1		0430	55	1247.	408.9	9.6	1		1005	122	2347.	1415.8	25.7	1		1540	189	1467.	535.4	11.8
1		0435	56	1371.	471.2	10.7	1		1010	123	2337.	1400.5	25.5	1		1545	190	1452.	525.3	11.6
1		0440	57	1476.	541.5	11.9	1		1015	124	2327.	1385.2	25.3	1		1550	191	1437.	515.4	11.5
1		0445	58	1592.	619.5	13.2	1		1020	125	2317.	1369.8	25.1	1		1555	192	1423.	505.6	11.3
1		0450	59	1701.	704.2	14.6	1		1025	126	2306.	1354.6	24.9	1		1600	193	1408.	495.8	11.1
1		0455	60	1796.	794.5	16.1	1		1030	127	2296.	1339.3	24.7	1		1605	194	1394.	486.2	11.0
1		0500	61	1895.	889.1	17.6	1		1035	128	2286.	1324.0	24.5	1		1610	195	1379.	476.7	10.8
1		0505	62	1996.	986.5	19.2	1		1040	129	2276.	1308.8	24.3	1		1615	196	1365.	467.2	10.6
1		0510	63	2100.	1085.2	20.8	1		1045	130	2266.	1293.7	24.1	1		1620	197	1352.	457.9	10.5
1		0515	64	2180.	1184.2	22.4	1		1050	131	2255.	1278.5	23.9	1		1625	198	1338.	448.6	10.3
1		0520	65	2258.	1282.4	24.0	1		1055	132	2243.	1263.4	23.7	1		1630	199	1324.	439.5	10.2
1		0525	66	2323.	1379.2	25.3	1		1100	133	2231.	1248.4	23.4	1		1635	200	1311.	430.4	10.0
1		0530	67	2482.	1473.8	26.4	1		1105	134	2219.	1233.4	23.2							

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	16.58-HR
(CFS)	(HR)					
		(CFS)				
9682.	6.75		4689.	2384.	2384.	2384.
		(INCHES)	0.905	1.272	1.272	1.272
		(AC-FT)	2325.	3267.	3267.	3267.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	16.58-HR
(AC-FT)	(HR)					
2173.	6.75		1709.	921.	921.	921.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	16.58-HR
(FEET)	(HR)					
33.70	6.75		28.72	16.77	16.77	16.77

CUMULATIVE AREA = 48.16 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					1.00	1.16	1.24	1.29	1.40	1.51
HYDROGRAPH AT										
+	41	4.73	1	FLOW	1166.	1577.	1765.	1910.	2204.	2503.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO										
+	A-B	4.73	1	FLOW	1116.	1506.	1683.	1821.	2103.	2390.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42
HYDROGRAPH AT										
+	302	6.14	1	FLOW	1238.	1686.	1892.	2052.	2375.	2706.
				TIME	4.33	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT										
+	NODEB	10.87	1	FLOW	2321.	3142.	3516.	3811.	4407.	5016.
				TIME	4.42	4.42	4.33	4.33	4.33	4.33
ROUTED TO										
+	B-C	10.87	1	FLOW	2282.	3092.	3461.	3748.	4328.	4920.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT										
+	303	4.49	1	FLOW	1337.	1727.	1902.	2038.	2308.	2581.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	42B	4.08	1	FLOW	837.	1150.	1294.	1406.	1633.	1865.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
3 COMBINED AT										
+	NODEC	19.44	1	FLOW	3989.	5363.	5988.	6474.	7453.	8452.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO										
+	C-D	19.44	1	FLOW	3949.	5312.	5933.	6416.	7388.	8380.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT										
+	42A	8.23	1	FLOW	1491.	2052.	2310.	2511.	2917.	3334.
				TIME	4.33	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT										
+	NODED	27.67	1	FLOW	5407.	7302.	8166.	8837.	10205.	11603.
				TIME	4.42	4.42	4.42	4.42	4.33	4.33
ROUTED TO										
+	D-E	27.67	1	FLOW	5280.	7135.	7981.	8638.	9965.	11319.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75
HYDROGRAPH AT										
+	305	3.99	1	FLOW	934.	1223.	1353.	1453.	1655.	1859.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT										
+	NODEE	31.66	1	FLOW	5969.	8018.	8957.	9690.	11167.	12675.
				TIME	4.75	4.75	4.67	4.67	4.67	4.67
ROUTED TO										
+	F-F1	31.66	1	FLOW	5827.	7813.	8717.	9423.	10853.	12311.
				TIME	5.25	5.25	5.25	5.17	5.17	5.17
HYDROGRAPH AT										
+	306A	4.50	1	FLOW	417.	586.	665.	727.	854.	985.
				TIME	5.67	5.67	5.58	5.58	5.58	5.58
2 COMBINED AT										
+	NODEF1	36.16	1	FLOW	6211.	8369.	9353.	10118.	11669.	13261.
				TIME	5.25	5.25	5.25	5.25	5.17	5.17
HYDROGRAPH AT										
+	43	6.40	1	FLOW	891.	1249.	1416.	1547.	1812.	2085.
				TIME	4.42	4.33	4.33	4.33	4.33	4.33
ROUTED TO										
+	H-I1	6.40	1	FLOW	838.	1171.	1325.	1445.	1691.	1945.
				TIME	5.17	5.17	5.17	5.17	5.08	5.08
HYDROGRAPH AT										
+	309A	5.60	1	FLOW	646.	880.	987.	1071.	1242.	1417.
				TIME	5.58	5.58	5.50	5.50	5.50	5.42
2 COMBINED AT										
+	I1	12.00	1	FLOW	1460.	2020.	2280.	2485.	2903.	3332.
				TIME	5.42	5.25	5.25	5.17	5.17	5.17
ROUTED TO										
+	I1-F1	12.00	1	FLOW	1460.	2019.	2278.	2484.	2900.	3325.
				TIME	5.75	5.50	5.50	5.42	5.42	5.42

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  2 COMBINED AT
+                    NLVDP      48.16      1   FLOW        7594.    10317.    11568.    12547.    14517.    16529.
                                                TIME        5.33      5.33      5.25      5.25      5.25      5.25

 ROUTED TO
+                    NLVDB      48.16      1   FLOW        2159.     2928.     4130.     5147.     7515.     9682.
                                                TIME        7.50      7.42      7.25      7.08      6.83      6.75

                                             ** PEAK STAGES IN FEET **
                                             1  STAGE       21.99     27.66     29.37     30.48     32.28     33.70
                                                TIME        7.50      7.42      7.25      7.08      6.83      6.75
1
                                             SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                                 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                    INTERPOLATED TO
                                                                                  COMPUTATION INTERVAL
            ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                          PEAK                                          PEAK

                                    (MIN)      (CFS)     (MIN)       (IN)      (MIN)      (CFS)     (MIN)       (IN)

           FOR PLAN = 1  RATIO= 1.00
              I1-F1  MANE          5.00    1459.82     343.74       0.53       5.00    1459.54     345.00       0.53

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3381E+03 EXCESS=0.0000E+00 OUTFLOW=0.3378E+03 BASIN STORAGE=0.4523E+00 PERCENT ERROR=   0.0

           FOR PLAN = 1  RATIO= 1.16
              I1-F1  MANE          5.00    2018.85     329.97       0.73       5.00    2018.84     330.00       0.73

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4684E+03 EXCESS=0.0000E+00 OUTFLOW=0.4682E+03 BASIN STORAGE=0.4167E+00 PERCENT ERROR=   0.0

           FOR PLAN = 1  RATIO= 1.24
              I1-F1  MANE          5.00    2279.74     326.97       0.83       5.00    2278.32     330.00       0.83

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5293E+03 EXCESS=0.0000E+00 OUTFLOW=0.5289E+03 BASIN STORAGE=0.5550E+00 PERCENT ERROR=   0.0

           FOR PLAN = 1  RATIO= 1.29
              I1-F1  MANE          5.00    2485.29     325.43       0.90       5.00    2484.09     325.00       0.90

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5770E+03 EXCESS=0.0000E+00 OUTFLOW=0.5770E+03 BASIN STORAGE=0.4207E+00 PERCENT ERROR=  -0.1

           FOR PLAN = 1  RATIO= 1.40
              I1-F1  MANE          4.90    2901.08     324.11       1.05       5.00    2899.89     325.00       1.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6748E+03 EXCESS=0.0000E+00 OUTFLOW=0.6746E+03 BASIN STORAGE=0.4952E+00 PERCENT ERROR=   0.0

           FOR PLAN = 1  RATIO= 1.51
              I1-F1  MANE          4.52    3329.30     321.99       1.21       5.00    3325.35     325.00       1.21

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7761E+03 EXCESS=0.0000E+00 OUTFLOW=0.7761E+03 BASIN STORAGE=0.4342E+00 PERCENT ERROR=   0.0


1TABLE 1     STATION          NLVDP
                               FLOW
             PLAN                1
             RATIO            1.24

 PER   DAY MON   HRMN

   1     1       0000          0.00
   2     1       0005          0.00
   3     1       0010          0.00
   4     1       0015          0.00
   5     1       0020          0.00
   6     1       0025          0.00
   7     1       0030          0.00
   8     1       0035          0.00
   9     1       0040          0.00
  10     1       0045          0.02
  11     1       0050          0.06
  12     1       0055          0.17
  13     1       0100          0.41
  14     1       0105          0.87
  15     1       0110          1.67
  16     1       0115          2.96
  17     1       0120          4.89
  18     1       0125          7.60
  19     1       0130         11.19
  20     1       0135         15.74
  21     1       0140         21.32
  22     1       0145         27.96
  23     1       0150         35.77
  24     1       0155         44.90
  25     1       0200         55.61
  26     1       0205         68.29
  27     1       0210         83.43
  28     1       0215        101.66
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29	1	0220	123.67
30	1	0225	150.18
31	1	0230	181.72
32	1	0235	218.71
33	1	0240	261.18
34	1	0245	308.87
35	1	0250	361.03
36	1	0255	416.71
37	1	0300	474.74
38	1	0305	534.00
39	1	0310	594.08
40	1	0315	654.80
41	1	0320	717.72
42	1	0325	785.80
43	1	0330	864.26
44	1	0335	958.88
45	1	0340	1078.52
46	1	0345	1235.37
47	1	0350	1439.76
48	1	0355	1713.12
49	1	0400	2062.52
50	1	0405	2511.77

1TABLE 1 STATION NLVDP
(CONT.) FLOW
PLAN 1
RATIO 1.24

PER	DAY	MON	HRMN	
51	1		0410	3067.80
52	1		0415	3729.26
53	1		0420	4501.61
54	1		0425	5369.05
55	1		0430	6297.21
56	1		0435	7250.05
57	1		0440	8183.60
58	1		0445	9051.81
59	1		0450	9817.44
60	1		0455	10451.37
61	1		0500	10943.39
62	1		0505	11282.30
63	1		0510	11487.32
64	1		0515	11568.31
65	1		0520	11555.21
66	1		0525	11475.39
67	1		0530	11354.34
68	1		0535	11213.59
69	1		0540	11067.65
70	1		0545	10922.63
71	1		0550	10777.19
72	1		0555	10624.46
73	1		0600	10453.74
74	1		0605	10252.63
75	1		0610	10010.71
76	1		0615	9718.95
77	1		0620	9374.91
78	1		0625	8979.26
79	1		0630	8536.91
80	1		0635	8055.70
81	1		0640	7546.64
82	1		0645	7019.47
83	1		0650	6485.28
84	1		0655	5953.58
85	1		0700	5432.84
86	1		0705	4930.15
87	1		0710	4451.97
88	1		0715	4002.58
89	1		0720	3584.38
90	1		0725	3199.83
91	1		0730	2849.60
92	1		0735	2531.10
93	1		0740	2243.91
94	1		0745	1987.60
95	1		0750	1757.05
96	1		0755	1553.04
97	1		0800	1371.91
98	1		0805	1210.58
99	1		0810	1069.52
100	1		0815	943.49

1TABLE 1 STATION NLVDP
(CONT.) FLOW
PLAN 1
RATIO 1.24

PER	DAY	MON	HRMN	
101	1		0820	834.97
102	1		0825	737.46
103	1		0830	654.07
104	1		0835	579.21
105	1		0840	515.31
106	1		0845	458.24
107	1		0850	408.59
108	1		0855	365.42
109	1		0900	326.28
110	1		0905	293.71
111	1		0910	263.89

PER	DAY	MON	HRMN	
112	1		0915	237.72
113	1		0920	215.11
114	1		0925	194.12
115	1		0930	176.13
116	1		0935	160.36
117	1		0940	145.61
118	1		0945	132.84
119	1		0950	121.88
120	1		0955	111.61
121	1		1000	102.11
122	1		1005	94.48
123	1		1010	87.27
124	1		1015	80.41
125	1		1020	74.35
126	1		1025	69.23
127	1		1030	64.29
128	1		1035	59.53
129	1		1040	55.25
130	1		1045	51.70
131	1		1050	48.26
132	1		1055	44.90
133	1		1100	41.62
134	1		1105	39.07
135	1		1110	36.67
136	1		1115	34.33
137	1		1120	32.06
138	1		1125	29.86
139	1		1130	28.16
140	1		1135	26.55
141	1		1140	24.97
142	1		1145	23.43
143	1		1150	21.90
144	1		1155	20.49
145	1		1200	19.40
146	1		1205	18.31
147	1		1210	17.24
148	1		1215	16.17
149	1		1220	15.12
150	1		1225	14.09

1TABLE 1 STATION NLVDP
(CONT.) FLOW
PLAN 1
RATIO 1.24

PER	DAY	MON	HRMN	
151	1		1230	13.37
152	1		1235	12.69
153	1		1240	12.05
154	1		1245	11.43
155	1		1250	10.82
156	1		1255	10.21
157	1		1300	9.61
158	1		1305	9.16
159	1		1310	8.77
160	1		1315	8.39
161	1		1320	8.01
162	1		1325	7.63
163	1		1330	7.26
164	1		1335	6.88
165	1		1340	6.51
166	1		1345	6.20
167	1		1350	5.97
168	1		1355	5.74
169	1		1400	5.51
170	1		1405	5.28
171	1		1410	5.05
172	1		1415	4.81
173	1		1420	4.58
174	1		1425	4.35
175	1		1430	4.12
176	1		1435	3.97
177	1		1440	3.84
178	1		1445	3.71
179	1		1450	3.58
180	1		1455	3.44
181	1		1500	3.31
182	1		1505	3.18
183	1		1510	3.05
184	1		1515	2.92
185	1		1520	2.79
186	1		1525	2.66
187	1		1530	2.55
188	1		1535	2.48
189	1		1540	2.41
190	1		1545	2.33
191	1		1550	2.26
192	1		1555	2.19
193	1		1600	2.12
194	1		1605	2.05
195	1		1610	1.98
196	1		1615	1.91
197	1		1620	1.84
198	1		1625	1.77
199	1		1630	1.69
200	1		1635	1.62

MAX 11568.31

MIN	0.00
AVE	1870.57

*** NORMAL END OF HEC-1 ***

Hydrologic Support Data

REGRESSION ANALYSIS OF LOWER CENTRAL VALLEY PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION

		DATA FROM JMM MODELS			REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB))		COMPUTED VALUES			
SITE ID	STORM PROBABILITY (%)	10-YR 10	50-YR 2	100-YR 1	A	B	10-YR 10	50-YR 2	100-YR 1	500-YR 0.2
4.01	EAST S 309	0.91	1.44	1.66	1.66256	-0.32635	0.91	1.44	1.66	2.19
4.25	SUBBASIN 117	0.98	1.61	1.66	1.72847	-0.31225	1.01	1.51	1.73	2.23
4.08	SUBBASIN 101	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.08	SUBBASIN 109	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.08	SUBBASIN 116	0.98	1.44	1.66	1.65323	-0.29365	0.98	1.45	1.65	2.13
4.32	SUBBASIN 301	0.98	1.44	1.9	1.81898	-0.37952	0.95	1.56	1.82	2.43
4.58	SUBBASIN 118	1.06	1.69	1.83	1.87063	-0.34445	1.08	1.63	1.87	2.43
4.5	SUBBASIN 102	1.06	1.61	1.83	1.83522	-0.3357	1.06	1.60	1.84	2.38
4.5	SUBBASIN 110	1.06	1.61	1.83	1.83522	-0.3357	1.06	1.60	1.84	2.38
4.67	SUBBASIN 111	1.06	1.69	1.92	1.93279	-0.37665	1.07	1.67	1.93	2.54
5.18	SUBBASIN 119	1.14	1.95	2.09	2.15461	-0.42856	1.17	1.86	2.15	2.84
5.08	SUBBASIN 112	1.21	1.86	2.01	2.0502	-0.35738	1.23	1.80	2.05	2.63
5	SUBBASIN 103	1.21	1.78	2.01	2.01479	-0.34862	1.21	1.77	2.01	2.58

		CHECK: INITIAL DATA MINUS COMPUTED			PERCENT DIFFERENCE		
4.01	EAST S 309	-0.001	0.004	-0.003	-0.1%	0.3%	-0.2%
4.25	SUBBASIN 117	-0.029	0.098	-0.068	-3.0%	6.1%	-4.1%
4.08	SUBBASIN 101	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.08	SUBBASIN 109	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.08	SUBBASIN 116	0.003	-0.010	0.007	0.3%	-0.7%	0.4%
4.32	SUBBASIN 301	0.035	-0.116	0.081	3.6%	-8.0%	4.3%
4.58	SUBBASIN 118	-0.017	0.058	-0.041	-1.7%	3.4%	-2.2%
4.5	SUBBASIN 102	-0.002	0.007	-0.005	-0.2%	0.5%	-0.3%
4.5	SUBBASIN 110	-0.002	0.007	-0.005	-0.2%	0.5%	-0.3%
4.67	SUBBASIN 111	-0.006	0.018	-0.013	-0.5%	1.1%	-0.7%
5.18	SUBBASIN 119	-0.028	0.092	-0.065	-2.4%	4.7%	-3.1%
5.08	SUBBASIN 112	-0.017	0.058	-0.040	-1.4%	3.1%	-2.0%
5	SUBBASIN 103	-0.002	0.007	-0.005	-0.2%	0.4%	-0.2%
	AVG	-0.005	0.0158	-0.011	-0.4%	0.8%	-0.6%

REGRESSION ANALYSIS OF LOWER CENTRAL VALLEY PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION
FILE HAS DATA FOR GOWAN PORTION OF BASIN

SEQ	STORM	DATA FROM JMM MODELS			REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB))		COMPUTED VALUES			
	PROBABILITY (%)	10-YR 10	50-YR 2	100-YR 1	A	B	10-YR 10	50-YR 2	100-YR 1	500-YR 0.2
1	KK AP.1	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
2	KK AP.2	1.14	1.65	2	1.95967	-0.36352	1.12	1.71	1.96	2.54
3	KK AP.3	1.15	1.67	1.9	1.89813	-0.32526	1.15	1.67	1.90	2.42
4	KK AP.4	1.13	1.63	1.8	1.81403	-0.29445	1.14	1.61	1.81	2.29
5	KK AP.5	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
6	KK AP.6	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
7	KK AP.7	1.35	1.8	1.9	1.92902	-0.24604	1.36	1.76	1.93	2.33
8	KK GD.1	1.33	1.96	2.2	2.20969	-0.38023	1.33	1.95	2.21	2.82
9	KK GD.2	1.25	1.89	2	2.05124	-0.33839	1.27	1.82	2.05	2.60
10	KK GD.3	1.19	1.79	1.9	1.94591	-0.3197	1.21	1.72	1.95	2.46
11	KK AP.8	1.14	1.65	1.9	1.88618	-0.32665	1.13	1.66	1.89	2.41
12	KK AP.9	1.14	1.65	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
13	KK GD.7	1.14	1.65	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
14	KK GD.4	1.25	1.89	2	2.05124	-0.33839	1.27	1.82	2.05	2.60
15	KK GD.5	1.2	1.73	1.9	1.91802	-0.30846	1.21	1.70	1.92	2.41
16	KK GD.6	1.14	1.59	1.8	1.79499	-0.2854	1.14	1.60	1.79	2.25
17	KK GD.8	1.08	1.57	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
18	KK GD.34	1.08	1.57	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
19	KK GD.9	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
20	KK GD.10	1.2	1.73	1.9	1.91802	-0.30846	1.21	1.70	1.92	2.41
21	KK GD.11	1.14	1.59	1.8	1.79499	-0.2854	1.14	1.60	1.79	2.25
22	KK GD.33	1.14	1.64	1.9	1.88618	-0.32665	1.13	1.66	1.89	2.41
23	KK GD.32C	1.13	1.57	1.9	1.85653	-0.32366	1.11	1.63	1.86	2.38
24	KK GD.30	1.35	1.98	2.23	2.2366	-0.38381	1.35	1.97	2.24	2.85
25	KK GD.31B	1.12	1.55	1.9	1.84901	-0.32614	1.10	1.62	1.85	2.37
26	KK GD.28	1.14	1.55	1.8	1.77728	-0.28102	1.13	1.58	1.78	2.23
27	KK GD.25	1.21	1.72	2	1.98133	-0.33848	1.20	1.75	1.98	2.53
28	KK GD.26	1.17	1.59	1.9	1.86005	-0.30716	1.15	1.65	1.86	2.35
29	KK GD.27	1.1	1.55	1.8	1.78261	-0.29971	1.09	1.57	1.78	2.26
30	KK GD.29	1.12	1.55	1.8	1.78261	-0.29971	1.09	1.57	1.78	2.26
31	KK PDGC	1.08	1.55	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
32	KK GD.21	1.28	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
33	KK GD.22	1.21	1.66	2	1.95477	-0.33191	1.19	1.72	1.95	2.49
34	KK GD.23	1.23	1.71	2	1.98133	-0.33848	1.20	1.75	1.98	2.53
35	KK GD.24	1.14	1.55	1.8	1.77728	-0.28102	1.13	1.58	1.78	2.23
36	KK GD.18	1.26	1.81	2.1	2.08356	-0.36074	1.25	1.83	2.08	2.66
37	KK GD.19	1.21	1.7	1.9	1.90341	-0.30051	1.21	1.70	1.90	2.39
38	KK GD.20	1.09	1.56	1.7	1.72507	-0.27546	1.09	1.53	1.73	2.17
39	KK GD.15	1.29	1.93	2.1	2.13268	-0.35986	1.30	1.88	2.13	2.71
40	KK GD.16	1.23	1.7	2.1	2.03887	-0.36272	1.20	1.79	2.04	2.62
41	KK GD.17	1.09	1.56	1.9	1.85744	-0.34125	1.07	1.62	1.86	2.41
42	KK GD.12	1.26	1.85	2.1	2.10127	-0.36512	1.26	1.85	2.10	2.69
43	KK GD.13	1.23	1.78	2	2.03887	-0.36272	1.20	1.79	2.04	2.62
44	KK GD.14A	1.15	1.63	1.8	1.82155	-0.29196	1.15	1.62	1.82	2.29
45	KK GD.14B	1.12	1.59	1.7	1.72859	-0.25896	1.13	1.55	1.73	2.15
46	KK EPT.1	1.03	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
47	KK EPT.3	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
48	KK EPT.4	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
49	KK EPT.5	1.01	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22
50	KK EPT.2	1	1.55	1.7	1.72554	-0.30598	1.02	1.51	1.73	2.22

REGRESSION ANALYSIS OF SPRING MOUNTAIN PRECIPITATION
VALUES ARE FROM JMM HEC-1 MODELS AND INCLUDE DEPTH AREA REDUCTION

		DATA FROM JMM MODELS			REGRESSION EQN COEFFICIENTS		COMPUTED VALUES			
	STORM	10-YR	50-YR	100-YR	Y=A+B*(LN(%PROB))		10-YR	50-YR	100-YR	500-YR
	PROBABILITY (%)	10	2	1	A	B	10	2	1	0.2
DAT A	SB 223	1.06	1.52	1.74	1.73323	-0.29365	1.06	1.53	1.73	2.21
DAT B	SB 213	1.29	2.03	2.27	2.29435	-0.43163	1.30	2.00	2.29	2.99
DAT C	SB 206	1.36	2.03	2.36	2.34718	-0.43112	1.35	2.05	2.35	3.04
DAT D	SB 215	1.29	1.86	2.36	2.28126	-0.44523	1.26	1.97	2.28	3.00
DAT E	SB 201	1.44	2.2	2.44	2.46701	-0.44097	1.45	2.16	2.47	3.18
DAT F	SB 202	1.51	2.28	2.44	2.4931	-0.41702	1.53	2.20	2.49	3.16
DAT G	SB 207 211 212	1.36	2.03	2.44	2.40243	-0.45975	1.34	2.08	2.40	3.14
DAT I	SB 214	1.29	1.86	2.44	2.33651	-0.47385	1.25	2.01	2.34	3.10
DAT J	SB 205	1.44	2.2	2.53	2.52917	-0.47318	1.44	2.20	2.53	3.29
DAT K	SB 208	1.44	2.03	2.53	2.45392	-0.45457	1.41	2.14	2.45	3.19
DAT L	SB 210	1.51	2.2	2.53	2.51984	-0.44047	1.51	2.21	2.52	3.23
DAT M	SB 203 209	1.51	2.28	2.62	2.61741	-0.48143	1.51	2.28	2.62	3.39
DAT N	SB 204	1.59	2.28	2.62	2.60675	-0.44405	1.58	2.30	2.61	3.32

		CHECK: INITIAL DATA MINUS COMPUTED			PERCENT DIFFERENCE		
DAT A	SB 223	0.003	-0.010	0.007	0.3%	-0.6%	0.4%
DAT B	SB 213	-0.010	0.035	-0.024	-0.8%	1.7%	-1.1%
DAT C	SB 206	0.006	-0.018	0.013	0.4%	-0.9%	0.5%
DAT D	SB 215	0.034	-0.113	0.079	2.6%	-6.1%	3.3%
DAT E	SB 201	-0.012	0.039	-0.027	-0.8%	1.8%	-1.1%
DAT F	SB 202	-0.023	0.076	-0.053	-1.5%	3.3%	-2.2%
DAT G	SB 207 211 212	0.016	-0.054	0.038	1.2%	-2.6%	1.5%
DAT I	SB 214	0.045	-0.148	0.103	3.5%	-8.0%	4.2%
DAT J	SB 205	0.000	-0.001	0.001	0.0%	-0.1%	0.0%
DAT K	SB 208	0.033	-0.109	0.076	2.3%	-5.4%	3.0%
DAT L	SB 210	0.004	-0.015	0.010	0.3%	-0.7%	0.4%
DAT M	SB 203 209	0.001	-0.004	0.003	0.1%	-0.2%	0.1%
DAT N	SB 204	0.006	-0.019	0.013	0.4%	-0.8%	0.5%
	AVG	0.0079	-0.026	0.0183	0.6%	-1.4%	0.7%

REGRESSION ANALYSIS OF interbasin PRECIPITATION
values are BEFORE depth area reduction

SEQ	STORM	DATA FROM JMM MODELS 10-YR	50-YR	100-YR	REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB)) A	B	COMPUTED VALUES 10-YR	50-YR	100-YR	500-YR
	PROBABILITY (%)	10	2	1			10	2	1	0.2
1	SB 105	2.23	3.33	3.72	3.74591	-0.65351	2.24	3.29	3.75	4.80
2	SB 104	2.23	3.33	3.72	3.74591	-0.65351	2.24	3.29	3.75	4.80
3	SB 103	1.95	2.87	3.29	3.28264	-0.58014	1.95	2.88	3.28	4.22
4	SB 102	1.71	2.6	3	2.99483	-0.55896	1.71	2.61	2.99	3.89
5	SB 101	1.58	2.32	2.72	2.69485	-0.48888	1.57	2.36	2.69	3.48
6	SB 111	1.71	2.73	3.15	3.15597	-0.62686	1.71	2.72	3.16	4.16
7	SB 116	1.58	2.32	2.52	2.55672	-0.41732	1.60	2.27	2.56	3.23
8	SB 110	1.71	2.6	3	2.99483	-0.55896	1.71	2.61	2.99	3.89
9	SB 109	1.58	2.32	2.72	2.69485	-0.48888	1.57	2.36	2.69	3.48

difference			
	0.0112	-0.037	0.0259
	0.0112	-0.037	0.0259
	-0.003	0.0105	-0.007
	-0.002	0.0074	-0.005
	-0.011	0.036	-0.025
	0.0026	-0.009	0.006
	0.0158	-0.053	0.0367
	-0.002	0.0074	-0.005
	-0.011	0.036	-0.025
	0.0013	-0.004	0.0029

REGRESSION ANALYSIS OF RANGE WASH PRECIPITATION
VALUES ARE FROM BOYLE ENGINEERING CORPORATION

	DATA FROM MODEL						REGRESSION EQN COEFFICIENTS Y=A+B*(LN(%PROB))		COMPUTED VALUES					
SITE	5-YR	10-YR	25-YR	50-YR	100-YR	500-yr	A	B	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR
	20.00	10.00	4	2	1	0.2								
41	0.91	1.09	1.4	1.68	1.89		1.889	-0.336	0.884	1.117	1.424	1.657	1.889	2.429
302	0.87	1.04	1.34	1.61	1.81		1.8097	-0.32238	0.844	1.067	1.363	1.586	1.810	2.329
303	0.81	0.99	1.25	1.53	1.69		1.70037	-0.30251	0.794	1.004	1.281	1.491	1.700	2.187
42B	0.83	1.02	1.28	1.53	1.73		1.72602	-0.30251	0.820	1.029	1.307	1.516	1.726	2.213
42A	0.83	1.02	1.28	1.53	1.73		1.72602	-0.30251	0.820	1.029	1.307	1.516	1.726	2.213
305	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008
43	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008
309A	0.75	0.92	1.16	1.38	1.57		1.5633	-0.27603	0.736	0.928	1.181	1.372	1.563	2.008

DIFFERENTIAL: INITIAL DATA MINUS COMPUTED

SITE	5-YR	10-YR	25-YR	50-YR	100-YR
41	0.026	-0.027	-0.024	0.023	0.001
302	0.026	-0.027	-0.023	0.024	0.000
303	0.016	-0.014	-0.031	0.039	-0.010
42B	0.010	-0.009	-0.027	0.014	0.004
42A	0.010	-0.009	-0.027	0.014	0.004
305	0.014	-0.008	-0.021	0.008	0.007
43	0.014	-0.008	-0.021	0.008	0.007
309A	0.014	-0.008	-0.021	0.008	0.007

PERCENT DIFFERENCE

SITE	5-YR	10-YR	25-YR	50-YR	100-YR
41	2.9%	-2.4%	-1.7%	1.4%	0.0%
302	3.0%	-2.6%	-1.7%	1.5%	0.0%
303	2.0%	-1.4%	-2.5%	2.6%	-0.6%
42B	1.2%	-0.9%	-2.1%	0.9%	0.2%
42A	1.2%	-0.9%	-2.1%	0.9%	0.2%
305	1.8%	-0.8%	-1.8%	0.6%	0.4%
43	1.8%	-0.8%	-1.8%	0.6%	0.4%
309A	1.8%	-0.8%	-1.8%	0.6%	0.4%

UPPER LAS VEGAS WASH Volume 4 PART 2

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 4
Engineering Analysis
without North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 4
Engineering Analyses; without North Las Vegas Detention Basin Diversion Dike

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1. Cross Section Label Key
2. Cross Section Plots

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

The Upper Las Vegas Wash Flood Insurance Study area extends from the upstream end of the Upper Las Vegas Wash Diversion Berm/Channel downstream through a series of flood control structures to the terminus of the King Charles channel at its confluence with the A Channel. The wash was separated into 3 subreaches:

- Subreach 1 - Upper Las Vegas Wash Interception Berm/Channel to Upper Las Vegas Detention Basin (ULVDB)
- Subreach 2 - ULVDB to the North Las Vegas Detention Basin (NLVDB)
- Subreach 3 - NLVDB to the terminus of the King Charles channel (KCC) at its confluence with the A Channel near I-15
- Subreach 4 - N Channel from the diversion at King Charles to the Interstate 10 and N Channel culvert

The water surface profiles for each subreach were modeled using HEC-2. The discharges for the models were computed using HEC-1. Listed below are the HEC-2 models used by subreach.

Subreach 1

ulvdv5	ULVDB to upstream end of the Upper Las Vegas Diversion Berm (upstream study limits) subcritical model, 10-500 yr profiles

Subreach 2

nlvdbv6b	NLVDB to Upper Las Vegas Detention Basin (ULVDB) subcritical model, 10-500 yr profiles

Subreach 3

lnlvwo16	Downstream study limit at A Channel to North Las Vegas Detention Basin (NLVDB) subcritical model, 10-50 yr profiles
ln-50026	Craig Road Bridge to NLVDB subcritical model, 100 -500 yr profiles
kgsbwo2	King Charles Channel, A Channel to Craig Road Bridge, subcritical model, 100-500 yr profiles
kgscwo2	King Charles Channel , A Channel to Craig Road Bridge, supercritical model, 10-500 yr profiles

The "N" Channel Diversion diverts flow from the King Charles Channel into a lined concrete channel between the King Charles Channel and I-15. This channel was modeled as a separate subreach.

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Subreach 4

nch-spwo N Channel supercritical model, 10-50 yr profiles

nch-spwob N Channel supercritical model, 100 - 500 yr profile

Subreach 1 - ULV Interception Berm/Channel (sta 749+97) to the ULVDB (590+59)

A subcritical/critical water surface profile was modeled from downstream to upstream from the Upper Las Vegas Detention Basin to the upstream end of the Upper Las Vegas Interception Berm (file name: ULVDV5.dat). The peak discharge for each return period was used throughout the model subreach to compute the water surface profile.

Discharges: Q_{10}=3465 cfs, Q_{50}=10312, Q_{100}=14737 cfs, Q_{500}=24938 cfs
Wash Manning's n = 0.04
Concrete, Soil Cement n = 0.025
expansion coeff=0.3
contraction coeff =0.1

The Project Officer advised us to use the upslope (northerly) floodplain boundary as the limit of study between the ULV Diversion Berm/Channel to the ULVDB. Therefore, the flood hazards on the fan surface and inflowing arroyos were not determined or mapped.

Listed below by station are comments regarding the characteristics of the wash.

Sta	Description
749+97	Upstream extent of HEC-2 model, at the upstream end of the Upper Las Vegas Wash Interceptor Berm/Channel. The interceptor berm extends from station 660+60 to 749+97 the right bank is lined with rock (d50=12"), the channel bottom is compacted native material. The left bank is lined with roller compacted concrete. A Manning's n of 0.04 was used throughout the subreach.
668+14	Upstream end of 4.5' high rock grade control structure
666+60	Downstream end of rock grade control apron
660+60	Downstream end of Interceptor berm where the interceptor channel transitions into the wash. Manning's "n" for wash reach to basin=0.04
590+59	Downstream end of the HEC-2 model. The ULVDB Pool elevations were used in the model as the starting water surface elevations.

Return period (yr)	10	50	100	500
Discharge (cfs)	3465	10312	14737	24938
ULVDB Pool Elev (ft)	2351.3	2367.0	2372.4	2375.7

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Subreach 2 - ULVDB (sta 564+87) to NLVDB (306+80)

A subcritical/critical water surface profile was modeled from downstream to upstream from the NLVDB to the ULVDB (file name: NLVDB6B.dat). The peak discharges in the wash for the 10 - 100 year events are produced by the Interbasin Storm. The peak discharge in the wash for the 500 year event is produced by the Spring Mountain Storm. A station equation was placed at Station 311+00 ahead and 299+01.96 back to maintain the stationing established in the With Diversion Dike condition. This equation is only applicable to the Without Diversion Dike condition. The 10 yr and 50 yr FIS profiles are not shown between stations 267+00 and 311+00, since they follow a different hydraulic baseline alignment.

Wash Discharges: Q_{10}=2939 cfs (IB), Q_{50}=6751 (IB), Q_{100}=8537 cfs, Q_{500}=19217 cfs
Wash Manning's n = 0.04
expansion coeff=0.3
contraction coeff =0.1

The Project Officer advised us to use the upslope (northerly) floodplain boundary as the limit of study between the ULVDB to the NLVDB.

Listed below by station are comments regarding the characteristics of the wash.

Sta	Description
564+87	Upstream extent of model; The source of the cross sections downstream of Upper Las Vegas Detention Basin Spillway are from Upper Las Vegas Detention Basin Plans. The peak discharges for the Interbasin storm and Spring Mountain Storm were used in the HEC-2 modeled from 564+87 to 309+35 (Q_{10}=2939 cfs (IB), Q_{50}=6751 (IB), Q_{100}=8537 cfs, Q_{500}=19217 cfs)
564+97 -558+70	Transition from spillway to wash; cross-sections cut from Upper Las Vegas Detention Basin Plans. The lining is native material over a roller compacted concrete toe. The spillway apron toe is 26ft below the invert elevation of the transition
555+70 -320+44	The wash sections were obtained by aerial photogrammetry
315+00 -312+35	Wash sections were obtained from the 1996 Kenney Aerial Topographic Maps

The NLVDB Diversion Dike diverts flow from the historical wash channel into the North Las Vegas Detention Basin. The was changes invert slope (0.01 in the wash to 0.002 in the diversion channel) and bottom width (120 feet in the wash to 70 feet in the diversion channel). Diversion channel sections were obtained from the project plans.

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

An 'n' of 0.025 was used in the lined channel.

The HEC-2 model NLDVB6B extends into the North Las Vegas Detention Basin. This alignment is different from the hydraulic baseline alignment, which contains a station equation at the diversion dike, and continues down the historical wash channel through the diversion dike. NLDVB6B was used to general computed 10 through 100 year water surfaces in the diversion channel and upstream in the wash. The results of this model indicated that the 100-year discharge would slightly overtop the diversion dike crest of 2142.0 feet. The computed water surface elevations in the model do not take into account uncertainties introduced by the potential effects of sediment deposition at the change in direction of flow at the dike, changes from super- to subcritical flow, superelevation at the bend, or waves, all of which could increase the actual water surface elevations. Based on this analysis, the performance of the dike to withstand the 100-year event was questioned (See *Review of Flood Control Structures, Volume 2*), and the dike was assumed (for this study case) not to remain in place at discharges equal to or greater than the 100-year peak discharge.

Computed water surface elevations in the NLVDB6B model for the 10- and 50-year discharges are at least three feet below the top of the dike and are therefore diverted into the basin. Removal of the dike in the 100- and 500-year discharges, and modeling these flows down the historical wash channel without the dike in place, would produce lower water surfaces than the NLVDB6B model at the dike and immediately upstream. However, because the dike would likely remain in place until overtopped, the NLVDB6B model was used to set 100- and 500-year water surface elevations in the vicinity of the dike, downstream of the dike in the diversion channel, and immediately upstream of the dike in the wash. The 100- and 500-year water surfaces are coincident at the dike and immediately upstream due to the assumption that the dike remains in place up to the 100-year discharge, and then is removed.

307+65 This section represents the upstream end of the control structure transition which serves to constrict the flow, causing wash flows over approximately 8350 cfs to begin diverting flow over the dike. The flow splits between the flow into the basin and over the dike were calculated in the HEC-1 models using a rating table developed in HEC-2, refer to the DIVDIKE node in the HEC-1 models.

306+80 The downstream end of control structure transition. The channel slope changes from 0.2% upstream in the diversion channel to 0.76% downstream in the basin inlet channel.

306+50 The downstream end of control structure is lined with soil cement. Critical depth was computed in both sub and super critical runs at this section. A stable supercritical water surface profile was computed downstream of this section to the downstream end of the inlet channel. The supercritical flow regime is drowned out by the basin stage at the time of the peak

discharge. Upstream of this section in the diversion channel, approximately 200 cfs is diverted during the 100 year event and 6838 cfs during the 500 year event over the dike. The resulting flows downstream of this section are 8343 and 10989 cfs for the 100 and 500 year events, respectively.

300+67 Supercritical flow 10-500 yr, BFE's set by maximum basin stage computed in HEC-1.

294+85 Supercritical flow 10-500 yr, BFE's set by maximum basin stage computed in HEC-1.

The maximum basin stages in the NLVDB for the 10 - 100-yr were determined using the respective Spring Mountain HEC-1 models for each recurrence interval. This storm produces higher runoff volumes than the Interbasin Storm, and is thus the critical storm for determining basin-pool elevations. The Spring Mountain discharges attenuated by the ULVDB are conveyed through the NLVDB diversion dike channel with adequate freeboard for the 10 - 100-yr events. The peak stage in the basin during the 500-yr flood would be produced by the Range Wash Storm, since 500-yr runoff events from the Interbasin and Spring Mountain Storms would overtop the diversion dike.

The starting water surface for the 10-year event was determined using normal depth. The basin stages at the time of the peak were used in the HEC-2 model as the starting water surfaces for the 50-year event (2121.5), 100-year event (2125.0), and 500-yr event (2129.0).

Return period	10	50	100	500
Wash Flow	2939	6751	8537	19217
NLVDB Inflow	2939	6751	8343	8343
Basin Pool elev.	2117.9	2130.5	2135.4	2137.3

Subreach 3 - NLVDB (299+02) to A Channel (1+50)

The water surface profile for Subreach 3 between NLVDB and the downstream terminus of the King Charles Channel at the A Channel was computed using several models. The reach from the Craig Road Bridge to the NLVDB was modeled as a subcritical/critical water surface profile. The water surface profile from the downstream terminus of the King Charles Channel to Craig Road Bridge was computed using both subcritical/critical and supercritical/critical flow regimes.

There are numerous locations within the wash upstream of Lone Mountain Road with substantial piles of rubble and debris, including auto bodies, concrete construction debris, tires, and urban trash. This debris was observed during each of the 3 NHC site

visits. There is a high probability that much of this debris would be mobilized during large flood events and potentially reduce the capacity of the existing flood control structures. The City of North Las Vegas responded to NHC's concerns by stating in a letter dated June 21, 1996 that:

> The section of the wash between Lone Mountain Road and the North Las Vegas Detention Basin is scheduled for cleaning and debris removal on a yearly basis. Our maintenance schedule indicates that these activities should occur within the next 60 days. For your reference in preparing your hydraulic model, I will provide you with a photograph of the wash after maintenance activities are complete.

During a site visit in December of 1997, the amount of debris and rubble in the wash appeared to have increased from the previous site visit in 1996. In general, the hydraulic models assume that the debris in the wash will not affect conveyance. However, the effects of debris were taken into account at section 184+62 and at Lone Mountain Bridge. (See discussion below.)

N Values used in Subreach 3

Concrete lined channel	n = 0.014
Developed overbanks (Primarily pavement areas, smooth earth, or sparse landscaping)	n= 0.03 to 0.035
Earth Channels (constructed)	n = 0.03
Unimproved Wash	n = 0.045
Industrial lots	n = 0.045
expansion coeff=0.3	
contraction coeff =0.1	

The hydraulic baseline was modified from the With Diversion Dike Condition to follow the historical wash between stations 267+00 and 299+02. HEC-2 model LN-50026 with the 100- and 500-yr profiles, reflects this alignment, however the HEC-2 model LNLVWO16 alignment for the 10- and 50-yr profiles is consistent with the With Diversion Dike Condition (these flows are assumed diverted through the basin).

Sta	Description
294+13	Cross sections obtained from 1996 Kenney aerial photogrammetry
268+45	A Manning's n of 0.045 was used for the wash from station 294+13 to the Lone Mountain Bridge.
263+83	Begin profile for 10- and 50-yr floods. Sections obtained from aerial
198+02	photogrammetry.
192+15	Sections cut from CNLV Topographic maps
-186+19	Sections represent topography at a large excavation in the wash

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

184+72
184+62

Sections represent channel constrictions caused by tailing's piles and concrete rubble pile in channel invert. The mounds and debris cause the flow to back up and water to break out between 18710 & 18472 during the 100 and 500 year flood events. The peak breakout flow for the 100 year event is 426 cfs and 2921 cfs for the 500 yr event. This flow leaves the channel at Losee and Azure. A pile of concrete construction debris (i.e. concrete junction boxes, manhole eccentric cones and bases) deposited on the upstream side of a dirt road (Azure) appears as a 2-3' mound in the wash invert on the CNLV topography maps. The cross sections used in the model reflect this pile of debris to the extent possible from available mapping.

Breakout flows calculations at Azure and Losee Rd., Station 185+00 compute normal depth of a rectangular channel at 1' depth for breakout Q

100 yr Q_{out} = 426 cfs
n = 0.045
s = 0.008 $^{ft}/_{ft}$
w = 150 → v = 2.9 fps, d = 1.0'
ss = 0

∴ End AO_1 Zone where breakout flow crosses over Losee & Azure and is unconfined laterally

500 yr

Q_{out} = 2,921 cfs
The CNLV Topographic maps were used to delineate the 500 yr flood plain. Downslope of the intersection of Losee & Azure the ground surface slopes at 1% to the southeast. The cross section normal to the direction of flow is relatively flat with out any significant channels. The breakout flow will likely spread to sheet flow until it is confined to 1-3' deep rills in the wash surface. A ridge shown on the CNLV topography confines the flow on the east side. The lateral extent of the 500 yr flood plain was approximated using normal depth calculations. Berms on the up-slope side of a golf course south of Ann Road cause some of the 500-year event to be pooled.

There is a high degree of uncertainty as to how the 2,921 cfs breaking out of the channel at Azure and Losee will be distributed in the wash - east of the main wash. A ridge approximately 750' to the east of Losee (shown on sheet 19 of the City of North Las Vegas topo) confines the eastern inundation limits to a 1300 ft ± corridor. Approximate depth and velocity is as follows

Rectangular channel
BW = 1300'

Q = 2921		depth = 0.8 ft
n = 0.045	→	vel = 2.8 fps
s = 0.01		

176+12 Section obtained by aerial photogrammetry.

170+58-165+46 These sections were obtained by aerial photogrammetry. The wash is composed of a partially constructed channel within the natural wash. We were provided with signed and approved rough grading plans for the Sunrise Park Inc., dated May 1996. During our December 1997 site visit, it appeared construction had been suspended. City officials informed NHC that the project had been stopped. At this time the section 165+46, obtained from aerial photogrammetry, was inserted back into the models and the Sunrise Park sections were removed. In April of 1998, following completion of the hydraulic modeling we were informed the plans for this section of channel were completed. Since incorporating these improvements would have required remodeling this subreach and would have delayed the submittal of the study, it was agreed with the Project Officer that the proposed improvements would not be included in the study.

Near section 170+58 there is significant debris scattered in the wash The debris includes a mound of tires approx 100'x50' appearing 1'-3' deep, plywood, on other urban debris. This debris was assumed to be removed as per the CNLV letter dated June 21, 1996.

156+67 The section was obtained from CNLV aerial topographic mapping. Upstream of this section is unfinished channel grading from the Sunrise Park Inc construction.

156+67-143+68 Drainage channel: rock side slopes and a native material bed. Downstream of this section are channel improvements consisting of rock side slopes and a native material bed. We were unable to obtain channel plans for these improvements, however the sections 156+67 through 143+68 reflect the channel geometry as of December 1997.

<u>100-year</u> - Split flow computation between 130+94 and 151+14

Excavation in the wash between section 151+14 and 143+68 causes flow to overtop the left overbank area and sheet flow along the wash west of the main channel within the wash. Although, the main channel within the wash downstream of section 143+68 is capable of conveying the entire 100-year flow of 8,109 cfs, there are not any prominent physical features to guide the overbank flow back into the channel between sections 143+68 and 130+94. The flow on the west floodplain downstream of section

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

143+68 is hydraulically disconnected from the water surface profile computed by HEC-2. Breakout flows along the west bank will result in shallow flooding to the right of the channel. Normal depth calculations were used to determine the depth and velocity of the flow in the area to the west of the wash channel.

Break out flow:

avg depth = 1 ft	at a width = 500'	
s = 0.005 $^{ft}/_{ft}$		
n = 0.045	normal depth =>	Q = 1164 cfs
		V = 2.3 fps

AO Zone calc. from 130+94 to 151+14

s = 0.005		
n = 0.045		
w = 450'	normal depth =>	1.1 ft
Q = 1164		v = 2.4 fps

This sheet flow will return to the channel near station 130+94 where it will be captured by a trench running perpendicular to the wash. Due to the uncertainty in predicting where the flow will reenter the channel the BFE's were calculated in HEC-2 using the entire 100 yr flow of 8109 cfs.

143+68 The channel narrows at this location upstream of a perpendicular trench in the wash. Cross section was obtained from CNLV aerial topographic mapping.

141+67-130+94 Channel incised in wash between these stations, native earth bed and bank. These sections were obtained by aerial photogrametry. 20' wide trench perpendicular to channel intercepts right overbank flows.

130+94 116+14 The main channel transitions from a 100' wide and 8-12' deep man made channel to the shallower wider wash.

The wash flows southeast across Losee between sections 116+14 and 9+29. The majority of the flow crosses at two low water crossings along Losee, refer to spot elevations on Sheet 7 of the Work Maps for low water crossings on road. The wash main channel intersects Losee Road approx 350' south of Washburn Road.

109+62-101+55 At section 101+155, La Madre Way cuts through a ridge in the wash and is a localized low spot on the left bank. Cross section 101+55 in the HEC-2 run shows overtopping along the right bank during the 100 yr flood. The amount of flow that would break out at this location is small since the computed overtopping depth is 0.1' and the width of the low point is approximately 40 ft.

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

These cross sections were obtained from aerial photogrammetry.

101+55-88-60

The 10 yr and 50 yr flows are conveyed to Lone Mountain Road bridge within the wash. A rainfall event upstream of the bridge occurring in the summer/fall of 1997 was estimated to have had a peak discharge of 200 to 400 cfs. This estimate was developed from the highwater marks left downstream at the Craig Road Culverts. During a site visit in December 1997 there was approximately 2-3 feet of deposition in the Lone Mountain inlet channel and bridge. Much of this deposition is a result of headcut erosion occurring immediately upstream of the concrete bridge inlet channel in a native earth transition to the wash. The slope of the wash before the event was approximately 1%, the earth transition was approximately 9%, and the concrete inlet channel is 1%. On the December 1997 visit, the slope in the now larger transition was estimated to be 4 to 6%, with several large headcut channels at the upstream end. The material deposited in the channel and bridge ranged in size from large gravels to cobbles. The larger material is not representative of the wash surface, but is evident in the banks of the eroding channels. This material is older alluvial deposits, and appears to be available in virtually unlimited supply if the headcutting process proceeds upstream to Losee Road.

The large volume of sediment deposited in the channel and bridge, during the summer/fall 1997 flood event raised the question: would the channel and bridge become blocked with sediment during the 10 and 50 yr flood events? To answer this question, the critical shear stress was calculated for a 5" cobble. It was assumed that 90% of the inflowing sediment to the channel had a nominal diameter of less than 5 inches. The critical shear was related to flow depth to determine if the flow depths in the channel and bridge were greater than the depth required to initiate motion in 90% of the inflowing particle sizes flowing into the channel and bridge section. Assuming a dimension less shear stress between 0.03 and 0.047 and energy slope through the bridge to be equal to the bed slope, 1%, the critical shear stress required to move a 5" particle ranges from 61.5 and 96.4 N/m. These critical shear stresses correspond to flow depths between 2 and 3.5 feet. This cursory analysis does not take into account the dynamics of the bed load matrix, hiding factors, changing transport capacities, or sediment continuity that would be required better estimate the sediment routing through the channel and bridge. However, it does provide a rough estimate that at flow depths greater than 3.5 feet deep the culvert would likely pass the sediment through the channel and bridge.

Using an HEC-RAS model of the reach between Lone Mountain and Craig Road produced for the **142 Acre Site at Losee Road and Craig Road LOMR**, the flow through the Lone Mountain Road Bridge was found to

become pressurized at flows greater than 4000 cfs. The bridge would be pressurized during a 100 and 500 yr floods of 8110 and 14939 cfs, respectively, with flow overtopping the road and breaking out over the left bank. Much of the bedload carried into the inlet channel by the 100 and 500 yr floods would be deposited in the channel and bridge, since the bridge would be capable of passing less than 50% of the flow, but 90 to 100% of the bedload mobilized by the 100 and 500 yr floods would be conveyed to the bridge inlet channel.

Based on the high supply of cobble sized material that would not be transported through the bridge under pressure flow conditions, the Lone Mountain Bridge was assumed blocked during 100 and 500 yr floods. Because the bridge remains in open channel flow conditions during the 50-year event, it was assumed that the inflowing load will be transported through the bridge under these conditions. Lone Mountain Road slopes to the east at approximately 1 to 3%. The 100 and 500 year flows would be backed up by the road and overtop the road from the Losee/Lone Mountain Intersection to approximately 1700 feet to the east along Lone Mountain Road. There would be a significant difference in energy head between the flow overtopping the bridge at Lone Mountain Road and overtopping Lone Mountain near Berg Street. The overtopping of Lone Mountain was modeled by cutting a section starting downstream of the left bank of section 9120 to the center of the bridge and then to the intersection of Losee and Lone Mountain Road. This section does not appear in the 10-50 yr HEC-2 model (LNLVW16O).

Flow splits at Lone Mountain Bridge

Lone Mountain Bridge is assumed to be completely blocked during the 100 and 500 without diversion scenarios. The flow split at the bridge was computed by partitioning cross sections 87+94, at the bridge, into areas where the flow would be conveyed in the right and left banks and in the channel. The ratio of the conveyance area of each partition with the total area was multiplied by the peak discharge.

100 year

Left floodplain
(8109 cfs) (57%) = 4622 cfs

Channel
(8109 cfs) (11%) = 892 cfs

Right floodplain
(8109 cfs) (32%) = 2595 cfs

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

Sheet flow computations for the left and right floodplains were based on normal depth computations.

Left bank normal depth computation downstream of Lone Mountain Road

Q = 4622 cfs
n = 0.03 side slope right = 0
s = 0.008 side slope left = 175
bw = 650'

=> d = 1.3', v = 4.8 fps ∴ AO depth 1 ft
a slight ridge running north to south confines the flow in the left floodplain on the east side and guides the flow back to the channel downstream of cross section 6828 where the flow starts to back up and break out as a result of the Craig Road culverts.

Right bank normal depth computation downstream of Lone Mountain Road

Lone Mnt Rd to 350' d/s of LMR
n = 0.03
s = 0.008
bw = 400
Q = 2594 cfs => d = 1.3 ft, v = 5.1 ft

350' d/s of LMR to 650' d/s of LMR
n = 0.03
s = 0.008
bw = 600
Q = 2594 cfs => d = 1.0 ft, v = 4.4 fps

> 650' d/s of LMR
n = 0.03
s = 0.008
bw = 900
Q = 2594 cfs => d=0.77, v = 3.7 fps, E ≈ 1.0
End AO zone depth 1'
Losee Road confines the right floodplain flow on the west side. The flow will disperse and have an energy depth less than 1' and/or re-enter the channel.

91+20 Upstream end of concrete inlet channel to Lone Mountain Road. The transition from the wash to the inlet channel consists of an unlined 9% flared slope to the wash that has been head cut into several gullies to a slope between 4% & 6%, as described above.

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

88+60 Station Equation 88+60 ahead = 88+34.5 back downstream end of concrete inlet channel upstream end of Lone Mountain Road Bridge. Section used for 10 and 50 yr HEC-2 model (LNLVWO16). Section not included in 100-500 yr flood model (LN-50026).

88+05 Left bank to Lone Mountain Road (cross section station 300) obtained from CNLV topo, cross section station 300 to Losee obtained from BSI grading plans. Section not included in 10-50 yr flood model (LNLVWO16). Section used for 100 and 500 yr HEC-2 model (LN-50026).

87+54 Downstream end of Lone Mountain Bridge begin transition to trapezoidal channel (rock side slopes & native material bottom) channel "n"=0.03 overbank n=0.03

86+73-60+92 Trapezoidal channel rock side slopes native material bottom with rock grade control structures at 200' intervals

59+74 Upstream end of Craig Road Culverts (7-8'x8.5' RCB). The culvert has adequate capacity to convey the 10 - 50 year flood events. The 100 and 500 yr HEC-2 model, LN-50026, ends at this station. The starting water surface elevation for the 100 and 500 yr model was determined by balancing the flow through the Craig Road culverts, the flow over Craig Road at the culvert and the flow over Craig near the intersection of Craig and Frehner Road with the total 100 yr flow of 8109 cfs for a given water surface elevation (see Table 1). The rating curve for the culvert was computed using HY8. The low points along Craig Road occur near the intersection of Craig and Frehner roads, approximately 1923.6 feet NGVD 29 and near the center of the Craig Culvert, approximately 1924 feet NGVD 29. Road profiles and low points were obtained from the BSI Site Grading Plan and converted from NAVD 88 to NGVD 29 by subtracting 2.4'. The water over topping the road at Craig and Frehner during the 500 year event continues south over Craig Road and is contained to the East by the UPRR embankment. Flow overtopping Craig Road near the culvert is split to the west and east by the concrete walls of the King Charles Diversion Channel. Approximately 491cfs flows to the west into the industrial park between bordered on the west by Losee Road and on the east by the King Charles Diversion Channel.

The computed flow splits

	WSEL	Craig culvert	Left bank	Right bank
100-yr	1925.6	6307	1312	491
500-yr	1926.2	6638	4858	3444

Without North Las Vegas Detention Basin Diversion Dike - Hydraulic Notes

On the south side of Craig Road, west of the RC channel, are two 80' x 250' buildings. There are three ~35' alleys on either end of the ends of the buildings and a 35' alley between them.

Downstream of the Craig Road commercial site, the flow is bounded on the southeast by a concrete block wall on the east side of Frehner. Split flow to the right of King Charles Channel downstream of Craig Road. The UPRR bridge on the KC Channel causes water to back up and flow over the right bank upstream of the UPRR bridge. This area between Frehner and the UPRR embankment is primarily industrial businesses with 1/3 of the lot area used for storage and work areas. Chainlink fences at the borders of those businesses, in addition to stored materials will serve to disperse the flow and increase the probability of uniform shallow flooding.

n = 0.045
bw =2/3 (450) = 300
Q = 1021 cfs => d = 1.0 ft, v = 3.3 fps

The 491 cfs passing through the Craig Road commercial site will flow along Frehner and combine with the weir flow of 1021 cfs near Losee and Frehner. Any attenuation that might occur in these industrial areas is ignored. The resulting discharge between Losee and the railroad embankment is 1512 cfs.

n = 0.045
bw = 2/3 (550) = 370
Q = 1512 cfs => d = 1.1 ft, v = 3.6 fps

This flow will enter the "A" channel between Losee Road and the UPRR embankment.

KING CHARLES CHANNEL

The water surface profile for the 10-500 year flood events in the King Charles Channel were modeled for both the supercritical and subcritical flow regimes. The HEC-2 model LNLVWO16 was used to compute the 10-50 yr subcritical profiles, KGSBW02 was used to compute the 100-500 yr subcritical profile and KGSCW02 was used to compute the 10-500 yr supercritical profiles. Cross section geometry for the King Charles Channel was obtained from the King Charles Diversion Channel from the N-Channel As-built plans.

The flow in the King Charles Channel downstream of the Craig Road culvert changes regime from supercritical to subcritical, and from subcritical to supercritical. The details of the composite profiles are shown on Table 2. Froude numbers less than 1.2 were considered to be subject to a hydraulic jump. This assumption is based on COE EM1601

Hydraulic Design of Flood Control Channels (pg 11) which states that Froude numbers between 0.86 and 1.13 are unstable. Due to the uncertainties in the modeling of the channel, a Froude number of 1.2 was used instead of 1.13 to determine the lower limit of stable supercritical flow. The flow regime through the channel was determined to be supercritical if it met the following criteria:

1. Froude number >1.2
2. Downstream wsel < than upstream wsel

If both of the criteria listed above were not met than the water surface was assumed to be calculated by the subcritical model. Resulting in a subcritical or critical water surface elevation.

58+51
51+05 The KCC starts at 58+52 in a 60 foot wide concrete rectangular section downstream of the Craig Road culvert and extends down to station 51+05. The rectangular section narrows from a bottom width of 60 ft at the culvert to a width of 35 ft at section 51+05. Invert slope is 0.0065 ft/ft.

51+05
50+05 Concrete transition from rectangular channel to a trapezoidal channel at section 50+05, bottom width 15 ft, side slopes 2H:1V. The invert slope changes at section 51+05 to 0.02 ft/ft.

50+05
43+60 Concrete trapezoidal channel from 50+05 to 43+60. The invert slope changes at section 50+05 from 0.02 ft/ft to 0.0082 ft/ft. This grade of 0.0082 ft/ft extends to 41+15. A maintenance access ramp between stations 49+20 and 47+81 was not included in the models. Instead a uniform trapezoidal channel was modeled.

43+60
42+47 The channel transitions from a trapezoidal channel to a rectangular channel at the upstream face of the UPRR Bridge, station 42+46. As-built plans for the bridge were not available. Field Surveys verified the invert and soffit elevations at the bridge. The bridge was modeled using the normal bridge method. The normal bridge method accounts for the losses occurring in the 10 and 50 yr floods due to pier obstructions and increased wetted perimeter. The 100 and 500 yr flood hydraulics at the bridge become more complicated with a portion of the water that flows over Craig Road reentering the channel upstream of the UPRR bridge. In addition to the water reentering from the left bank, water is leaving the channel along the right bank and flowing into the adjacent industrial park. Rating curves for the flow through the UPRR bridge (developed using the Special Bridge routine in HEC-2), out of the channel along the right bank (developed using a standard weir equation along the right channel bank), and out of the UPRR culvert northeast of the bridge were developed. A water surface elevation was calculated by balancing the combined flow through the outlets at a common water surface elevation with the total flow

upstream of the outlets (see Table 3). The water surface elevation computed from the flow balance for the 500 yr flood was 1912.7. The water surface computed at the bridge using the normal bridge routine in HEC-2 was 1912.0. This 0.7' difference in water surface elevations near the bridge opening is acceptable due to the uncertainty of the flow characteristics at a discharge far above the capacity of the channel system.

42+47
41+88

The bridge is skewed to the flow by 35° between sections 42+47 and 41+88. The length of the bridge perpendicular to the railroad tracks is 33 ft. The effective length of the bridge, taking into account the distance between the first point along the channel centerline where the flow is directly affected by the upstream face of the bridge to the last point along the channel centerline where the flow is directly affected by the flow, is closer to 57 ft. The upstream and downstream bridge sections were spaced 57 ft apart to account for the skew of the bridge and cut perpendicular to the channel instead of using a skew factor in the HEC-2 model at the bridge.

The contraction and expansion coefficients were changed to 0.3 and 0.5, respectively, through the bridge sections. The discharge was reduced at section 42+46 from 6307 cfs to 5779 cfs to account for the breakout flows.

41+15
38+23

The flow at this section is divided between the King Charles Channel, and the N Channel. The division of flow between the King Charles Channel and the N Channel is based the ratio of the channel areas to the total channel area, resulting in 80% of the flow diverted to the King Charles Channel and 20% of the flow diverted into the N-Channel. The inlet at the N Channel has a maximum capacity of approximately 1248 cfs.

N-Channel Normal Depth Calculations

N-Channel entrance

w = 4.75
h = 10.5
s = 0.00576
n = 0.014
Q = 624
v = 12.5

A normal depth computation using the cross section at the face of the "N" channel was used to determine the maximum conveyance into the "N" channel.

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Q = 1248 cfs max conveyance

Return period	King Charles Channel u/s (cfs)	N-Channel (cfs)	King Charles Channel d/s (cfs)
10	1281	256	1025
50	2183	437	1746
100	5779	1156	4623
500	7081	1248*	5833

*since 20% of 500 w/o diversion 1416 cfs > 1248 cfs maximum, "N" Channel conveyance

A transition along the side slope of the right bank begins at section 41+15. The vertical bank changes to a 1.5H:1V side slope at section 40+60. The left bank remains vertical. The invert slope changes from 0.0082 ft/ft upstream of section 41+16 to 0.0033 ft/ft downstream of this section. The channel curves at a centerline radius of 150' to the south. The effects of superelevation were neglected. Under extreme hydraulic conditions during the 500 yr flood, transverse waves combined with superelevation may cause minor overtopping along the left bank through the curve. It is unlikely that the volume and depth of the overtopping would be sufficient to cause significant flooding. However, the area to the left of the channel was designated a shaded X Zone due to the upstream flow split through the UPRR culverts that would travel along Donovan Way (see discussion of split flow to the right of King Charles Channel).

38+23
37+24 The left bank transitions from a vertical slope to a 1.5H:1V side slope at section 37+24.

37+24
5+44 The channel between section 37+24 and 5+44 is a uniform trapezoidal channel with a bottom width of 20 ft +/- and side slopes of 1.5H:1V. A concrete trapezoidal channel drains into the KCC at station 22+50. This channel is intended to convey flow from the industrial complex to the west underneath the UPRR embankment through 2 - 3ft x 6ft culverts. Flapgates on downstream side of these culverts appeared to be stuck in an almost closed position during NHC's December 1997 field visit. On the upstream side of the culvert was half filled with sediment and had a tree with a 4" diameter trunk growing in the channel. Inflow from the culverts was neglected in the analysis.

5+44 The channel transitions from a trapezoidal channel at station 5+44 to a rectangular channel with a bottom width of 35 ft at section 4+44. The rectangular section continues to section 2+43 where a splitter wall divides the channel into to channels of equal bottom width. The HEC-2 model end at section 1+50. Downstream of this section the uniform rectangular

channel ends at station 0+88 the KCC and A Channel confluence. The stationing continues downstream to station 0+00 and the upstream face of the Interstate 15 bridge.

The starting water surface elevations used in the model at station 1+50 were calculated in HEC-2 using the slope area routine with the assumption that the bed slope approximated the energy slope at this section.

The Project Officer instructed NHC to use the Ensign and Buckley Preliminary LMMP to obtain the 100 yr backwater elevations from the A Channel (1892.9 ft). We were instructed to estimate the 10, 50, and 500 yr backwater elevations by using the discharges from the Lower Central Valley Storm in the Clark County Regional Flood Control District **Las Vegas Valley Flood Insurance Study Hydrology Report**. Normal depth was computed at station 0+00 for these discharges and added to the invert elevation at 0+00, 1885.4 ft. The Manning's N used in the calculations was calculated by applying the normal depth calculation for the known 100 yr water surface and discharge used in the Ensign and Buckley Preliminary LMMP and determining the N.

A Channel Normal Depth Calculations:
ss_L=2H:1V invert el.= 1885.4 ft
ss_R=0H:1V invert s= 0.0033 ft/ft
BW=48 ft n= 0.017

Return Period	LCVS Q	Depth	WSEL	Backwater to Station
10	2160	3.8	1889.2	1+50
50	5120	6.4	1891.8	4+50
100	6730	7.5	1892.9	0+00
500	12400	10.8	1896.2	7+00

The computed water surface elevations from the 10 - 500 yr events in the A Channel back up into the KCC and set the maximum water surface elevations for the 10, 50, and 500 year recurrence intervals as listed above.

500 Year Breakout Flows From Station Ann Road to Craig Road

The 2921 cfs breakout from the 500 yr flood will be distributed in a series of small washes across a width of approximately 1300' and an average depth of 0.8 ft upstream of Ann Road. A berm running perpendicular to the wash south of Ann Road will act to pond some of the water and force the rest toward Losee Road. The flow will be conveyed in a corridor with an approximate width of 1400' between the main wash channel and a Golf Course east of Losee. Downstream

of Washburn Road, the wash surface slopes southeasterly. Sheet flow from the 500 yr breakout flow will spread out, potentially covering an area that extends to the UPRR embankment. The inundation limits for the extent of the 500 yr breakout flow were estimated using USGS Las Vegas NE and Valley Quadrangle maps. Sheet flows will be distributed in multiple channels and new channels would probably form. The unpredictable nature of the flow paths potentially exposes the entire area shown on the work maps to shallow flooding.

100 Year Breakout Flows Downstream of Craig Road East of the King Charles Channel.

Approximately 1312 cfs during the 100 yr flood was calculated to overtop Craig Road east of the KCC. This water flows into a vacant triangular parcel bounded by the King Charles Channel on the west and the UPRR embankment to the southeast. This area has remnant channels of the Upper Las Vegas Wash which flow toward 2 - 5.5 ft x 12 ft culverts under the UPRR embankment. These culverts were computed to have a conveyance of 819 cfs at a water surface elevation of 1912.7 ft. The remaining 493 cfs would flow to the south west back into the channel upstream of the UPRR bridge.

The water flowing through the UPRR culverts would be conveyed in a trapezoidal earth channel between Donovan Road and the UPRR embankment and has a bottom width of 30 ft +/- , side slopes 3H:1V, and an average depth of 4 to 5 feet deep. The invert slope is approximately 0.005 ft/ft. The water would breakout of this channel upstream of the Donovan N Channel crossing with much of the flow entering the N Channel. A portion of the flow could cross the N Channel in Donovan Road, but this flow would be too small to result in flooding depths greater than 1 foot for the 100-year condition.

N CHANNEL

The N Channel conveys approximately 20% of the flow for the 10-500 yr floods from the King Charles channel upstream of station 41+15 on the KCC alignment to Interstate 15, the study limit. This reach was both a subcritical/critical and supercritical/critical water surface profile was calculated using HEC-2. The subcritical/critical HEC-2 model defaulted to critical depth for the N Channel reach at a n of 0.14 the n was increased to 0.025 before the a subcritical water surface profile was computed. However, a couple of cross section were not able to converge on a solution. Those sections that did converge on a subcritical solution had unstable Froude numbers between 0.85 and 0.97. The supercritical water surface profile was stable for the entire channel reach for the 10-50 year events. The computed profile for the 100 and 500 yr floods was also stable when the combined flow from across Donovan and from the diversion was entered at the upstream end of the model. However, when the flow across

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Donovan was inserted between sections 5+71 and 4+46, the model calculated critical depth at sections 4+96 and 4+46. The increased discharges at these sections is likely the reason for the inability of the model to converge on a supercritical solution. Therefore the supercritical/critical water surface profile with overtopping between 5+71 and 4+46, channel n=0.017 in locations with side flow entering and channel n = 0.014 for other areas, was considered the most representative model of the hydraulic conditions.

As is standard practice in computing a supercritical water surface profile using HEC-2 model the fields for the contraction and expansion coefficients were swapped. The starting water surface for the model was set using the water surface elevation in the KCC at the diversion, section 41+15.

7+08
6+38 The N Channel branches off the KCC through a 9.5 ft wide concrete lined rectangular channel and has a 10" wall running down the center of channel. The channel widens from 9.5 ft to 16 ft at the upstream side of Donovan Way, station 6+38. The channel has a constant slope of 0.0058 between station 7+08 to the downstream study limit at station 0+00

6+38 The N Channel passes under Donovan Way in 2 - 6 ft x 8 ft reinforced concrete box culverts. The soffit and invert elevations of these culverts were verified by field surveys. The culvert was modeled using the Normal Bridge Routine in HEC-2. Contraction and Expansion coefficients of 0.3 and 0.5, respectively, were used at the culvert. The contraction and expansion coefficients could have been remained 0.1 and 0.3, respectively, since the entire reach of channel from the diversion to the culvert is a gradual transition. However, a conservative approach of increasing the coefficients was modeled.

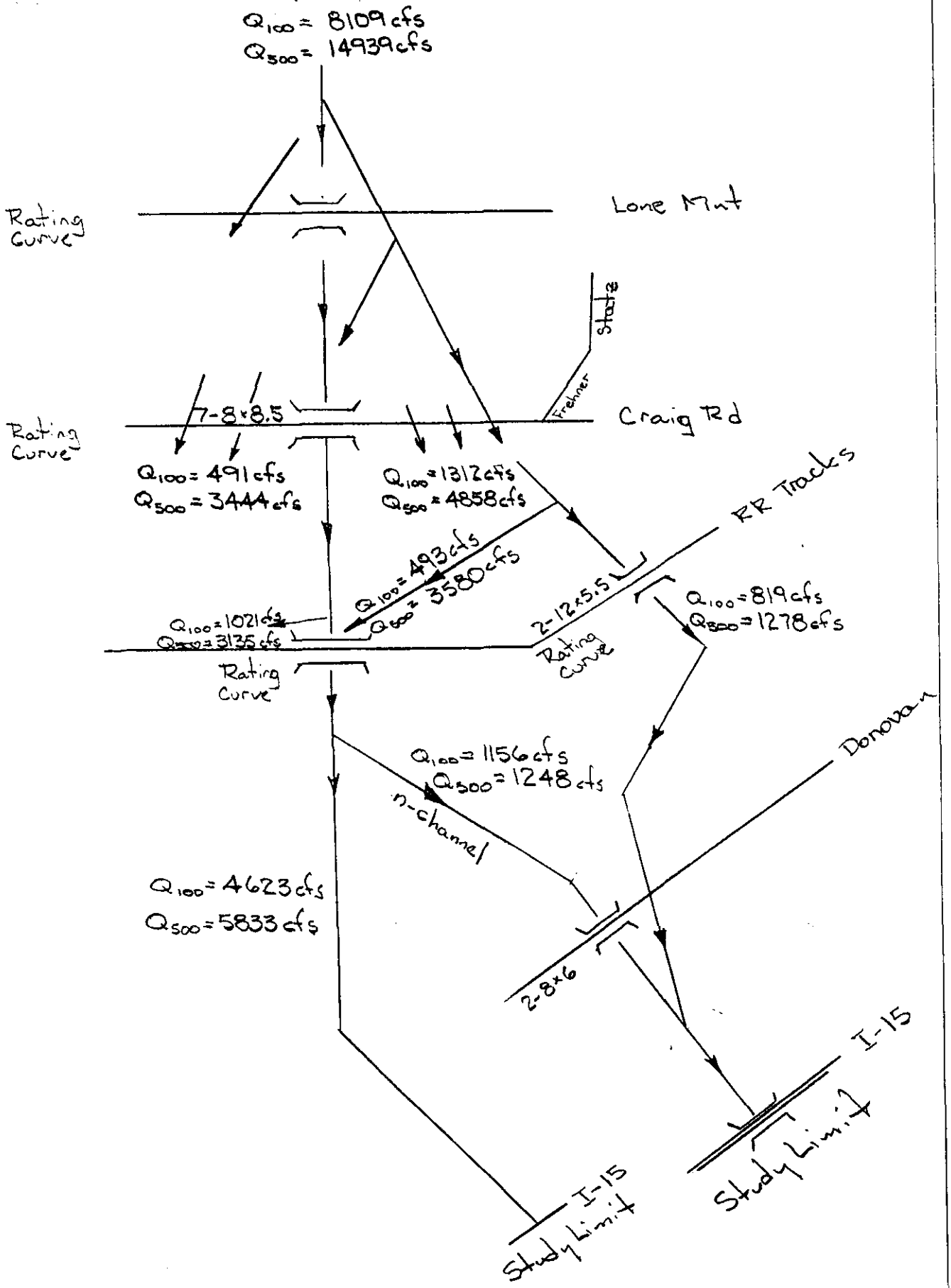
5+72
5+46 The channel transitions from the box culverts to a trapezoidal channel with a 10 ft bottom, 2H:1V side slopes, and a depth of 7 ft.

The 100 yr flow, 819 cfs, entering the N Channel from flow overtopping Donovan Way was added in 273 cfs increments to the model between sections 5+72 and 5+46, 5+46 and 4+96, and 4+96 and 4+46. The channel roughness was increased by 20% from 0.014 to 0.017 between sections 5+46 and 0+25. This increase was added to account for the turbulence created by flow entering the channel as shallow flow. No increase in the 10-100 yr floods were made since there was not any flow entering the channel at this point.

5+46
0+25 Uniform trapezoidal concrete lined channel.

0+25 Transition from trapezoidal channel to 2 - 6 ft x 12 ft concrete box culverts at station 0+00. Section 0+00, the upstream face of the Interstate 15 culvert, represents the downstream study limit.

Without Flow Splits Lone Mnt Rd to I-15



No. 5505 Engineer's Computation Pad

Table 1 **Flow Balance at Craig Road**

Craig Road 7-8x8.4 culvert
1:1 bevel , 45^ flare

Q	HW EL. NAVD88	NGVD29
5800	1924.65	1927.05
5920	1924.87	1927.27
6040	1925.01	1927.41
6160	1925.32	1927.72
6280	1925.55	1927.95
6300	1925.58	1927.98
6520	1926.01	1928.41
6640	1926.25	1928.65
6760	1926.49	1928.89
6880	1926.73	1929.13
7000	1926.98	1929.38

Flow over Craig Road

Q	WS Elev	Depth	Length
3	1924.65	0.03	150
35	1924.87	0.18	150
65	1925.01	0.27	150
503	1925.32	0.48	500
884	1925.55	0.64	580
926	1925.58	0.66	580
2755	1926.01	0.94	1000
6974	1926.25	1.11	2000
8550	1926.49	1.27	2000
10229	1926.73	1.43	2000
6041	1926.98	1.59	1000

Flow over Freiner & Craig

Q	WS Elev	Depth	Length
184	1924.65	0.55	150
304	1924.87	0.77	150
391	1925.01	0.91	150
606	1925.32	1.22	150
786	1925.55	1.45	150
810	1925.58	1.48	150
1188	1926.01	1.91	150
1419	1926.25	2.15	150
1663	1926.49	2.39	150
1919	1926.73	2.63	150
2199	1926.98	2.88	150

WSEL	craig culv	craig wr	fr/cr wr	total Q
1925.0	6031	63	384	6479
1925.2	6114	333	523	6970
1925.4	6202	635	669	7506
1925.6	6310	1011	828	8149
1925.8	6413	1861	1003	9277
1926.0	6515	2712	1179	10406
1926.2	6615	6095	1371	14081
1926.4	6715	7959	1571	16245
1926.6	6815	9319	1780	17915
1926.8	6914	9056	1998	17968

					LOB Q	craig ch	ROB Q	Total Q
~~500yr w~~	~~1925.7~~	~~6339~~	~~1253~~	~~878~~	~~8470~~	~~1504~~	~~6339~~	~~627~~	~~8470~~
100yr w/o	1925.6	6307	981	822	8109	1312	6307	491	8109
	1926.1	6588	5154	1319	13062	3896	6588	2577	13062
500yr w/o	1926.2	6638	6888	1414	14939	4858	6638	3444	14939

Table 2.

UPPER LAS VEGAS WASH - King Charles Channel without Diversion at North Las Vegas Wash
King Charles Channel Flow Regime Table

SUPERCRITICAL RUN					SUBCRITICAL RUN					Test 1	Resulting WSEL	Test 2	Final WSEL
10 YR Flood Event					10 YR Flood Event								
SECNO	Q	CWSEL	VCH	FRCH	SECNO	Q	CWSEL	VCH	FRCH				
150	1025	1889.0	9.9	1.01	150	1025	1889.0	9.9	1.02	SUB	1889.02		1889.02
243.6	1025	1888.8	11.5	1.28	243.6	1025	1889.6	8.7	0.84	SUB	1889.63	SUB	1889.63
244.6	1025	1888.6	12.0	1.36	244.6	1025	1889.8	8.1	0.76	SUB	1889.8	SUB	1889.8
450	1025	1889.2	13.8	1.65	450	1025	1890.0	9.9	1	SUPER	1889.18	SUB	1890.03
544	1025	1890.7	11.7	1.21	544	1025	1891.1	10.2	1.01	SUPER	1890.68	SUPER	1890.68
600	1025	1890.9	11.5	1.18	600	1025	1891.3	10.2	1	SUB	1891.31	SUB	1891.31
700	1025	1891.2	11.5	1.19	700	1025	1891.6	10.2	1.01	SUB	1891.6	SUB	1891.6
1200	1025	1892.7	11.9	1.24	1200	1025	1893.2	10.2	1	SUPER	1892.73	SUPER	1892.73
1700	1025	1894.5	11.8	1.22	1700	1025	1894.9	10.2	1	SUPER	1894.46	SUPER	1894.46
2000	1025	1895.5	11.7	1.21	2000	1025	1895.9	10.2	1	SUPER	1895.48	SUPER	1895.48
2200	1025	1895.8	12.8	1.38	2200	1025	1896.5	10.2	1	SUPER	1895.82	SUPER	1895.82
3724	1025	1901.5	10.2	1.01	3724	1025	1901.5	10.2	1	SUB	1901.54	SUB	1901.54
3823	1025	1901.1	10.8	1.11	3823	1025	1902.6	7.2	0.63	SUB	1902.55	SUB	1902.55
4020	1025	1901.8	10.4	1.06	4020	1025	1902.6	8.4	0.77	SUB	1902.56	SUB	1902.56
4060	1025	1902.1	10.0	1	4060	1025	1902.6	8.7	0.82	SUB	1902.55	SUB	1902.55
4115	1025	1900.6	14.6	1.94	4115	1281	1902.9	8.0	0.7	SUB	1902.86	SUB	1902.86
4188	1281	1900.9	16.5	2.39	4188	1281	1903.5	5.9	0.52	SUB	1903.5	SUB	1903.5
4189	1281	1901.0	16.3	2.35	4189	1281	1903.5	6.4	0.58	SUB	1903.45	SUB	1903.45
4246	1281	1901.3	18.7	2.89	4246	1281	1903.4	7.5	0.73	SUB	1903.39	SUB	1903.39
4247	1281	1901.2	19.0	2.96	4247	1281	1903.7	6.4	0.58	SUB	1903.68	SUB	1903.68
4360	1281	1904.4	16.9	1.84	4360	1281	1905.8	10.7	1.01	SUPER	1904.36	SUPER	1904.36
4831	1281	1908.6	14.8	1.54	4831	1281	1909.7	10.7	1.01	SUPER	1908.62	SUPER	1908.62
4920	1281	1909.5	14.1	1.45	4920	1281	1910.4	10.7	1.01	SUPER	1909.47	SUPER	1909.47
5005	1281	1910.4	13.0	1.3	5005	1281	1911.1	10.7	1.01	SUPER	1910.41	SUPER	1910.41
5105	1281	1911.2	12.1	1.22	5105	1281	1911.7	10.6	1	SUPER	1911.23	SUPER	1911.23
5200	1281	1911.6	12.2	1.29	5200	1281	1912.1	10.3	1.01	SUPER	1911.57	SUPER	1911.57
5500	1281	1913.1	11.8	1.38	5500	1281	1913.6	9.5	1	SUPER	1913.06	SUPER	1913.06
5852	1281	1915.3	9.8	1.17	5852	1281	1915.1	9.1	1.01	SUB	1915.13	SUB	1915.13
50 YR Flood Event					50 YR Flood Event								
150	1746	1890.3	11.8	1.02	150	1746	1890.3	11.8	1.02	SUB	1890.31		1890.31
243.6	1746	1889.8	14.3	1.34	243.6	1746	1891.1	10.6	0.85	SUB	1891.05	SUB	1891.05
244.6	1746	1889.6	14.8	1.42	244.6	1746	1891.3	9.7	0.76	SUB	1891.33	SUB	1891.33
450	1746	1890.2	15.8	1.56	450	1746	1891.3	11.7	1	SUPER	1890.21	SUB	1891.32
544	1746	1891.9	13.6	1.24	544	1746	1892.6	11.7	1.01	SUPER	1891.93	SUPER	1891.93
600	1746	1892.2	13.5	1.22	600	1746	1892.8	11.7	1	SUPER	1892.18	SUPER	1892.18
700	1746	1892.4	13.7	1.25	700	1746	1893.1	11.6	1.01	SUPER	1892.4	SUPER	1892.4
1200	1746	1893.9	14.0	1.28	1200	1746	1894.7	11.6	1	SUPER	1893.94	SUPER	1893.94
1700	1746	1895.7	13.9	1.28	1700	1746	1896.4	11.6	1	SUPER	1895.65	SUPER	1895.65
2000	1746	1896.6	14.0	1.28	2000	1746	1897.4	11.6	1	SUPER	1896.64	SUPER	1896.64
2200	1746	1897.0	14.9	1.4	2200	1746	1898.0	11.6	1	SUPER	1897	SUPER	1897
3724	1746	1903.0	11.7	1.01	3724	1746	1903.0	11.6	1	SUB	1903	SUB	1903
3823	1746	1902.3	13.0	1.16	3823	1746	1904.1	8.7	0.66	SUB	1904.14	SUB	1904.14
4020	1746	1902.9	13.1	1.17	4020	1746	1904.1	9.8	0.78	SUB	1904.14	SUB	1904.14
4060	1746	1903.0	13.0	1.16	4060	1746	1904.1	10.1	0.82	SUB	1904.12	SUB	1904.12
4115	1746	1901.3	18.1	2.04	4115	2183	1904.2	10.3	0.78	SUB	1904.17	SUB	1904.17
4188	2183	1901.5	19.6	2.38	4188	2183	1905.4	6.9	0.49	SUB	1905.41	SUB	1905.41
4189	2183	1901.7	19.5	2.35	4189	2183	1905.4	7.5	0.56	SUB	1905.35	SUB	1905.35
4246	2183	1902.0	21.3	2.69	4246	2183	1905.3	8.2	0.64	SUB	1905.3	SUB	1905.3
4247	2183	1901.8	21.7	2.76	4247	2183	1905.6	7.3	0.54	SUB	1905.6	SUB	1905.6
4360	2183	1905.6	18.9	1.81	4360	2183	1907.4	12.0	1	SUPER	1905.62	SUPER	1905.62
4831	2183	1910.1	16.3	1.49	4831	2183	1911.3	12.0	1.01	SUPER	1910.05	SUPER	1910.05
4920	2183	1910.9	15.5	1.4	4920	2183	1912.0	12.0	1.01	SUPER	1910.94	SUPER	1910.94
5005	2183	1912.0	14.3	1.26	5005	2183	1912.7	12.0	1.01	SUPER	1911.95	SUPER	1911.95
5105	2183	1913.2	12.6	1	5105	2183	1913.1	12.7	1	SUB	1913.13	SUB	1913.13
5200	2183	1913.0	13.7	1.18	5200	2183	1913.9	11.1	0.87	SUB	1913.94	SUB	1913.94
5500	2183	1914.2	13.4	1.28	5500	2183	1914.8	11.4	1.01	SUPER	1914.19	SUPER	1914.19
5852	2183	1916.2	12.0	1.21	5852	2183	1916.2	10.8	1.01	SUPER	1916.15	SUPER	1916.15

Table 2.

UPPER LAS VEGAS WASH - King Charles Channel without Diversion at North Las Vegas Wash
King Charles Channel Flow Regime Table

SUPERCRITICAL RUN					SUPERCRITICAL RUN					Test 1	Resulting WSEL	Test 2	Final WSEL
SECNO	Q	CWSEL	VCH	FRCH	SECNO	Q	CWSEL	VCH	FRCH				
100 YR Flood Event					100 YR Flood Event								
150	4623	1894.26	16.53	1.01	150	4623	1894.43	16.02	0.98	SUB	1894.43		1894.43
243.6	4623	1893.56	18.42	1.19	243.6	4623	1895.42	14.65	0.86	SUB	1895.42	SUB	1895.42
244.6	4623	1892.99	19.58	1.31	244.6	4623	1895.95	13.55	0.77	SUB	1895.95	SUB	1895.95
450	4623	1893.89	19.45	1.3	450	4623	1895.83	15	0.9	SUPER	1893.89	SUB	1895.83
544	4623	1895.21	18.21	1.32	544	4623	1896.49	14.66	1.01	SUPER	1895.21	SUPER	1895.21
600	4623	1895.49	18.07	1.3	600	4623	1896.73	14.67	1	SUPER	1895.49	SUPER	1895.49
700	4623	1895.66	18.36	1.33	700	4623	1896.99	14.65	1.01	SUPER	1895.66	SUPER	1895.66
1200	4623	1897.21	18.59	1.36	1200	4623	1898.6	14.64	1.01	SUPER	1897.21	SUPER	1897.21
1700	4623	1898.94	18.54	1.35	1700	4623	1900.3	14.64	1.01	SUPER	1898.94	SUPER	1898.94
2000	4623	1899.96	18.51	1.35	2000	4623	1901.3	14.64	1.01	SUPER	1899.96	SUPER	1899.96
2200	4623	1900.48	18.91	1.39	2200	4623	1901.9	14.64	1.01	SUPER	1900.48	SUPER	1900.48
3724	4623	1906.3	15.04	1.03	3724	4623	1906.95	14.67	1.01	SUB	1906.95	SUB	1906.95
3823	4623	1905.37	17.53	1.18	3823	4623	1907.54	13.79	0.86	SUB	1907.54	SUB	1907.54
4020	4623	1905.74	17.41	1.17	4020	4623	1907.51	14.93	0.96	SUB	1907.51	SUB	1907.51
4060	4623	1905.87	17.31	1.16	4060	4623	1907.44	15.41	1	SUB	1907.44	SUB	1907.44
4115	4623	1903.48	24.68	1.96	4115	5779	1907.51	16.81	1.01	SUPER	1903.48	SUB	1907.51
4188	5779	1903.58	26.21	2.26	4188	5779	1911.66	8.93	0.45	SUB	1911.66	SUB	1911.66
4189	5779	1903.94	25.93	2.22	4189	5779	1911.27	11.41	0.65	SUB	1911.27	SUB	1911.27
4246	5779	1904.22	27.19	2.39	4246	5779	1911.37	11.41	0.65	SUB	1911.37	SUB	1911.37
4247	5779	1903.83	27.87	2.48	4247	6307	1912.04	9.85	0.5	SUB	1912.04	SUB	1912.04
4360	6307	1909.15	24.29	1.84	4360	6307	1911.96	15.39	1.01	SUPER	1909.15	SUB	1911.96
4831	6307	1913.49	22.41	1.66	4831	6307	1915.87	15.36	1.01	SUPER	1913.49	SUPER	1913.49
4920	6307	1914.3	21.98	1.62	4920	6307	1916.57	15.37	1.01	SUPER	1914.3	SUPER	1914.3
5005	6307	1915.14	21.47	1.57	5005	6307	1917.27	15.37	1.01	SUPER	1915.14	SUPER	1915.14
5105	6307	1918.19	18.04	1.01	5105	6307	1918.19	18.04	1.01	SUB	1918.19	SUB	1918.19
5200	6307	1918.26	17.46	1	5200	6307	1920.52	14.09	0.73	SUB	1920.52	SUB	1920.52
5500	6307	1918.88	16.19	1	5500	6307	1921.8	11.9	0.63	SUB	1921.8	SUB	1921.8
5852	6307	1919.02	17.77	1.29	5852	6307	1922.28	11.45	0.67	SUB	1922.28	SUB	1922.28
500 YR Flood Event					500 YR Flood Event								
150	5833	1895.62	14.77	0.78	150	5833	1896.08	16.89	0.95	SUB	1896.08		1896.08
243.6	5833	1895.57	18.57	1.07	243.6	5833	1896.93	15.88	0.86	SUB	1896.93	SUB	1896.93
244.6	5833	1894.45	20.29	1.22	244.6	5833	1897.55	14.69	0.77	SUB	1897.55	SUB	1897.55
450	5833	1895.42	19.93	1.2	450	5833	1898.42	14.01	0.74	SUB	1898.42	SUB	1898.42
544	5833	1896.24	19.44	1.34	544	5833	1898.39	14.25	0.88	SUPER	1896.24	SUB	1898.39
600	5833	1896.52	19.3	1.32	600	5833	1898.24	14.95	0.94	SUPER	1896.52	SUPER	1896.52
700	5833	1896.69	19.59	1.35	700	5833	1898.23	15.49	0.99	SUPER	1896.69	SUPER	1896.69
1200	5833	1898.25	19.7	1.36	1200	5833	1899.75	15.66	1.01	SUPER	1898.25	SUPER	1898.25
1700	5833	1899.99	19.55	1.35	1700	5833	1901.47	15.62	1.01	SUPER	1899.99	SUPER	1899.99
2000	5833	1901.01	19.45	1.34	2000	5833	1902.47	15.63	1.01	SUPER	1901.01	SUPER	1901.01
2200	5833	1901.56	19.65	1.36	2200	5833	1903.07	15.63	1.01	SUPER	1901.56	SUPER	1901.56
3724	5833	1907.46	17.86	1.2	3724	5833	1909.15	12.91	0.78	SUB	1909.15	SUB	1909.15
3823	5833	1907.14	18.78	1.19	3823	5833	1908.2	16.01	0.97	SUB	1908.2	SUB	1908.2
4020	5833	1907.84	18.67	1.18	4020	5833	1908.57	16.48	1.01	SUB	1908.57	SUB	1908.57
4060	5833	1908.03	18.57	1.17	4060	5833	1908.61	16.72	1.03	SUB	1908.61	SUB	1908.61
4115	5833	1904.8	23.84	1.65	4115	7081	1908.63	18.24	1.03	SUPER	1904.8	SUB	1908.63
4188	7081	1904.54	26.15	2.03	4188	7081	1913.61	9.44	0.44	SUB	1913.61	SUB	1913.61
4189	7081	1904.99	25.78	1.99	4189	7081	1912.78	13.98	0.8	SUB	1912.78	SUB	1912.78
4246	7081	1905.28	26.76	2.11	4246	7081	1912.93	13.98	0.8	SUB	1912.93	SUB	1912.93
4247	7081	1904.75	27.67	2.21	4247	6638	1915.57	8.02	0.36	SUB	1915.57	SUB	1915.57
4360	6638	1909.35	24.63	1.85	4360	6638	1914.87	11.53	0.64	SUB	1914.87	SUB	1914.87
4831	6638	1913.69	22.81	1.67	4831	6638	1916.1	15.68	1.01	SUPER	1913.69	SUB	1916.1
4920	6638	1914.49	22.4	1.64	4920	6638	1916.83	15.62	1.01	SUPER	1914.49	SUPER	1914.49
5005	6638	1915.31	21.91	1.59	5005	6638	1917.52	15.63	1.01	SUPER	1915.31	SUPER	1915.31
5105	6638	1918.54	18.34	1.01	5105	6638	1918.54	18.34	1.01	SUB	1918.54	SUB	1918.54
5200	6638	1918.59	17.76	1	5200	6638	1920.96	14.29	0.72	SUB	1920.96	SUB	1920.96
5500	6638	1919.16	16.48	1	5500	6638	1922.3	11.98	0.62	SUB	1922.3	SUB	1922.3
5852	6638	1919.21	18.1	1.29	5852	6638	1922.83	11.37	0.64	SUB	1922.83	SUB	1922.83

Test 1: If supercritical F > 1.2, then go to Test 2 otherwise use subcritical water surface elevation

Test 2: If resulting water surface from Test 1 > downstream water surface the use supercritical watersurface otherwise use subcritical water surface elevation

Unstable Flow 0.86<F<1.13, Supercritical run assumed unstable if less than 1.2

Source: EM1601

Table 3 **Flow Balance at UPRR and King Charles intersection**

RR culvert rating table
source: hy8

Q (cfs)	HW (ft)	depth	wsel
0	100.5	0.00	1907.6
120	103.23	2.73	1910.33
240	103.55	3.05	1910.65
360	103.86	3.36	1910.96
400	103.96	3.46	1911.06
600	104.59	4.09	1911.69
720	105.16	4.66	1912.26
840	105.73	5.23	1912.83
960	106.29	5.79	1913.39
1080	106.86	6.36	1913.96
1200	107.45	6.95	1914.55

UPRR bridge rating curve
soffit el = 1910.2
source: HEC-2 SB

secno	Q (cfs)	depth	cwsel	criws	eg	vch	frch
4246	1281	3.61	1903.51	0	1904.22	6.72	0.62
4246	2183	5.51	1905.41	0	1906.28	7.52	0.56
4246	2833	6.73	1906.63	0	1907.62	7.98	0.54
4246	3125	7.25	1907.15	0	1908.19	8.17	0.53
4246	3750	8.36	1908.26	0	1909.38	8.51	0.52
4246	4375	10	1909.9	0	1910.96	8.3	0.46
4246	5000	11.42	1911.32	0	1912.39	8.3	0.43
4246	5500	12.35	1912.25	0	1913.35	8.44	0.42
4246	6500	14.08	1913.98	0	1915.16	8.75	0.41
4246	7000	14.98	1914.88	0	1916.1	8.86	0.4
4246	7500	15.32	1915.22	0	1916.56	9.28	0.42
4246	8000	15.86	1915.76	0	1917.18	9.56	0.42

Right Bank Normal Depth Calc
source: 48sx ditch prog

Q (cfs)	d	ws
100	0.9	1910.6
200	1.3	1911
300	1.6	1911.3
400	1.8	1911.5
500	2.1	1911.8
600	2.3	1912
700	2.5	1912.2
800	2.7	1912.4
900	2.8	1912.5
1000	3	1912.7
1200	3.3	1913
1500	3.6	1913.3
2000	4.2	1913.9
2500	4.6	1914.3
3000	5.1	1914.8
3500	5.4	1915.1
4000	5.8	1915.5

ws el	culv Q	brg Q	rt bank Q	Total Q
1910.5	184	4639	75	4898
1910.7	259	4727	125	5111
1910.9	337	4815	175	5327
1911.1	413	4903	233	5549
1911.3	476	4991	300	5767
1911.5	540	5097	400	6036
1911.7	602	5204	467	6273
1911.9	644	5312	550	6506
1912.1	686	5419	650	6756
1912.3	728	5529	750	7007
1912.5	771	5645	900	7315
1912.7	813	5760	1000	7573
1912.9	855	5876	1133	7864
1913.1	898	5991	1300	8189
1913.3	941	6107	1500	8548
1913.5	983	6223	1667	8872

	ws el	culv Q	brg Q	rt ban	Total Q		
	1913.7	1025	6338	1833	9197		
	1913.9	1067	6454	2000	9521		
	1914.1	1108	6567	2250	9925		
	1914.3	1149	6678	2500	10327		
	1914.5	1190	6789	2700	10679		
	1914.7	1231	6900	2900	11031		
	1914.9	1271	7029	3100	11401		
	1915.1	1312	7324	3300	11935		
	1912.5	778	5665	918	7360		
	1914.4	1167	6727	2590	10484		
100 w/o	1912.7	819	5779	1021	7619	8110	491 cfs flows to the left of the KC channel at Craig
500 w/o	1914.9	1278	7081	3135	11495	14939	3444 cfs flows to the left of the KC channel at Craig
~~500 w~~	~~1912.9~~	~~852~~	~~5868~~	~~4124~~	~~7843~~	~~8470~~	~~627 cfs flows to the left of the KC channel at Craig~~

Assumptions:

Invert El	1909.7
bw	100
SSr	55
SSl	0
Sf	0.006
n	0.1

Study Contractor: NHC

HYDRAULIC ANALYSES INDEX

City of Las Vegas, City of North Las Vegas

Clark County, NV

(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

HYDRAULIC ANALYSES INDEX

FLOODING SOURCE/ STREAM NAME	HYDRAULIC METHOD/ MODEL USED	METHOD/MODEL ANALYSIS DATE	EXHIBIT NO. PAPER COPY	EXHIBIT NO. FLOPPY DISKETTES
Upper Las Vegas Wash				
Break out Flows	Hydraulic Notes	Weir Flow Normal depth	A	CD
ULV Berm to ULVD Basin	ULVDV5/HEC-2	4/98	B	CD
ULVD Basin to NLVD Basin	NLVDBV6B/HEC-2	4/98	C	CD
NLVD Basin to A-Channel	LNLVWO16/HEC-2	4/98	D	CD
NLVD Basin to Craig Rd	LN-50026/HEC-2	4/98	E	CD
Craig Rd to A-Channel SB	KGSBWO2/HEC-2	4/98	F	CD
Craig Rd to A-Channel SC	KGSCWO2/HEC-2	4/98	G	CD
N. Channel to I-15 SC	NCH-SPWO/HEC-2	4/98	H	CD
N. Channel to I-15 SC	NCH-SPWO8/HEC-2	4/98	I	CD

Upper Las Vegas Wash
without North Las Vegas Detention Basin Diversion Dike

Paper Copy B
Upper Las Vegas Detention Basin to end of
Upper Las Vegas Diversion Berm

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15APR98    TIME   13:57:22 *
 *****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*           (916) 756-1104           *
**************************************
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x     x  xxxxxxx   xxxxx              xxxxx
x     x  x        x     x           x     x
x     x  x        x                       x
xxxxxxx  xxxx     x          xxxxx    xxxxx
x     x  x        x                  x
x     x  x        x     x            x
x     x  xxxxxxx   xxxxx              xxxxxxx
```

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1
    15APR98      13:57:22                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 15APR98    13:57:22

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC
T1      PEMA 10-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      UPPER NO. LAS VEGAS WASH

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2                                                                  2359.1

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      0                   -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150

QT        4       3465      10312      14737      24938
NC     .040       .040       .040         .1         .3

X1    59059         48       1404     2167.8
X3       10          0          0          0          0          0          0          0          0
GR   2384.7       1000     2383.8    1022.61       2379    1053.28     2381.3    1072.55     2382.8    1092.06
GR   2384.5    1110.67     2384.5    1140.38     2382.8     1157.2     2366.7    1179.45     2357.2    1201.11
GR   2357.3    1229.33     2357.5    1263.04     2357.5    1311.18     2356.8    1379.91     2382.8       1404
GR     2376    1416.23     2370.5    1436.02     2368.8    1452.13     2358.9    1479.16     2357.4    1490.49
GR     2357    1520.32     2355.5    1529.21     2357.2    1536.79     2356.9    1560.53     2356.2    1568.17
GR   2357.4    1582.07     2356.5     1621.8     2357.1    1631.88     2357.5    1678.36     2358.6    1722.03
GR   2358.6    1762.36     2358.4    1788.31     2358.7    1811.22       2359    1833.65     2359.2    1884.42
GR   2359.9     1901.3     2359.7    1929.04     2362.1    1952.43       2369    1984.65     2368.8    2040.19
GR   2371.1    2060.59     2370.4    2108.56     2365.8    2120.49     2367.7    2133.55       2381    2149.72
GR   2386.4     2167.8     2386.1    2197.93     2386.3    2238.41

X1    60826         76    1712.38    2497.85       1767       1767       1767
X3       10          0          0          0          0          0          0          0          0
GR   2392.4       1000       2394    1023.02     2392.4    1038.78     2397.9    1058.49     2395.3    1075.97
GR   2391.1     1100.2     2394.9    1117.44     2393.9    1124.66       2380    1152.28     2378.5    1168.56
GR   2377.3     1180.2     2377.6    1199.71     2380.3    1212.89     2377.3    1241.94     2377.8    1252.98
GR   2376.2    1284.24     2376.5     1299.4     2375.9    1326.12     2375.4    1337.58     2374.1    1341.99
GR   2375.8    1349.75       2375    1368.66     2375.8    1377.07     2376.2    1408.51     2386.9    1423.57
GR   2376.2    1445.88     2376.7    1471.18     2376.9    1503.45     2376.1    1537.16     2375.2    1575.28
1
    15APR98      13:57:22                                                                    PAGE    2

GR   2375.2    1594.14     2374.9    1622.95     2375.5    1634.41     2375.1    1664.71     2374.7    1682.25
GR   2372.9    1693.65     2385.7    1712.38     2382.1    1728.19     2373.8    1746.26     2374.4    1763.63
GR   2375.4    1802.46     2374.5    1814.94     2376.3    1837.01     2376.4    1860.45     2375.7    1886.94
GR   2375.3    1898.63     2373.5     1912.3     2374.3     1922.2     2371.5    1928.59     2373.6       1937
GR   2372.9     1957.4     2373.2    2000.35     2374.1    2013.36     2374.7    2038.89     2374.5    2087.87
GR   2373.9    2126.47     2373.2    2155.35     2372.6    2197.58     2372.7    2226.28     2373.4    2257.18
GR   2374.5    2274.85     2374.4     2285.1     2373.9    2291.43     2374.1    2321.86     2374.3    2364.99
GR   2374.4    2432.29     2379.2    2456.68     2389.2    2479.59     2397.8    2497.85     2394.1    2509.84
GR   2381.8    2533.33     2376.3    2552.96     2376.8    2578.91       2377    2604.09     2395.1    2630.98
GR   2396.3    2660.33

X1    62524         26       1000    1622.71       1698       1698       1698
GR   2406.4       1000     2405.4    1008.16     2398.7    1029.59     2387.5     1049.3     2388.2    1073.41
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GR	2388	1112.7	2387.9	1155.68	2387.6	1187.28	2388.1	1213.18	2388.2	1260.08
GR	2388.4	1274.19	2389	1336.34	2388.5	1346.51	2388.7	1353.78	2390.3	1368.24
GR	2390.9	1413.12	2390.5	1434.91	2390.2	1484.32	2389.8	1508.66	2390.4	1553.25
GR	2390.2	1560.63	2390.5	1577.24	2391.5	1587	2405.9	1610.57	2411	1622.71
GR	2410.9	1641.27								
X1	63598	42	1138.14	1706.37	1074	1074	1074			
X3	10	0	0	0	0	0	0	0	0	
GR	2419.8	1000	2415.8	1015.59	2415.8	1024.64	2407.5	1043.99	2409.7	1063.73
GR	2406.8	1084.98	2403.4	1100.44	2405.6	1107.23	2401.7	1119.91	2410.6	1138.14
GR	2401.9	1143.02	2399.2	1153.91	2399.1	1175.82	2398.4	1181.83	2397.7	1206.59
GR	2398.3	1214.51	2399	1238.26	2399.2	1264.33	2399.2	1295.88	2398.9	1343.44
GR	2398.3	1380.35	2398.4	1424.69	2398	1484.16	2397.7	1533.45	2397.5	1551.3
GR	2399.3	1559.64	2399.4	1605.05	2398.1	1614.34	2398.1	1650.12	2398.1	1671.78
GR	2415.9	1706.37	2413.7	1720.83	2404.1	1742.09	2405.1	1755.9	2410.6	1771.91
GR	2415.5	1789.06	2416.2	1805.67	2420.7	1839.77	2418.9	1859.3	2417.8	1879.3
GR	2417	1904.65	2415.7	1911.29						
X1	65055	62	1681.48	2222.75	1457	1457	1457			
X3	10	0	0	0	0	0	0	0	0	
GR	2428.1	1000	2428.3	1025.18	2426.1	1071.98	2414.4	1095.95	2414.6	1142.01
GR	2414.9	1157.14	2414.4	1193.39	2413.8	1199.22	2414.3	1204.34	2413.7	1232.19
GR	2413.8	1268.57	2414.1	1316.84	2413.3	1353.03	2412.6	1358.63	2413.3	1364.94
GR	2413.1	1381.78	2411.8	1391.13	2412.8	1404.23	2412.7	1434.47	2413.6	1453.46
GR	2413.5	1477.13	2413.7	1512.25	2413.1	1525.82	2413.1	1549.81	2413.4	1569.87
GR	2413	1583.44	2412.7	1618.33	2415.2	1643.74	2415.5	1681.48	2414.5	1715.41
GR	2413.4	1736.6	2411.2	1749.88	2411.5	1783.99	2410.8	1840.23	2411.5	1875.53
GR	2412.6	1897.8	2413.3	1926.96	2413.3	1949.94	2412.1	1972.09	2413	1993.04
GR	2413.7	2040.95	2413.7	2058.58	2412.6	2110.01	2412	2131.08	2412.4	2167.57
GR	2411.5	2173.16	2411.6	2180.6	2416.4	2201.08	2425.3	2222.75	2424.2	2253.46
GR	2422.9	2274.24	2426.3	2288.64	2425.7	2304.23	2418.4	2339.49	2424.2	2352.57
GR	2416.3	2378.17	2418.2	2385.25	2416.7	2390.01	2423.7	2403.42	2426.4	2420.27
GR	2424	2447.05	2425.7	2460.81						
NC	.03	.03	.03	.1	.3					
NC	.035	.035	.035	.1	.3					
X1	66061	33	1142.15	1547.04	1006	1006	1006			
X3	10	0	0	0	0	0	0	0	0	
GR	2422	1000	2420.3	1010.6	2420.5	1056.55	2420.8	1097.21	2422.1	1101.26
GR	2421.7	1116.25	2425	1126.79	2425.8	1142.15	2424.9	1158.99	2425.1	1184.71
GR	2420	1208.52	2420.1	1237.51	2419.9	1282.15	2419.9	1340.01	2420.1	1400.43

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GR	2420.1	1451.92	2420.3	1510.43	2428.2	1538.11	2428.6	1547.04	2428.5	1556.8
GR	2427.6	1561.03	2428.1	1579.96	2430.8	1590.67	2430.4	1596.92	2429.6	1601.74
GR	2431.8	1620.44	2428.8	1669.31	2429.8	1674.96	2427.6	1701.21	2427	1722.17
GR	2428	1727.46	2428.2	1745.44	2429.8	1769.16				
X1	66660	31	1255.62	1622.77	599	599	599			
X3	10	0	0	0	0	0	0	0	0	
GR	2436.0	775.00	2432.0	825.00	2427.6	1000	2427.8	1031.31	2425.8	1075.66
GR	2425.5	1117.2	2425.4	1168.93	2429.6	1180.08	2430.4	1197.88	2434.6	1217.58
GR	2434.9	1255.62	2431.5	1273	2425.1	1296.03	2425.1	1344.13	2425.5	1404.55
GR	2425.3	1470.68	2425.6	1519.85	2425.6	1588.49	2435.3	1622.77	2435	1651.58
GR	2433.1	1671.52	2434.1	1686.47	2433.6	1712.83	2432.1	1728.31	2436.3	1748.79
GR	2441.9	1771.71	2442.1	1778.67	2437.2	1797.9	2433.7	1826.05	2433.3	1844.09
GR	2433.2	1862.5								
X1	66814	36	1176.97	1618.95	154	154	154			
X3	10	0	0	0	0	0	0	0	0	
GR	2437.5	730	2431.9	840	2429.4	1000	2428.9	1036.85	2426.9	1078.1
GR	2426.4	1101.85	2427.1	1119.71	2426.7	1153.04	2434.1	1164.53	2434.1	1170.06
GR	2437	1176.97	2436.6	1195.84	2435.9	1229.11	2436.1	1250.54	2435.9	1263.1
GR	2431.5	1279.89	2431.5	1321.26	2431.4	1368.94	2431.2	1412.51	2431.1	1468.23
GR	2431.1	1526.5	2431.1	1583.41	2439.3	1608.11	2440.1	1618.95	2440	1634.31
GR	2433.4	1660.08	2433.7	1685.67	2434.6	1691.15	2434.1	1700.44	2435.9	1725.32
GR	2442.1	1752.7	2438.1	1769.25	2435.8	1785.32	2434.6	1810.56	2434.8	1826.99
GR	2433.5	1840.14								
X1	68187				1373	1373	1373		9.2	
X3	10									
X1	69560	33	1229.14	1589.47	1373	1373	1373			
X3	10	0	0	0	0	0	0	0	0	
GR	2457	600	2456	700	2456.1	1000	2455.5	1008.72	2453	1022.67
GR	2454.6	1042.07	2454.4	1072.03	2452.9	1077.13	2454.6	1083.19	2454.9	1122.82
GR	2453.4	1129.11	2453.3	1137.06	2452.3	1154.86	2452.1	1164.47	2454.8	1175.63
GR	2454.3	1197.4	2454.8	1229.14	2454.3	1242.91	2449.8	1261.07	2450.1	1304.32
GR	2449.9	1354.87	2449.6	1402.04	2449.5	1435.21	2449.9	1484.51	2450.2	1518.62
GR	2449.9	1559.63	2458.6	1589.47	2458.3	1604.36	2451.6	1627.5	2450.9	1635.87
GR	2451	1664.86	2450.8	1692.86	2454.7	1710.07				
X1	71045				1485	1485	1485		9.9	
X3	10									
X1	72532	23	1160.33	1527.5	1487	1487	1487			
X3	10	0	0	0	0	0	0	0	0	
GR	2479.4	1000	2479.4	1054.39	2478.5	1059.45	2478.6	1070.61	2478.7	1082.82
GR	2477.4	1128.55	2477.8	1160.33	2475.7	1172.96	2469.6	1193.16	2470.2	1245.75
GR	2469.7	1299.24	2469.6	1337.6	2469.7	1379.31	2469.7	1417.1	2469.9	1491.65
GR	2470.6	1499.3	2478.4	1527.5	2478.2	1538.28	2477.4	1556.39	2475.1	1569.35
GR	2474.2	1589.99	2474.3	1611.5	2475.1	1624.84				

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X1	73765				1233	1233	1233		8.3	
X3	10	0						0	0	
X1	74997	22	1273.99	1625.35	1232	1232	1232			
X3	10	0	0	0	0	0	0	0	0	
GR	2492.7	1000	2493.4	1029.61	2493	1080.21	2492.1	1117.91	2491.8	1175.23
GR	2491.2	1182.18	2491	1233.17	2492.1	1251.9	2492.9	1273.99	2486.6	1295.79
GR	2486.2	1343.52	2485.9	1401.12	2485.7	1442.79	2486	1518.89	2486.2	1559.66
GR	2486	1597.54	2494.5	1625.35	2494.6	1651.79	2491.9	1671.04	2489.6	1684.47
GR	2489.7	1701.73	2489.6	1746.66						

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1
0

CCHV= .100 CEHV= .300
*SECNO 59059.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2382.80 ELREA= 2386.40

59059.000	3.65	2359.15	2359.15	2359.10	2359.82	.67	.00	.00	2382.80
3465.0	.0	3465.0	.0	.0	526.2	.0	.0	.0	2386.40
.00	.00	6.58	.00	.000	.040	.000	.000	2355.50	1478.48
.021335	0.	0.	0.	0	4	0	.00	393.11	1871.59

*SECNO 60826.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.09

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2385.70 ELREA= 2397.80

60826.000	4.00	2375.50	.00	.00	2375.70	.19	15.82	.05	2385.70
3465.0	.0	3465.0	.0	.0	988.5	.0	30.7	20.7	2397.80
.14	.00	3.51	.00	.000	.040	.000	.000	2371.50	1742.55
.004899	1767.	1767.	1767.	10	0	0	.00	629.88	2437.89

*SECNO 62524.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .51

62524.000	2.28	2389.78	2389.75	.00	2390.53	.75	14.67	.17	2406.40
3465.0	.0	3465.0	.0	.0	499.9	.0	59.7	39.2	2411.00
.21	.00	6.93	.00	.000	.040	.000	.000	2387.50	1045.28
.019119	1698.	1698.	1698.	12	11	0	.00	318.30	1363.58

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 63598.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.88

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2410.60 ELREA= 2415.90

63598.000	2.74	2400.24	.00	.00	2400.48	.23	9.90	.05	2410.60
3465.0	.0	3465.0	.0	.0	893.0	.0	76.9	49.6	2415.90
.28	.00	3.88	.00	.000	.040	.000	.000	2397.50	1149.70
.005404	1074.	1074.	1074.	5	0	0	.00	526.24	1675.94

*SECNO 65055.000

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3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .52


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

 65055.000      2.77   2413.57       .00       .00   2414.17       .61     13.59       .11   2415.50
    3465.0        .0    3465.0        .0        .0    554.1         .0     101.1      65.5   2425.30
       .35       .00      6.25       .00       .000    .040        .000     .000   2410.80   1733.38
   .019788     1457.     1457.     1457.         5       0           0       .00    422.65    2188.99


CCHV=   . .100 CEHV=     .300
*SECNO 66061.000
3280 CROSS SECTION  66061.00 EXTENDED       .32 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.06


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

 66061.000      2.42   2422.32       .00       .00   2422.69       .37      8.50       .02   2425.80
    3465.0        .0    3465.0        .0        .0    706.1         .0     115.7      74.1   2428.60
       .41       .00      4.91       .00       .000    .035        .000     .000   2419.90   1197.71
   .004656     1006.     1006.     1006.         5       0           0       .00    319.78    1517.49


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   15APR98      13:57:22                                                                    PAGE    7

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 66660.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2434.90 ELREA=      2435.30

 66660.000      1.90   2427.00   2427.00       .00   2427.80       .80      4.66       .13   2434.90
    3465.0        .0    3465.0        .0        .0    481.6         .0     123.8      78.4   2435.30
       .43       .00      7.19       .00       .000    .035        .000     .000   2425.10   1289.20
   .015592      599.      599.      599.         4      15           0       .00    304.23    1593.43


*SECNO 66814.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2437.00 ELREA=      2440.10

 66814.000      1.72   2432.82   2432.82       .00   2433.61       .79      2.41       .00   2437.00
    3465.0        .0    3465.0        .0        .0    486.4         .0     125.5      79.5   2440.10
       .44       .00      7.12       .00       .000    .035        .000     .000   2431.10   1274.84
   .015720      154.      154.      154.        20      11           0       .00    313.77    1588.60


*SECNO 68187.000
3280 CROSS SECTION  68187.00 EXTENDED       .14 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.01


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2446.20 ELREA=      2449.30

 68187.000      2.54   2442.84       .00       .00   2443.18       .34      9.52       .05   2446.20
    3465.0        .0    3465.0        .0        .0    745.2         .0     144.9      89.4   2449.30
       .52       .00      4.65       .00       .000    .035        .000     .000   2440.30   1271.72
   .003885     1373.     1373.     1373.         9       0           0       .00    319.35    1591.07


*SECNO 69560.000
1
   15APR98      13:57:22                                                                    PAGE    8

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .54


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2454.80 ELREA=      2458.60

 69560.000      2.04   2451.54       .00       .00   2452.26       .71      8.97       .11   2454.80
    3465.0        .0    3465.0        .0        .0    511.0         .0     164.7      99.4   2458.60
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      .57       .00      6.78       .00      .000      .035      .000      .000   2449.50   1254.04
   .013196     1373.     1373.     1373.         5         0         0       .00    311.22   1565.26


*SECNO 71045.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.77


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2464.70 ELREA=      2468.50

 71045.000      2.73   2462.13       .00       .00   2462.48       .35     10.19       .04   2464.70
    3465.0        .0    3465.0        .0        .0     725.6        .0     185.8     110.1    2468.50
       .66       .00      4.78       .00      .000      .035      .000      .000   2459.40   1251.28
   .004192     1485.     1485.     1485.         5         0         0       .00    316.33   1567.61


*SECNO 72532.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .61


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2477.80 ELREA=      2478.40

 72532.000      1.94   2471.54       .00       .00   2472.18       .64      9.62       .09   2477.80
    3465.0        .0    3465.0        .0        .0     539.1        .0     207.4     120.9    2478.40
       .72       .00      6.43       .00      .000      .035      .000      .000   2469.60   1186.74
   .011259     1487.     1487.     1487.         5         0         0       .00    315.95   1502.69


*SECNO 73765.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.55

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2486.10 ELREA=      2486.70

 73765.000      2.46   2480.36       .00       .00   2480.74       .37      8.53       .03   2486.10
    3465.0        .0    3465.0        .0        .0     705.2        .0     225.0     129.9    2486.70
       .79       .00      4.91       .00      .000      .035      .000      .000   2477.90   1185.01
   .004674     1233.     1233.     1233.         5         0         0       .00    319.57   1504.58


*SECNO 74997.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2492.90 ELREA=      2494.50

 74997.000      2.22   2487.92       .00       .00   2488.48       .56      7.69       .05   2492.90
    3465.0        .0    3465.0        .0        .0     579.1        .0     243.2     138.8    2494.50
       .85       .00      5.98       .00      .000      .035      .000      .000   2485.70   1291.21
   .008749     1232.     1232.     1232.         3         0         0       .00    312.62   1603.83


T1       FEMA 50-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       UPPER NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                                                                            2367.0

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2                    -1

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 2
0

 CCHV=      .100 CEHV=      .300
 *SECNO 59059.000

 3265 DIVIDED FLOW


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2382.80 ELREA=      2386.40

  59059.000     11.50   2367.00       .00   2367.00   2367.09       .09       .00       .00   2382.80
    10312.0        .0   10312.0        .0        .0    4328.0        .0        .0        .0    2386.40
        .00       .00      2.38       .00      .000      .040      .000      .000   2355.50   1457.04
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   .000252        0.        0.        0.         0         0         0       .00    529.63   2128.74


*SECNO 60826.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2385.70 ELREA=      2397.80

 60826.000      4.55   2376.05   2376.05       .00   2376.97       .92      1.41       .25   2385.70
   10312.0        .0   10312.0        .0        .0    1339.5        .0     115.0      24.1   2397.80
       .06       .00      7.70       .00      .000      .040      .000      .000   2371.50   1741.37
   .016755     1767.     1767.     1767.        20        17         0       .00    659.44   2440.66


*SECNO 62524.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.68

 62524.000      4.73   2392.23       .00       .00   2392.80       .57     15.80       .03   2406.40
   10312.0        .0   10312.0        .0         0    1699.7        .0     174.2      47.6   2411.00
       .14       .00      6.07       .00      .000      .040      .000      .000   2387.50   1040.98
   .005908     1698.     1698.     1698.         7         0         0       .00    547.21   1588.19


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   15APR98      13:57:22                                                                          PAGE   11

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 63598.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .67


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2410.60 ELREA=      2415.90

 63598.000      3.55   2401.05       .00       .00   2401.99       .94      9.08       .11   2410.60
   10312.0        .0   10312.0        .0        .0    1322.8        .0     211.4      60.9   2415.90
       .18       .00      7.80       .00      .000      .040      .000      .000   2397.50   1146.42
   .013086     1074.     1074.     1074.         3         0         0       .00    531.10   1677.52


*SECNO 65055.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

 65055.000      4.70   2415.50   2414.89       .00   2416.25       .75     15.31      6.68   2415.50
   10312.0        .0   10312.0        .0        .0    1481.2        .0     258.3      78.4   2425.30
       .24       .00      6.96       .00      .000      .040      .000      .000   2410.80   1681.58
   .008619     1457.     1457.     1457.        20         8         0       .00    515.65   2197.23


CCHV=      .100 CEHV=      .300
*SECNO 66061.000
3280 CROSS SECTION  66061.00 EXTENDED       1.70 FEET


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

 66061.000      3.80   2423.70       .00       .00   2424.93      1.24      8.54       .14   2425.80
   10312.0        .0   10312.0        .0        .0    1156.1        .0     288.8      88.2   2428.60
       .27       .00      8.92       .00      .000      .035      .000      .000   2419.90   1191.26
   .008360     1006.     1006.     1006.         4         0         0       .00    331.08   1522.34


*SECNO 66660.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2434.90 ELREA=      2435.30

 66660.000      3.85   2428.95       .00       .00   2430.34      1.39      5.36       .04   2434.90
   10312.0        .0   10312.0        .0        .0    1091.8        .0     304.3      92.7   2435.30
       .29       .00      9.45       .00      .000      .035      .000      .000   2425.10   1282.14
   .009603      599.      599.      599.         2         0         0       .00    318.21   1600.36


1
   15APR98      13:57:22                                                                          PAGE   12

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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*SECNO 66814.000
3280 CROSS SECTION  66814.00 EXTENDED      1.00 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2437.00 ELREA=      2440.10

 66814.000      3.40   2434.50   2434.50       .00   2436.08      1.58      1.67       .06   2437.00
   10312.0        .0   10312.0        .0        .0   1020.8         .0     308.0      93.8   2440.10
       .29       .00     10.10       .00      .000      .035      .000      .000   2431.10   1268.45
   .012364       154.      154.      154.        20        11         0       .00    325.19   1593.64


*SECNO 68187.000
3280 CROSS SECTION  68187.00 EXTENDED      2.15 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.67


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2446.20 ELREA=      2449.30

 68187.000      4.55   2444.85       .00       .00   2445.69       .84      9.54       .07   2446.20
   10312.0        .0   10312.0        .0        .0   1401.6         .0     346.2      104.2   2449.30
       .34       .00      7.36       .00      .000      .035      .000      .000   2440.30   1264.04
   .004443      1373.     1373.     1373.         6         0         0       .00    333.09   1597.13


*SECNO 69560.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2454.80 ELREA=      2458.60

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   15APR98      13:57:22                                                                  PAGE   13

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         CLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 69560.000      3.83   2453.33       .00       .00   2454.75      1.42      8.88       .17   2454.80
   10312.0        .0   10312.0        .0        .0   1078.3         .0     385.2      114.6   2458.60
       .38       .00      9.56       .00      .000      .035      .000      .000   2449.50   1246.84
   .010272      1373.     1373.     1373.         4         0         0       .00    324.54   1571.38


*SECNO 71045.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2464.70 ELREA=      2468.50

 71045.000      4.68   2464.08       .00       .00   2464.97       .90     10.17       .05   2464.70
   10312.0        .0   10312.0        .0        .0   1357.9         .0     426.8      125.7   2468.50
       .44       .00      7.59       .00      .000      .035      .000      .000   2459.40   1243.40
   .004892      1485.     1485.     1485.         3         0         0       .00    330.91   1574.31


*SECNO 72532.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2477.80 ELREA=      2478.40

 72532.000      3.78   2473.38       .00       .00   2474.67      1.29      9.58       .12   2477.80
   10312.0        .0   10312.0        .0        .0   1132.6         .0     469.3      137.0   2478.40
       .48       .00      9.10       .00      .000      .035      .000      .000   2469.60   1180.64
   .008870      1487.     1487.     1487.         4         0         0       .00    328.71   1509.35


*SECNO 73765.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2486.10 ELREA=      2486.70

 73765.000      4.33   2482.23       .00       .00   2483.19       .96      8.48       .03   2486.10
   10312.0        .0   10312.0        .0        .0   1314.2         .0     503.9      146.3   2486.70
       .53       .00      7.85       .00      .000      .035      .000      .000   2477.90   1178.82
   .005490      1233.     1233.     1233.         4         0         0       .00    332.51   1511.34


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   15APR98      13:57:22                                                                  PAGE   14
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 74997.000
3280 CROSS SECTION  74997.00 EXTENDED       .25 FEET


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2492.90 ELREA=      2494.50

 74997.000       4.16    2489.86        .00        .00    2491.01       1.15       7.77        .06    2492.90
   10312.0         .0    10312.0         .0         .0    1195.8          .0      539.4      155.6    2494.50
        .57        .00       8.62       .00       .000       .035       .000       .000    2485.70    1284.53
   .007312      1232.      1232.      1232.          4          0          0        .00     325.63    1610.15


T1       FEMA 100-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       UPPER NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  4                                                                          2372.4

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       3                    -1

1
    15APR98       13:57:22                                                                                    PAGE   15

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 3
0

 CCHV=      .100 CEHV=      .300
 *SECNO 59059.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2382.80 ELREA=      2386.40

  59059.000      16.90    2372.40        .00    2372.40    2372.46        .06        .00        .00    2382.80
    14737.0         .0    14737.0         .0         .0    7695.8          .0         .0         .0    2386.40
        .00        .00       1.91       .00       .000       .040       .000       .000    2355.50    1429.18
   .000112          0.         0.         0.          0          0          0        .00     710.08    2139.26


 *SECNO 60826.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2385.70 ELREA=      2397.80

  60826.000       5.00    2376.50    2376.50        .00    2377.74       1.24        .68        .35    2385.70
    14737.0         .0    14737.0         .0         .0    1650.1          .0      189.6       28.7    2397.80
        .05        .00       8.93       .00       .000       .040       .000       .000    2371.50    1740.37
   .018586      1767.      1767.      1767.         20         17          0        .00     702.61    2442.99


 *SECNO 62524.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.81

  62524.000       5.53    2393.03        .00        .00    2393.76        .74      15.97        .05    2406.40
    14737.0         .0    14737.0         .0         .0    2137.5          .0      263.4       53.1    2411.00
        .12        .00       6.89       .00       .000       .040       .000       .000    2387.50    1039.57
   .005664      1698.      1698.      1698.          6          0          0        .00     549.92    1589.50


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    15APR98       13:57:22                                                                                    PAGE   16

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 63598.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .65
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2410.60 ELREA=      2415.90

 63598.000      4.12   2401.62       .00       .00   2402.89      1.27      8.97       .16   2410.60
  14737.0        .0    14737.0        .0        .0    1627.0        .0     309.8      66.4   2415.90
      .16        .00       9.06       .00       .000      .040      .000      .000   2397.50   1144.12
   .013525     1074.     1074.     1074.         3         0         0       .00    534.51   1678.63


*SECNO 65055.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

 65055.000      4.79   2415.59       .00       .00   2416.10       .51     13.13       .08   2415.50
  14737.0     5320.6     9416.4        .0    1086.4    1531.7        .0     380.8      93.8   2425.30
      .23        4.90       6.15       .00       .040      .040      .000      .000   2410.80   1093.50
   .006435     1457.     1457.     1457.         2         0         0       .00   1104.14   2197.65


CCHV=      .100 CEHV=      .300
*SECNO 66061.000
3280 CROSS SECTION  66061.00 EXTENDED      2.16 FEET


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   15APR98      13:57:22                                                                    PAGE   17

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

 66061.000      4.26   2424.16   2424.16       .00   2426.13      1.96      9.45       .44   2425.80
  14737.0        .0    14737.0        .0        .0    1310.5        .0     426.1      110.5   2428.60
      .25        .00      11.24       .00       .000      .035      .000      .000   2419.90   1189.09
   .011417     1006.     1006.     1006.         4        12         0       .00    334.87   1523.96


*SECNO 66660.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2434.90 ELREA=      2435.30

 66660.000      5.02   2430.12       .00       .00   2431.69      1.57      5.52       .04   2434.90
  14737.0        .0    14737.0        .0        .0    1466.2        .0     445.2      115.0   2435.30
      .27        .00      10.05       .00       .000      .035      .000      .000   2425.10   1277.96
   .007604      599.      599.      599.         3         0         0       .00    326.50   1604.46


*SECNO 66814.000
3280 CROSS SECTION  66814.00 EXTENDED      1.85 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2437.00 ELREA=      2440.10

 66814.000      4.25   2435.35   2435.35       .00   2437.34      1.99      1.43       .13   2437.00
  14737.0        .0    14737.0        .0        .0    1301.9        .0     450.1      116.2   2440.10
      .27        .00      11.32       .00       .000      .035      .000      .000   2431.10   1265.18
   .011505      154.      154.      154.        20        11         0       .00    331.04   1596.22


*SECNO 68187.000
3280 CROSS SECTION  68187.00 EXTENDED      3.39 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.56

1
   15APR98      13:57:22                                                                    PAGE   18

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2446.20 ELREA=      2449.30
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 68187.000      5.79   2446.09       .00       .00   2447.06       .96      9.61       .10   2446.20
   14737.0        .0   14737.0        .0        .0    1870.5        .0     500.1     128.0   2449.30
       .32       .00      7.88       .00       .000      .035      .000      .000   2440.30   1182.13
   .004703    1373.    1373.    1373.         6         0         0       .00    418.72   1600.85


*SECNO 69560.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2454.80 ELREA=      2458.60

 69560.000      4.80   2454.30       .00       .00   2456.03      1.73      8.74       .23   2454.80
   14737.0        .0   14737.0        .0        .0    1398.1        .0     551.6     139.8   2458.60
       .36       .00     10.54       .00       .000      .035      .000      .000   2449.50   1242.88
   .009100    1373.    1373.    1373.         4         0         0       .00    331.84   1574.72


*SECNO 71045.000
3280 CROSS SECTION  71045.00 EXTENDED        .32 FEET


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2464.70 ELREA=      2468.50

 71045.000      5.52   2464.92       .00       .00   2465.99      1.08      9.90       .06   2464.70
   14737.0     763.8   13973.2        .0     203.2    1642.7        .0     606.9     155.1   2468.50
       .41      3.76      8.51       .00       .035      .035      .000      .000   2459.40   1011.42
   .005095    1485.    1485.    1485.         4         0         0       .00    565.76   1577.18


*SECNO 72532.000

3301 HV CHANGED MORE THAN HVINS

1
    15APR98      13:57:22                                                                          PAGE   19

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2477.80 ELREA=      2478.40

 72532.000      4.65   2474.25       .00       .00   2475.92      1.67      9.75       .18   2477.80
   14737.0        .0   14737.0        .0        .0    1419.7        .0     662.7     170.5   2478.40
       .45       .00     10.38       .00       .000      .035      .000      .000   2469.60   1177.78
   .008747    1487.    1487.    1487.         4         0         0       .00    334.70   1512.48


*SECNO 73765.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2486.10 ELREA=      2486.70

 73765.000      5.29   2483.19       .00       .00   2484.45      1.26      8.49       .04   2486.10
   14737.0        .0   14737.0        .0        .0    1635.2        .0     705.9     180.0   2486.70
       .48       .00      9.01       .00       .000      .035      .000      .000   2477.90   1175.66
   .005561    1233.    1233.    1233.         3         0         0       .00    339.13   1514.79


*SECNO 74997.000
3280 CROSS SECTION  74997.00 EXTENDED       1.18 FEET


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2492.90 ELREA=      2494.50

 74997.000      5.08   2490.78       .00       .00   2492.27      1.50      7.75       .07   2492.90
   14737.0        .0   14737.0        .0        .0    1501.4        .0     750.3     189.5   2494.50
       .52       .00      9.82       .00       .000      .035      .000      .000   2485.70   1281.31
   .007180    1232.    1232.    1232.         3         0         0       .00    331.88   1613.19


T1       FEMA 500-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       UPPER NO.  LAS VEGAS WASH

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                 5                                                                           2375.7

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       4                    -1

1
    15APR98      13:57:22                                                                          PAGE   20

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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 *PROF 4
0

 CCHV=      .100 CEHV=      .300
 *SECNO 59059.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2382.80 ELREA=      2386.40

  59059.000      20.20   2375.70       .00   2375.70   2375.80       .10       .00       .00   2382.80
    24938.0         .0   24938.0         .0        .0   10065.3         .0         .0         .0   2386.40
        .00        .00      2.48        .00       .000      .040       .000       .000   2355.50   1417.31
    .000135         0.        0.         0.          0         0          0        .00    725.97   2143.28


 *SECNO 60826.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2385.70 ELREA=      2397.80

  60826.000       6.01   2377.51   2377.51       .00   2379.24      1.73       .80       .49   2385.70
    24938.0         .0   24938.0         .0        .0   2362.0         .0      252.1      29.1   2397.80
        .05        .00     10.56        .00       .000      .040       .000       .000   2371.50   1738.18
    .016332     1767.     1767.     1767.         20        17          0        .00    709.93   2448.11


 *SECNO 62524.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62

  62524.000       6.83   2394.33       .00       .00   2395.51      1.18      16.21       .05   2406.40
    24938.0         .0   24938.0         .0        .0   2855.1         .0      353.7      53.8   2411.00
        .10        .00      8.73        .00       .000      .040       .000       .000   2387.50   1037.29
    .006256     1698.     1698.     1698.          6         0          0        .00    554.34   1591.63


1
    15APR98      13:57:22                                                                                PAGE   21

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 63598.000

 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2410.60 ELREA=      2415.90

  63598.000       5.43   2402.93       .00       .00   2404.72      1.78       9.02       .18   2410.60
    24938.0         .0   24938.0         .0        .0   2328.4         .0      417.6      67.2   2415.90
        .13        .00     10.71        .00       .000      .040       .000       .000   2397.50   1142.44
    .011877     1074.     1074.     1074.          4         0          0        .00    538.73   1681.17


 *SECNO 65055.000

 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2415.50 ELREA=      2425.30

  65055.000       5.74   2416.54       .00       .00   2417.28       .74      12.46       .10   2415.50
    24938.0   10070.4   14867.6         .0    1641.0   2019.7         .0      517.8      94.8   2425.30
        .19       6.14      7.36        .00       .040      .040       .000       .000   2410.80   1091.57
    .006446     1457.     1457.     1457.          5         0          0        .00   1109.84   2201.41


 CCHV=      .100 CEHV=      .300
 *SECNO 66061.000
 3280 CROSS SECTION  66061.00 EXTENDED      3.85 FEET


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2425.80 ELREA=      2428.60

  66061.000       5.95   2425.85   2425.85       .00   2427.35      1.50       6.49       .23   2425.80
    24938.0   6027.6   18910.4         .0     621.9   1916.2         .0      589.4      113.7   2428.60
        .22       9.69      9.87        .00       .035      .035       .000       .000   2419.90   1000.00
    .006447     1006.     1006.     1006.          2        16          0        .00    529.87   1529.87


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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 66660.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2434.90 ELREA= 2435.30

66660.000	6.20	2431.30	2431.30	.00	2434.10	2.81	4.81	.39	2434.90
24938.0	.0	24938.0	.0	.0	1855.1	.0	619.6	119.7	2435.30
.23	.00	13.44	.00	.000	.035	.000	.000	2425.10	1273.73
.010294	599.	599.	599.	3	8	0	.00	334.89	1608.62

*SECNO 66814.000
3280 CROSS SECTION 66814.00 EXTENDED 3.51 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2437.00 ELREA= 2440.10

66814.000	5.91	2437.01	2437.01	.00	2437.47	.46	.45	.23	2437.00
24938.0	16708.3	8229.7	.0	2808.0	1920.9	.0	631.2	121.8	2440.10
.24	5.95	4.28	.00	.035	.035	.000	.000	2431.10	739.62
.001366	154.	154.	154.	20	15	0	.00	861.59	1601.21

*SECNO 68187.000
3280 CROSS SECTION 68187.00 EXTENDED 3.50 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2446.20 ELREA= 2449.30

68187.000	5.90	2446.20	2446.20	.00	2446.67	.46	1.88	.00	2446.20
24938.0	16713.8	8224.2	.0	2804.9	1917.9	.0	780.2	149.0	2449.30
.31	5.96	4.29	.00	.035	.035	.000	.000	2440.30	739.76
.001371	1373.	1373.	1373.	20	10	0	.00	861.43	1601.19

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 69560.000
3280 CROSS SECTION 69560.00 EXTENDED 1.08 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2454.80 ELREA= 2458.60

69560.000	6.28	2455.78	2455.78	.00	2457.83	2.05	3.80	.48	2454.80
24938.0	2207.4	22730.6	.0	372.0	1910.4	.0	890.6	171.6	2458.60
.34	5.93	11.90	.00	.035	.035	.000	.000	2449.50	1004.62
.008235	1373.	1373.	1373.	20	9	0	.00	575.19	1579.81

*SECNO 71045.000
3280 CROSS SECTION 71045.00 EXTENDED 1.67 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2464.70 ELREA= 2468.50

71045.000	6.87	2466.27	2465.64	.00	2467.78	1.51	9.89	.05	2464.70
24938.0	3004.8	21933.2	.0	606.8	2115.8	.0	975.9	197.1	2468.50
.38	4.95	10.37	.00	.035	.035	.000	.000	2459.40	663.35
.005499	1485.	1485.	1485.	8	6	0	.00	918.45	1581.81

*SECNO 72532.000
3280 CROSS SECTION 72532.00 EXTENDED .74 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2477.80 ELREA= 2478.40

72532.000	6.24	2475.84	.00	.00	2478.35	2.51	10.27	.30	2477.80
24938.0	.0	24938.0	.0	.0	1961.6	.0	1055.8	218.6	2478.40
.42	.00	12.71	.00	.000	.035	.000	.000	2469.60	1172.13
.008929	1487.	1487.	1487.	3	0	0	.00	346.11	1518.24

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 73765.000
3280 CROSS SECTION 73765.00 EXTENDED 1.69 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2486.10 ELREA= 2486.70

73765.000	7.18	2485.08	.00	.00	2486.91	1.83	8.50	.07	2486.10
24938.0	.0	24938.0	.0	.0	2295.2	.0	1116.1	228.6	2486.70
.45	.00	10.87	.00	.000	.035	.000	.000	2477.90	1166.41
.005480	1233.	1233.	1233.	2	0	0	.00	355.27	1521.68

*SECNO 74997.000
3280 CROSS SECTION 74997.00 EXTENDED 2.92 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2492.90 ELREA= 2494.50

74997.000	6.82	2492.52	.00	.00	2494.73	2.22	7.71	.12	2492.90
24938.0	.0	24938.0	.0	.0	2086.1	.0	1178.1	238.5	2494.50
.48	.00	11.95	.00	.000	.035	.000	.000	2485.70	1275.32
.007206	1232.	1232.	1232.	3	0	0	.00	343.54	1618.86

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THIS RUN EXECUTED 15APR98 13:57:23

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

UPPER NO. LAS VEGAS WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	59059.000	.00	.00	.00	2355.50	3465.00	2359.15	2359.15	2359.82	213.35	6.58	526.24	237.22
	59059.000	.00	.00	.00	2355.50	10312.00	2367.00	.00	2367.09	2.52	2.38	4327.97	6499.39
	59059.000	.00	.00	.00	2355.50	14737.00	2372.40	.00	2372.46	1.12	1.91	7695.76	13919.88
	59059.000	.00	.00	.00	2355.50	24938.00	2375.70	.00	2375.80	1.35	2.48	10065.27	21425.65
*	60826.000	1767.00	.00	.00	2371.50	3465.00	2375.50	.00	2375.70	48.99	3.51	988.53	495.06
*	60826.000	1767.00	.00	.00	2371.50	10312.00	2376.05	2376.05	2376.97	167.55	7.70	1339.53	796.65
*	60826.000	1767.00	.00	.00	2371.50	14737.00	2376.50	2376.50	2377.74	185.86	8.93	1650.07	1080.97
*	60826.000	1767.00	.00	.00	2371.50	24938.00	2377.51	2377.51	2379.24	163.32	10.56	2362.03	1951.35
*	62524.000	1698.00	.00	.00	2387.50	3465.00	2389.78	2389.75	2390.53	191.19	6.93	499.94	250.59
*	62524.000	1698.00	.00	.00	2387.50	10312.00	2392.23	.00	2392.80	59.08	6.07	1699.72	1341.61
*	62524.000	1698.00	.00	.00	2387.50	14737.00	2393.03	.00	2393.76	56.64	6.89	2137.53	1958.24
*	62524.000	1698.00	.00	.00	2387.50	24938.00	2394.33	.00	2395.51	62.56	8.73	2855.06	3152.83
*	63598.000	1074.00	.00	.00	2397.50	3465.00	2400.24	.00	2400.48	54.04	3.88	892.97	471.35
*	63598.000	1074.00	.00	.00	2397.50	10312.00	2401.05	.00	2401.99	130.86	7.80	1322.78	901.46
*	63598.000	1074.00	.00	.00	2397.50	14737.00	2401.62	.00	2402.89	135.25	9.06	1627.03	1267.18
	63598.000	1074.00	.00	.00	2397.50	24938.00	2402.93	.00	2404.72	118.77	10.71	2328.43	2288.27
*	65055.000	1457.00	.00	.00	2410.80	3465.00	2413.57	.00	2414.17	197.88	6.25	554.08	246.32
*	65055.000	1457.00	.00	.00	2410.80	10312.00	2415.50	2414.89	2416.25	86.19	6.96	1481.24	1110.76
*	65055.000	1457.00	.00	.00	2410.80	14737.00	2415.59	.00	2416.10	64.35	6.15	2618.15	1837.06

	65055.000	1457.00	.00	.00	2410.80	24938.00	2416.54	.00	2417.28	64.46	7.36	3660.66	3106.05
*	66061.000	1006.00	.00	.00	2419.90	3465.00	2422.32	.00	2422.69	46.56	4.91	706.08	507.78
	66061.000	1006.00	.00	.00	2419.90	10312.00	2423.70	.00	2424.93	83.60	8.92	1156.09	1127.83
*	66061.000	1006.00	.00	.00	2419.90	14737.00	2424.16	2424.16	2426.13	114.17	11.24	1310.55	1379.20
*	66061.000	1006.00	.00	.00	2419.90	24938.00	2425.85	2425.85	2427.35	64.47	9.87	2538.10	3105.96
*	66660.000	599.00	.00	.00	2425.10	3465.00	2427.00	2427.00	2427.80	155.92	7.19	481.64	277.50
	66660.000	599.00	.00	.00	2425.10	10312.00	2428.95	.00	2430.34	96.03	9.45	1091.78	1052.30
	66660.000	599.00	.00	.00	2425.10	14737.00	2430.12	.00	2431.69	76.04	10.05	1466.23	1690.02
*	66660.000	599.00	.00	.00	2425.10	24938.00	2431.30	2431.30	2434.10	102.94	13.44	1855.06	2457.88

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	66814.000	154.00	.00	.00	2431.10	3465.00	2432.82	2432.82	2433.61	157.20	7.12	486.41	276.36
*	66814.000	154.00	.00	.00	2431.10	10312.00	2434.50	2434.50	2436.08	123.64	10.10	1020.77	927.39
*	66814.000	154.00	.00	.00	2431.10	14737.00	2435.35	2435.35	2437.34	115.05	11.32	1301.86	1373.92
*	66814.000	154.00	.00	.00	2431.10	24938.00	2437.01	2437.01	2437.47	13.66	4.28	4728.94	6748.06
*	68187.000	1373.00	.00	.00	2440.30	3465.00	2442.84	.00	2443.18	38.85	4.65	745.24	555.89
*	68187.000	1373.00	.00	.00	2440.30	10312.00	2444.85	.00	2445.69	44.43	7.36	1401.58	1547.13
*	68187.000	1373.00	.00	.00	2440.30	14737.00	2446.09	.00	2447.06	47.03	7.88	1870.48	2148.96
*	68187.000	1373.00	.00	.00	2440.30	24938.00	2446.20	2446.20	2446.67	13.71	4.29	4722.84	6735.16
*	69560.000	1373.00	.00	.00	2449.50	3465.00	2451.54	.00	2452.26	131.96	6.78	510.97	301.63
*	69560.000	1373.00	.00	.00	2449.50	10312.00	2453.33	.00	2454.75	102.72	9.56	1078.28	1017.45
	69560.000	1373.00	.00	.00	2449.50	14737.00	2454.30	.00	2456.03	91.00	10.54	1398.13	1544.89
*	69560.000	1373.00	.00	.00	2449.50	24938.00	2455.78	2455.78	2457.83	82.35	11.90	2282.47	2748.05
*	71045.000	1485.00	.00	.00	2459.40	3465.00	2462.13	.00	2462.48	41.92	4.78	725.61	535.14
*	71045.000	1485.00	.00	.00	2459.40	10312.00	2464.08	.00	2464.97	48.92	7.59	1357.92	1474.39
	71045.000	1485.00	.00	.00	2459.40	14737.00	2464.92	.00	2465.99	50.95	8.51	1845.90	2064.70
	71045.000	1485.00	.00	.00	2459.40	24938.00	2466.27	2465.64	2467.78	54.99	10.37	2722.56	3363.01
*	72532.000	1487.00	.00	.00	2469.60	3465.00	2471.54	.00	2472.18	112.59	6.43	539.13	326.55
	72532.000	1487.00	.00	.00	2469.60	10312.00	2473.38	.00	2474.67	88.70	9.10	1132.64	1094.95
	72532.000	1487.00	.00	.00	2469.60	14737.00	2474.25	.00	2475.92	87.47	10.38	1419.72	1575.75
	72532.000	1487.00	.00	.00	2469.60	24938.00	2475.84	.00	2478.35	89.29	12.71	1961.56	2639.07
*	73765.000	1233.00	.00	.00	2477.90	3465.00	2480.36	.00	2480.74	46.74	4.91	705.15	506.81
	73765.000	1233.00	.00	.00	2477.90	10312.00	2482.23	.00	2483.19	54.90	7.85	1314.17	1391.67
	73765.000	1233.00	.00	.00	2477.90	14737.00	2483.19	.00	2484.45	55.61	9.01	1635.23	1976.21
	73765.000	1233.00	.00	.00	2477.90	24938.00	2485.08	.00	2486.91	54.80	10.87	2295.21	3368.66
	74997.000	1232.00	.00	.00	2485.70	3465.00	2487.92	.00	2488.48	87.49	5.98	579.07	370.44
	74997.000	1232.00	.00	.00	2485.70	10312.00	2489.86	.00	2491.01	73.12	8.62	1195.80	1205.96
	74997.000	1232.00	.00	.00	2485.70	14737.00	2490.78	.00	2492.27	71.80	9.82	1501.44	1739.22
	74997.000	1232.00	.00	.00	2485.70	24938.00	2492.52	.00	2494.73	72.06	11.95	2086.09	2937.79

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UPPER NO. LAS VEGAS WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	59059.000	3465.00	2359.15	.00	.00	.05	393.11	.00
	59059.000	10312.00	2367.00	7.85	.00	.00	529.63	.00
	59059.000	14737.00	2372.40	5.40	.00	.00	710.08	.00
	59059.000	24938.00	2375.70	3.30	.00	.00	725.97	.00
*	60826.000	3465.00	2375.50	.00	16.36	.00	629.88	1767.00
*	60826.000	10312.00	2376.05	.54	9.05	.00	659.44	1767.00
*	60826.000	14737.00	2376.50	.46	4.10	.00	702.61	1767.00
*	60826.000	24938.00	2377.51	1.01	1.81	.00	709.93	1767.00
*	62524.000	3465.00	2389.78	.00	14.28	.00	318.30	1698.00
*	62524.000	10312.00	2392.23	2.45	16.18	.00	547.21	1698.00
*	62524.000	14737.00	2393.03	.80	16.52	.00	549.92	1698.00
*	62524.000	24938.00	2394.33	1.30	16.81	.00	554.34	1698.00
*	63598.000	3465.00	2400.24	.00	10.46	.00	526.24	1074.00
*	63598.000	10312.00	2401.05	.81	8.82	.00	531.10	1074.00
*	63598.000	14737.00	2401.62	.57	8.59	.00	534.51	1074.00
	63598.000	24938.00	2402.93	1.32	8.61	.00	538.73	1074.00
*	65055.000	3465.00	2413.57	.00	13.32	.00	422.65	1457.00
*	65055.000	10312.00	2415.50	1.93	14.45	.00	515.65	1457.00
*	65055.000	14737.00	2415.59	.10	13.98	.00	1104.14	1457.00
	65055.000	24938.00	2416.54	.94	13.60	.00	1109.84	1457.00
*	66061.000	3465.00	2422.32	.00	8.75	.00	319.78	1006.00
	66061.000	10312.00	2423.70	1.38	8.20	.00	331.08	1006.00
*	66061.000	14737.00	2424.16	.46	8.57	.00	334.87	1006.00
*	66061.000	24938.00	2425.85	1.69	9.31	.00	529.87	1006.00
*	66660.000	3465.00	2427.00	.00	4.68	.00	304.23	599.00
	66660.000	10312.00	2428.95	1.96	5.26	.00	318.21	599.00
	66660.000	14737.00	2430.12	1.17	5.96	.00	326.50	599.00
*	66660.000	24938.00	2431.30	1.18	5.45	.00	334.89	599.00

*	66814.000	3465.00	2432.82	.00	5.83	.00	313.77	154.00
*	66814.000	10312.00	2434.50	1.67	5.54	.00	325.19	154.00
*	66814.000	14737.00	2435.35	.86	5.23	.00	331.04	154.00
*	66814.000	24938.00	2437.01	1.66	5.71	.00	861.59	154.00
*	68187.000	3465.00	2442.84	.00	10.02	.00	319.35	1373.00
*	68187.000	10312.00	2444.85	2.01	10.36	.00	333.09	1373.00
*	68187.000	14737.00	2446.09	1.24	10.74	.00	418.72	1373.00
*	68187.000	24938.00	2446.20	.11	9.19	.00	861.43	1373.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	69560.000	3465.00	2451.54	.00	8.70	.00	311.22	1373.00
*	69560.000	10312.00	2453.33	1.78	8.47	.00	324.54	1373.00
	69560.000	14737.00	2454.30	.97	8.21	.00	331.84	1373.00
*	69560.000	24938.00	2455.78	1.48	9.58	.00	575.19	1373.00
*	71045.000	3465.00	2462.13	.00	10.58	.00	316.33	1485.00
*	71045.000	10312.00	2464.08	1.95	10.75	.00	330.91	1485.00
	71045.000	14737.00	2464.92	.84	10.61	.00	565.76	1485.00
	71045.000	24938.00	2466.27	1.35	10.48	.00	918.45	1485.00
*	72532.000	3465.00	2471.54	.00	9.42	.00	315.95	1487.00
	72532.000	10312.00	2473.38	1.84	9.31	.00	328.71	1487.00
	72532.000	14737.00	2474.25	.86	9.33	.00	334.70	1487.00
	72532.000	24938.00	2475.84	1.59	9.57	.00	346.11	1487.00
*	73765.000	3465.00	2480.36	.00	8.82	.00	319.57	1233.00
	73765.000	10312.00	2482.23	1.87	8.85	.00	332.51	1233.00
	73765.000	14737.00	2483.19	.96	8.94	.00	339.13	1233.00
	73765.000	24938.00	2485.08	1.89	9.24	.00	355.27	1233.00
	74997.000	3465.00	2487.92	.00	7.56	.00	312.62	1232.00
	74997.000	10312.00	2489.86	1.93	7.63	.00	325.63	1232.00
	74997.000	14737.00	2490.78	.92	7.59	.00	331.88	1232.00
	74997.000	24938.00	2492.52	1.74	7.44	.00	343.54	1232.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 59059.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 60826.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 60826.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 60826.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 60826.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60826.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 60826.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 62524.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 62524.000 PROFILE= 4 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 63598.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 63598.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 63598.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 65055.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 65055.000 PROFILE= 2 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 65055.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 65055.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 66061.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 66061.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66061.000 PROFILE= 3 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66061.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66061.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66660.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66660.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66660.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66660.000 PROFILE= 4 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66814.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66814.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 66814.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66814.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=  66814.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
1
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 WARNING SECNO=  68187.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  68187.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  68187.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  68187.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  68187.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  68187.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  69560.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  69560.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  69560.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  69560.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  69560.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  71045.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  71045.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  72532.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  73765.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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Paper Copy C
North Las Vegas Detention Basin
to Upper Las Vegas Detention Basin

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15APR98    TIME   13:31:06 *
 *****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*           (916) 756-1104           *
**************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
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1
    15APR98      13:31:06                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 15APR98    13:31:06

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC


T1      FEMA 10-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      MIDDLE NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0         2                               .0076                                      2115.1

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      0                    -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150

  ***************************************************************************
  THE 500 YEAR DISCHARGE IS FROM SPRING MOUNTAIN STORM.  THE 10, 50, AND 100
  YEAR DISCHARGES ARE FROM THE INTERBASIN STORM
  ***************************************************************************


QT        4       2939       6751       8343      11017
NC     .025       .025       .025         .1         .3


    LINE "A" STA 27+61.6
X1    28903          8       1000     1117.1
GR     2145       1000     2128.6       1030     2114.6       1058     2114.4     1075.5     2114.6       1093
GR   2126.6       1117     2126.6     1117.1       2144     1186.7


X1    29486                                    582.2      582.2      582.2                4.42

1
    15APR98      13:31:06                                                                    PAGE    2


X1    30067                                    582.2      582.2      582.2                4.42
    LINE "A" STA 20+15
    D/S FACE OF CONTROL STRUCTURE

X1    30650         15       1015     1114.4      582.2      582.2      582.2
X3       10                                                                  2144
GR   2147.5        500       2144        621       2140        812       2136        823       2133        832
GR     2133        874       2136        884       2142        897       2142        952       2145       1000
GR     2145       1015     2127.7     1047.2     2127.5     1064.7     2127.7     1082.2       2145     1114.4


NC                                        .3         .5
    LINE "A" STA 9+85
    U/S FACE OF CONTROL STRUCTURE
    D/S FACE OF TRANSITION
X1    30680                                      30         30         30                 .23
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X3       10                                                    2144
    LINE "A" STA 9+00
    U/S FACE OF TRANSITION
    D/S END OF DIVERSION DIKE

QT        4       2939       6751       8537      19217

X1    30765         13       1015     1192.8         85         85         85
X3       10                                                  2142.9
GR     2148        525       2144        691       2140        757       2136        790       2136        800
GR     2142        824     2142.9        945       2142       1000       2142       1015     2128.5     1068.9
GR   2127.9     1103.9     2128.5     1138.9       2142     1192.8


X1    30935                                  170        170        170                  .34
X3       10

NC     .040       .040       .040         .1         .3
   SECTION CUT FROM KENNY TOPO
X1    31235         18       1192       1377        300        300        300
GR     2148        500       2148        564       2150        688       2148        737       2146        874
GR     2146        885       2147        983     2146.2       1000       2144       1132       2140       1168
GR     2136       1192       2132       1204     2130.9       1213       2132       1262     2129.1       1354
GR     2132       1367       2136       1377       2136       1400

NC                                       .1         .3

   SECTION CUT FROM KENNY TOPO
X1    31500         18       1168       1302        265        265        265
GR     2154        582       2152        678       2148        772       2148        802       2148        880
GR   2150.2       1000       2148       1064       2144       1117       2140       1142       2136       1168
GR   2132.9       1185       2132       1257       2132       1260       2136       1302       2136       1321
GR     2140       1352       2144       1371     2145.7       1390


1
   15APR98      13:31:06                                                                                  PAGE    3


X1    32044         18     1049.5    1400.79        544        544        544
X3       10
GR   2158.1       1000     2157.3     1049.5     2141.3    1082.69     2142.3    1093.37     2141.5    1115.96
GR   2139.8    1137.18     2138.9     1182.3     2138.1    1189.12     2137.5    1206.04     2138.6    1223.55
GR   2138.7    1240.23       2144     1279.77       2145    1302.32     2144.8     1321.6     2152.9    1344.81
GR   2155.4    1376.98     2157.3    1400.79     2157.3    1415.34

X1    33671         21     1204.79    1475.62       1627       1627       1627
X3       10
GR   2180.2       1000       2179     1024.4     2180.2    1043.16     2179.7    1093.26     2178.7    1142.94
GR   2176.6    1173.86     2176.2     1204.79    2175.1    1224.56     2171.8     1250.5     2154.2    1263.09
GR     2153    1291.82     2154.8     1301.91    2156.8    1321.79     2157.2    1339.36     2156.3     1354.2
GR   2159.7    1372.19     2160.1     1394.16    2162.6    1412.97     2171.1    1450.07     2173.5    1465.27
GR   2173.8    1475.62

X1    35645         30       1000    1337.03       1974       1974       1974
X3       10          0          0          0          0          0          0          0          0
GR   2191.9       1000     2190.5     1035.15    2189.2    1056.16     2183.9    1086.97     2169.5    1114.69
GR     2172    1127.15     2170.3     1142.71    2172.5    1155.59     2173.2    1199.87     2172.3    1206.34
GR   2174.5    1221.77     2176.2     1273.66       2176    1288.49       2179    1306.24     2186.4    1337.03
GR   2179.5    1363.03     2177.1     1386.96    2177.2    1394.97     2180.2    1415.21     2177.5    1430.47
GR   2178.1    1448.81     2177.3     1455.93       2180    1473.27     2185.4    1493.31     2194.3    1507.23
GR   2194.3    1534.84     2195.1     1550.86       2195    1587.25     2194.3    1607.37     2195.2    1639.04

X1    36822         29     1158.79    1435.70       1177       1177       1177
X3       10
GR   2209.7       1000     2208.6     1063.99    2207.9    1072.65     2209.2    1088.92     2208.6    1121.69
GR   2207.9    1158.79     2187.8     1186.45    2182.8    1209.18     2183.6    1216.84     2184.8    1235.06
GR   2183.6    1258.34     2181.4     1283.44    2182.5    1304.28     2181.4    1317.16     2181.9    1350.52
GR   2179.6    1359.84     2179.3     1366.43    2183.9     1386.2     2184.5    1397.54     2191.8    1419.91
GR   2207.6     1435.7     2210.1     1479.38    2210.2    1507.51     2208.1    1538.62     2207.6    1574.12
GR   2209.1    1593.29     2208.8     1608.66    2209.3    1620.15     2210.6    1643.71

X1    38410         20     1029.6    1422.47       1588       1588       1588
X3       10
GR   2224.3       1000     2224.1     1029.6    2222.8    1054.58     2201.7    1075.23     2198.5    1104.94
GR   2196.6    1119.69     2196.9     1148.79    2196.1    1170.51     2196.7    1204.61     2196.2    1229.06
GR   2197.3    1243.68     2196.9     1295.89    2197.7    1303.88     2198.8    1342.31     2211.8    1381.14
GR   2212.9    1388.48     2223.9     1422.47    2218.8    1442.88     2212.5    1475.26     2223.9    1502.25

X1    39519         26     1146.69    1409.05       1109       1109       1109
X3       10
GR   2236.6       1000     2235.1     1019.12    2234.3    1062.93     2234.4    1104.13     2233.6    1146.69
GR   2212.3    1170.36     2208.1     1182.19    2206.4    1231.27     2205.6    1241.98     2205.3    1257.55
GR     2206    1268.98       2203     1285.67    2204.1    1294.37     2203.7    1303.55     2204.9    1311.89
GR   2205.7    1328.63     2204.7     1334.67    2206.4    1357.76     2203.7    1365.15     2205.9    1376.22
GR   2229.1    1394.81     2232.4     1409.05    2232.5    1416.82     2230.1    1423.89       2233    1441.47
GR   2233.1    1474.39
1
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X1    40616         33     1123.66    1515.47       1097       1097       1097
X3       10          0          0          0          0          0          0          0          0
GR   2244.3       1000     2244.1     1066.3     2243.2    1106.79     2244.1    1123.66     2244.1    1149.12
GR   2242.5    1158.12     2233.3     1162.5     2219.6    1192.34     2217.1    1227.15     2213.7    1238.63
GR   2215.5    1245.44     2214.1     1253.06    2215.8    1261.34     2216.5    1282.07     2215.9    1325.99
GR   2215.1     1342.1     2213.8     1349.77    2216.3    1364.81     2217.5    1400.24     2217.8    1426.25
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GR	2217.6	1443.84	2225.9	1466.22	2233.5	1479.71	2235.5	1515.47	2222.8	1540.82
GR	2227.2	1552.45	2224.5	1559.89	2226.1	1568	2225.2	1571.41	2229.2	1583.55
GR	2229.3	1598.8	2241.9	1627.55	2242.7	1657.06				
X1	42138	44	1213.96	1728.02	1522	1522	1522			
X3	10									
GR	2251.5	1000	2253.4	1017.64	2254.1	1049.84	2253.5	1063.28	2247.1	1083
GR	2249.4	1098.09	2242.2	1116.44	2242.5	1129.95	2244.6	1143.43	2239.3	1160.74
GR	2233.8	1177.19	2233.4	1189.21	2238.8	1213.96	2233.9	1253.33	2228.5	1277.66
GR	2229.7	1288.2	2228.4	1304.47	2229.9	1326.9	2230.9	1360.58	2231.4	1393.79
GR	2231.4	1426.33	2230.4	1464.21	2228.5	1524.29	2227.4	1536.47	2228.3	1547.24
GR	2228.5	1558.96	2227.4	1569.97	2226.6	1577.62	2227.3	1583.2	2226.8	1592.21
GR	2224.8	1605.36	2226.7	1617.66	2225.8	1630.67	2230.2	1640.3	2231.2	1648.47
GR	2240.6	1681.86	2254	1709.4	2254.3	1728.02	2251.8	1744.52	2254.1	1760.1
GR	2254.7	1782.16	2255.1	1804.57	2254.3	1822.71	2249.5	1848.51		
X1	43231	49	1106.47	1469.25	1093	1093	1093			
X3	10	0	0	0	0	0	0	0	0	
GR	2263.8	1000	2264.4	1023.3	2261.1	1046.23	2257.2	1058.41	2262	1077.29
GR	2252.7	1095.53	2261	1106.47	2249.8	1124.35	2245	1147.12	2241.8	1163.12
GR	2239.5	1200.3	2238.7	1240.18	2238	1269.24	2238.5	1280.3	2237.1	1291.77
GR	2238	1299.95	2238.2	1312.83	2235.9	1331.36	2236.5	1339.42	2233.7	1356.07
GR	2235.6	1366.3	2235.4	1375.55	2236.1	1385.03	2234.7	1401.09	2235.4	1415.06
GR	2235.6	1431.52	2246.2	1438.62	2243.6	1447.5	2254.3	1469.25	2253.9	1480.38
GR	2244.5	1496.61	2239.2	1512.44	2238.8	1526.2	2239.8	1539.18	2245.1	1563.54
GR	2258.7	1578.39	2247.5	1593.16	2241.1	1617.51	2240	1647.34	2241.4	1668.04
GR	2244.7	1686.2	2259.1	1702.55	2254.9	1713.55	2260.8	1729.56	2261.4	1744.02
GR	2261.6	1760.79	2261.9	1787.85	2261.3	1824.97	2256.8	1863.39		
X1	44345	39	1221.18	1515.88	1114	1114	1114			
X3	10									
GR	2269.7	1000	2269.6	1006.12	2257.3	1026.82	2257	1040.24	2268.9	1059.94
GR	2269.9	1069.59	2269.6	1081.36	2265.6	1098.06	2260.9	1115.59	2260.3	1136.88
GR	2258.2	1146.77	2261	1166.42	2260.8	1182.18	2257.5	1202.07	2254.8	1221.18
GR	2247.6	1239.77	2252.2	1259.07	2251	1271.59	2251.1	1292.54	2245.2	1310.07
GR	2245.2	1335.3	2242.8	1349.07	2244.1	1356.77	2245.1	1368.71	2245.7	1381.66
GR	2245.2	1393.07	2244.5	1407.83	2245.5	1417.19	2245	1424.77	2245	1441.66
GR	2246.5	1448.07	2246.1	1455.41	2259.2	1471.74	2257.6	1485.68	2263.4	1504.65
GR	2265.4	1515.88	2267.6	1539.42	2269.9	1555.59	2269.6	1564.23		
X1	45725	45	1000	1450.19	1380	1380	1380			
X3	10									
GR	2279.8	1000	2259.5	1040.16	2258.4	1052.51	2258.7	1061.16	2258.5	1087.96
GR	2257.4	1117.06	2257.9	1137.71	2258.3	1161.47	2257.3	1196.3	2256.1	1238.36
GR	2255.6	1253.42	2255.6	1266.47	2254.9	1274.24	2255.4	1301.59	2255.6	1320.54
GR	2253	1329.48	2255.1	1337.89	2253.7	1344.71	2253.9	1361.71	2254.9	1393.66
GR	2256.3	1400.95	2256.3	1407.3	2264	1433.95	2276.3	1450.19	2265.6	1472.6

1

GR	2262.3	1485.48	2261.9	1501.65	2260.1	1508.19	2259	1522.48	2257.8	1547.95
GR	2257.5	1576.17	2264	1596.88	2277.9	1611.57	2279.5	1629.04	2280.1	1651.98
GR	2279.5	1677.75	2278.8	1695.15	2273.6	1727.34	2277.7	1757.11	2279.8	1782.27
GR	2278.9	1796.15	2276.6	1818.5	2277.8	1824.57	2277.9	1836.27	2277.4	1846.59
X1	46746	35	1050.59	1558.44	1021	1021	1021			
X3	10									
GR	2285.1	1000	2284	1016.17	2273.9	1045.65	2274.9	1050.59	2270.8	1071.77
GR	2266	1101.47	2264.9	1124.86	2263.9	1155.74	2264.5	1163.51	2264.2	1200.51
GR	2263.1	1256.82	2262.2	1267.06	2262.4	1275.41	2261.3	1291	2260.7	1308.7
GR	2260.5	1323.53	2262.4	1338.06	2261.7	1352.1	2261.2	1364.34	2260.3	1372.42
GR	2262.4	1380.73	2262.5	1392.85	2261.1	1400.96	2260.6	1426.44	2258.8	1437.68
GR	2261.7	1448.32	2261	1458.68	2261.5	1465.62	2261.5	1482.78	2260	1494.31
GR	2262.1	1503.25	2262.7	1513.17	2269.6	1524.52	2268.7	1537.22	2273.2	1558.44
X1	48046	43	1058.02	1454.12	1300	1300	1300			
X3	10	0	0	0	0	0	0	0	0	
GR	2273.4	1000	2280.9	1017.83	2276.8	1029.39	2285.7	1045.35	2288.7	1058.02
GR	2280.2	1081.02	2272.5	1100.91	2270.3	1120.39	2270.5	1129.2	2271.1	1138.24
GR	2270.5	1147.55	2271	1156.18	2270.9	1180.13	2271	1210.57	2270.2	1239.18
GR	2270.7	1246.95	2270.2	1261.99	2270	1281.1	2270.3	1295.75	2270.5	1351.34
GR	2268	1360.9	2269.7	1371.93	2269.7	1388.14	2266.9	1400.75	2269.7	1418.64
GR	2270.9	1431.31	2277.3	1440.75	2279.9	1454.12	2278.1	1463.22	2275.8	1487.56
GR	2277	1499.89	2274.4	1519.24	2273.7	1548.76	2276.1	1556.62	2276.6	1574.81
GR	2275.2	1587.19	2276.5	1611.71	2287	1637.99	2294.1	1654.25	2293.7	1669.5
GR	2288.3	1679.36	2293.7	1700.95	2294.3	1721.96				
X1	49654	47	1032.79	1431.43	1608	1608	1608			
X3	10	0	0	0	0	0	0	0	0	
GR	2309.3	1000	2308.1	1032.79	2305.5	1043.94	2284.5	1072.73	2283.9	1094.91
GR	2281.3	1102.48	2283.5	1109.46	2283.2	1134.02	2281.5	1140.58	2281.6	1151.62
GR	2284.1	1160.54	2283.5	1169.44	2281.1	1177.45	2283.6	1186.66	2284.5	1193.04
GR	2285.8	1217.3	2286.6	1254.87	2287.1	1271.42	2286	1279.86	2287	1293.39
GR	2287.5	1307.27	2286.5	1321.92	2284.8	1345.47	2285.1	1362.99	2284.6	1385.8
GR	2285.3	1399.15	2303.2	1414.61	2307.2	1431.43	2306.5	1451.9	2303.3	1468.55
GR	2293.1	1489.38	2289.1	1499.53	2289	1518.72	2290.6	1529.28	2292	1549.81
GR	2301.7	1572.7	2300.2	1585.5	2297.4	1595.23	2297.2	1605.85	2298.8	1611.19
GR	2293.6	1621.87	2291.3	1634.25	2293.1	1671.79	2289.3	1685.05	2287.7	1706.34
GR	2287.4	1739.52	2287.7	1785.34						
X1	50964	45	1049.63	1464.67	1310	1310	1310			
X3	10									
GR	2318.1	1000	2311.1	1013.78	2308.4	1031.27	2312.3	1049.63	2311.9	1069.23
GR	2297.2	1091.23	2295.3	1108.11	2296.1	1131.27	2293.6	1144.23	2293.1	1162.01
GR	2292.4	1169.11	2292.2	1186.62	2292.7	1193.19	2292.2	1217.33	2293	1227.27
GR	2292.9	1243.43	2291.4	1252.76	2292.4	1267.59	2292.6	1276.62	2296.2	1289.29
GR	2297.2	1306.89	2295.1	1321.97	2293.9	1339.43	2294.6	1349.87	2292.4	1365.53
GR	2293.5	1371.75	2293.9	1393.37	2292.4	1407.91	2292	1430.97	2292.4	1456.81

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GR   2313.4   1464.67    2312.3   1487.14    2305.1   1521.69    2305.2   1535.42    2308.6   1542.11
GR     2314   1575.52    2314.7   1599.55    2320.7   1634.21    2320.2   1664.36    2319.3    1708.3
GR   2319.7   1730.48    2319.9   1763.82    2319.5    1801.4    2319.2   1833.03    2316.9   1882.06
1
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X1   52020        23       1000   1368.67      1056      1056      1056
X3      10
GR   2326.2      1000    2320.6   1024.49    2310.9   1049.68    2302.6   1077.44    2300.5   1097.02
GR   2299.8   1114.55       2297   1124.84    2297.3   1134.36      2299   1144.48      2299   1184.46
GR     2298    1202.4    2297.3   1235.27    2299.1   1258.85    2299.4   1282.12    2298.4   1301.35
GR   2299.8   1315.61    2308.7   1338.21    2325.9   1368.67    2325.3   1395.58    2325.8   1411.94
GR   2325.9   1451.45    2325.9   1492.84    2326.2   1513.64

X1   53183        35    1023.46   1584.75      1163      1163      1163
X3      10
GR   2335.9      1000    2321.2   1009.35    2324.6   1023.46    2317.6   1030.59    2311.5   1053.21
GR   2310.6   1063.56    2311.1   1069.39    2309.9   1083.59    2310.8   1090.73    2310.4   1111.32
GR   2309.2   1118.92    2311.3   1128.82    2311.3   1174.74    2311.1   1214.76    2310.9   1246.96
GR   2309.7   1311.05    2309.2   1343.78      2309   1377.97    2306.5   1382.06    2309.5    1387.2
GR   2309.7   1398.02    2305.7   1410.17    2307.3   1422.56    2308.5    1435.3    2308.8   1459.21
GR   2308.7   1488.67    2310.5   1499.24    2315.8   1510.35      2325   1542.44    2329.4   1557.17
GR   2332.3   1572.24    2336.2   1584.75    2337.2   1606.24    2337.4   1626.09    2336.9   1659.02

X1   54519        59    1634.57   2040.91      1336      1336      1336
X3      10
GR   2341.7      1000    2344.5   1017.65    2344.3   1033.32    2344.9   1047.14      2336   1065.57
GR   2323.8   1098.95    2322.2   1127.07    2321.8   1162.12      2322      1197    2321.8    1204.3
GR   2322.6   1222.77    2323.8   1253.57    2324.6   1278.58    2328.9   1296.06    2326.7   1326.39
GR   2339.6   1338.01      2344   1360.82    2342.9   1384.17      2344   1406.09    2344.5   1422.52
GR   2343.6   1436.76    2344.4    1470.2    2343.6   1484.06    2345.7    1519.4    2345.7   1543.04
GR     2346   1568.82    2344.1   1591.74    2343.3    1602.9    2343.7   1623.39    2343.3   1634.57
GR   2326.1   1644.21    2319.9   1663.17    2319.4   1676.21    2319.7   1696.04    2318.8   1703.14
GR   2319.7   1711.21    2319.2    1735.5    2318.7   1749.97    2319.8   1765.72    2319.9   1779.36
GR     2319   1792.44      2319   1801.18    2317.9   1805.49    2318.9   1812.55    2319.5   1828.22
GR   2319.4   1856.87    2319.4   1901.62    2318.2   1911.73    2319.2   1916.64    2319.2   1935.72
GR   2327.8   1956.94    2345.4   1973.64    2344.9   1989.31    2346.3   1996.61    2345.7   2017.16
GR   2347.4   2040.91    2347.8   2058.42      2348   2081.27    2347.9    2107.8


X1   55570        23    1016.93   1551.34      1051      1051      1051
X3      10
GR   2356.2      1000       2356   1016.93    2337.6   1046.3     2331.8   1067.36       2331   1091.77
GR   2330.5   1139.87    2330.2   1187.66    2328.6   1236.66    2328.3   1283.38    2327.7   1319.99
GR   2327.3   1341.77    2326.8   1347.63    2327.1    1380.3    2325.3   1389.21    2326.8   1402.91
GR   2324.7   1415.77    2327.3   1426.84    2328.8   1472.84      2328   1489.71    2332.4   1511.96
GR     2338   1526.49    2349.3   1537.66    2354.2   1551.34

    SECTION CUT FROM UNLV DETENTION BASIN TOPO

X1   55870         8          0       660       300       300       300
GR    2350         0       2332       180    2326.7       200    2326.7       570       2332       585
GR    2334       625       2336       660      2338       682

    SECTION CUT FROM UNLV DETENTION BASIN TOPO
1
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X1   56010         7          0       770       140       140       140
X3                                                      610
GR    2350         0       2334       134      2332       143    2328.9       150    2328.9       727
GR    2332       736       2350       770

    SECTION CUT FROM UNLV DETENTION BASIN TOPO

X1   56230         6          0       667       220       220       220
X3                                                      630
GR    2350         0       2333        35    2332.5        40    2332.5       630       2333       633
GR    2350       667


NC                                      .3        .5
    SECTION 564+20 IS 67' D/S OF THE ULVN SPILLWAY
X1   56420         9         87       743       190       190       190
GR    2368         0       2364        26      2360        42      2352        60       2348        87
GR    2336       116    2334.3       121    2334.3       709      2348       743


X1   56487                                      67        67        67                 .67


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *PROF 1
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CCHV=      .100 CEHV=      .300
*SECNO 28903.000
3720 CRITICAL DEPTH ASSUMED
 28903.000       5.52    2119.92    2119.92    2115.10    2122.13       2.21        .00        .00    2145.00
    2939.0         .0     2939.0         .0         .0      246.2         .0         .0         .0    2126.60
       .00        .00      11.94        .00       .000       .025       .000       .000    2114.40    1047.36
   .005975          0.         0.         0.          0         29          0        .00      56.27    1103.64


*SECNO 29486.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 29486.000       5.52    2124.34    2124.34        .00    2126.55       2.21       3.48        .00    2149.42
    2939.0         .0     2939.0         .0         .0      246.2         .0        3.3         .8    2131.02
       .01        .00      11.94        .00       .000       .025       .000       .000    2118.82    1047.36
   .005975        582.       582.       582.          2          5          0        .00      56.27    1103.64


*SECNO 30067.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000       5.52    2128.76    2128.76        .00    2130.97       2.21       3.48        .00    2153.84
    2939.0         .0     2939.0         .0         .0      246.2         .0        6.6        1.5    2135.44
       .03        .00      11.94        .00       .000       .025       .000       .000    2123.24    1047.36
   .005975        582.       582.       582.          2          5          0        .00      56.27    1103.64


*SECNO 30650.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000       5.57    2133.07    2133.07        .00    2135.30       2.24       3.47        .01    2145.00
    2939.0         .0     2939.0         .0         .0      244.9         .0        9.9        2.2    2145.00
       .04        .00      12.00        .00       .000       .025       .000       .000    2127.50    1037.21
   .005931        582.       582.       582.          2          5          0        .00      54.97    1092.19


CCHV=      .300 CEHV=      .500
1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000       5.55    2133.28    2133.28        .00    2135.53       2.25        .18        .01    2145.23
    2939.0         .0     2939.0         .0         .0      244.2         .0       10.0        2.3    2145.23
       .04        .00      12.03        .00       .000       .025       .000       .000    2127.73    1037.24
   .005975         30.        30.        30.          2          5          0        .00      54.93    1092.16


*SECNO 30765.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.91

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.90 ELREA=      2142.00

 30765.000       8.10    2136.00        .00        .00    2136.22        .23        .08        .61    2142.00
    2939.0         .0     2939.0         .0         .0      769.9         .0       11.0        2.5    2142.00
       .05        .00       3.82        .00       .000       .025       .000       .000    2127.90    1038.98
   .000392         85.        85.        85.          3          0          0        .00     129.85    1168.82


*SECNO 30935.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.34 ELREA=      2142.34

 30935.000       7.82    2136.06        .00        .00    2136.31        .25        .07        .01    2142.34
    2939.0         .0     2939.0         .0         .0      734.1         .0       14.0        3.0    2142.34
       .06        .00       4.00        .00       .000       .025       .000       .000    2128.24    1040.09
   .000448        170.       170.       170.          3          0          0        .00     127.63    1167.71


CCHV=      .100 CEHV=      .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED        .34 FEET

 31235.000       7.24    2136.34        .00        .00    2136.49        .15        .18        .01    2136.00
    2939.0         .1     2934.8        4.0         .4      943.6        7.9       19.8        4.1    2136.00
       .09        .32       3.11        .51       .040       .040       .040       .000    2129.10    1189.94
   .000809        300.       300.       300.          2          0          0        .00     210.06    1400.00
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	*XLOBL*	*XLCH*	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300
*SECNO 31500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .35

31500.000	4.44	2136.44	.00	.00	2137.13	.69	.47	.16	*2136.00*
2939.0	.7	2922.9	15.4	.6	436.4	9.0	24.0	5.3	2136.00
.10	1.10	6.70	1.70	.040	.040	.040	.000	2132.00	1165.16
.006762	265.	265.	265.	2	0	0	.00	159.22	1324.38

*SECNO 32044.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	4.13	2141.63	2141.53	.00	2142.69	1.06	5.45	.11	2157.30
2939.0	.0	2939.0	.0	.0	355.0	.0	29.0	7.2	2157.30
.12	.00	8.28	.00	.000	.040	.000	.000	2137.50	1082.01
.016370	544.	544.	544.	15	11	0	.00	153.94	1262.08

*SECNO 33671.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	6.27	2159.27	.00	.00	2160.13	.85	17.41	.02	2176.20
2939.0	.0	2939.0	.0	.0	396.3	.0	43.0	12.1	2173.80
.18	.00	7.42	.00	.000	.040	.000	.000	2153.00	1259.46
.007539	1627.	1627.	1627.	6	0	0	.00	110.47	1369.93

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	*IDC*	*ICONT*	CORAR	TOPWID	ENDST

*SECNO 35645.000

3495 *OVERBANK AREA ASSUMED NON-EFFECTIVE*, ELLEA= 2191.90 ELREA= 2186.40

35645.000	6.20	2175.70	.00	.00	2176.43	.73	16.29	.01	2191.90
2939.0	.0	2939.0	.0	.0	427.5	.0	61.7	18.2	2186.40
.26	.00	6.88	.00	.000	.040	.000	.000	2169.50	1102.76
.009076	1974.	1974.	1974.	5	0	0	.00	155.62	1258.38

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	5.84	2185.14	.00	.00	2185.64	.51	9.18	.02	2207.90
2939.0	.0	2939.0	.0	.0	515.3	.0	74.4	23.0	2207.60
.31	.00	5.70	.00	.000	.040	.000	.000	2179.30	1198.57
.006781	1177.	1177.	1177.	4	0	0	.00	200.92	1399.49

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	2.91	2199.01	.00	.00	2199.61	.61	13.94	.03	*2224.10*
2939.0	.0	2939.0	.0	.0	469.3	.0	92.4	31.1	2223.90
.38	.00	6.26	.00	.000	.040	.000	.000	2196.10	1100.24
.011813	1588.	1588.	1588.	4	0	0	.00	242.68	1342.92

*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	5.31	2208.31	.00	.00	2208.79	.48	9.16	.01	*2233.60*
2939.0	.0	2939.0	.0	.0	528.5	.0	105.1	36.7	2232.40

```
      .44       .00      5.56       .00      .000      .040      .000      .000   2203.00   1181.60
   .006097     1109.     1109.     1109.         5         0         0       .00    196.55   1378.15


*SECNO 40616.000
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .63

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2244.10 ELREA=      2235.50

 40616.000      4.46   2218.16       .00       .00   2218.89       .73     10.03       .07   2244.10
    2939.0        .0    2939.0        .0        .0     429.1        .0     117.2      42.1   2235.50
       .48       .00      6.85       .00      .000      .040      .000      .000   2213.70   1212.34
   .015189     1097.     1097.     1097.         2         0         0       .00    233.03   1445.36


*SECNO 42138.000

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2238.80 ELREA=      2254.30

 42138.000      6.15   2230.95       .00       .00   2231.25       .31     12.32       .04   2238.80
    2939.0        .0    2939.0        .0        .0     661.7        .0     136.2      51.4   2254.30
       .58       .00      4.44       .00      .000      .040      .000      .000   2224.80   1266.64
   .005022     1522.     1522.     1522.         6         0         0       .00    299.91   1646.40


*SECNO 43231.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2261.00 ELREA=      2254.30

 43231.000      5.09   2238.79       .00       .00   2239.52       .72      8.14       .12   2261.00
    2939.0        .0    2939.0        .0        .0     431.0        .0     149.9      57.6   2254.30
       .62       .00      6.82       .00      .000      .040      .000      .000   2233.70   1235.39
   .012172     1093.     1093.     1093.         4         0         0       .00    198.28   1433.66


*SECNO 44345.000
1
   15APR98      13:31:06                                                                        PAGE   13

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2254.80 ELREA=      2265.40

 44345.000      5.44   2248.24       .00       .00   2248.80       .56      9.26       .02   2254.80
    2939.0        .0    2939.0        .0        .0     489.8        .0     161.7      62.2   2265.40
       .67       .00      6.00       .00      .000      .040      .000      .000   2242.80   1238.12
   .006037     1114.     1114.     1114.         3         0         0       .00    161.37   1458.08


*SECNO 45725.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2279.80 ELREA=      2276.30

 45725.000      4.83   2257.83       .00       .00   2258.27       .45      9.46       .01   2279.80
    2939.0        .0    2939.0        .0        .0     548.8        .0     178.1      69.0   2276.30
       .75       .00      5.36       .00      .000      .040      .000      .000   2253.00   1105.80
   .007859     1380.     1380.     1380.         5         0         0       .00    263.41   1412.58


*SECNO 46746.000

3265 DIVIDED FLOW
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2274.90 ELREA=      2273.20

 46746.000      5.14   2263.94       .00       .00   2264.23       .28      5.94       .02   2274.90
  2939.0         .0    2939.0        .0        .0     687.9         .0     192.6      75.6    2273.20
     .81         .00      4.27       .00       .000    .040       .000     .000    2258.80   1154.44
  .004478     1021.     1021.     1021.          5         0         0       .00     303.35   1515.21


*SECNO 48046.000
1
   15APR98      13:31:06                                                                          PAGE   14

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2288.70 ELREA=      2279.90

 48046.000      5.07   2271.97       .00       .00   2272.39       .41      8.12       .04   2288.70
  2939.0         .0    2939.0        .0        .0     568.8         .0     211.4      85.0    2279.90
     .88         .00      5.17       .00       .000    .040       .000     .000    2266.90   1105.59
  .009316     1300.     1300.     1300.          2         0         0       .00     327.30   1432.89

*SECNO 49654.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2308.10 ELREA=      2307.20

 49654.000      5.25   2286.35   2285.80       .00   2286.83       .48     14.43       .02   2308.10
  2939.0         .0    2939.0        .0        .0     529.5         .0     231.7      95.8    2307.20
     .96         .00      5.55       .00       .000    .040       .000     .000    2281.10   1070.19
  .008645     1608.     1608.     1608.         11        10         0       .00     256.65   1400.06

*SECNO 50964.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2312.30 ELREA=      2313.40

 50964.000      3.80   2295.20       .00       .00   2295.52       .32      8.68       .02   2312.30
  2939.0         .0    2939.0        .0        .0     642.7         .0     249.3      104.0   2313.40
    1.04         .00      4.57       .00       .000    .040       .000     .000    2291.40   1135.91
  .005235     1310.     1310.     1310.          5         0         0       .00     286.52   1457.86

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2326.20 ELREA=      2325.90

 52020.000      4.15   2301.15       .00       .00   2301.59       .44      6.04       .03   2326.20
  2939.0         .0    2939.0        .0        .0     554.5         .0     263.8      110.2   2325.90
    1.10         .00      5.30       .00       .000    .040       .000     .000    2297.00   1090.91
  .006265     1056.     1056.     1056.          5         0         0       .00     228.14   1319.05


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 53183.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2324.60 ELREA=      2336.20

 53183.000      5.36   2311.06   2310.66       .00   2311.52       .47      9.92       .01   2324.60
  2939.0         .0    2939.0        .0        .0     536.8         .0     278.4      117.9   2336.20
    1.16         .00      5.47       .00       .000    .040       .000     .000    2305.70   1058.28
  .012299     1163.     1163.     1163.         13        11         0       .00     347.44   1500.41


*SECNO 54519.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2343.30 ELREA=      2347.40

 54519.000      3.69   2321.59       .00       .00   2321.92       .33     10.38       .01   2343.30
  2939.0         .0    2939.0        .0        .0     634.3         .0     296.3      127.6   2347.40
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      1.24       .00      4.63       .00      .000      .040      .000      .000   2317.90   1658.01
    .005352     1336.     1336.     1336.         6         0         0       .00    283.60   1941.61


*SECNO 55570.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2356.00 ELREA=      2354.20

 55570.000      4.77   2329.47       .00       .00   2329.99       .53      8.02       .06   2356.00
    2939.0         .0    2939.0        .0        .0     503.4        .0     310.1     134.5   2354.20
      1.29       .00      5.84       .00      .000      .040      .000       .00   2324.70   1210.03
    .011734     1051.     1051.     1051.         4         0         0       .00    287.11   1497.14


*SECNO 55870.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.59

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 55870.000      3.73   2330.43       .00       .00   2330.49       .07       .45       .05   2350.00
    2939.0         .0    2939.0        .0        .0    1426.2        .0     316.7     136.8   2336.00
      1.33       .00      2.06       .00      .000      .040      .000      .000   2326.70    185.92
    .000557     300.      300.      300.         3         0         0       .00    394.63    580.56


*SECNO 56010.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .29


3470 ENCROACHMENT STATIONS=          .0     610.0  TYPE=       1  TARGET=      609.999
 56010.000      1.58   2330.48       .00       .00   2330.73       .25       .19       .06   2350.00
    2939.0         .0    2939.0        .0        .0     731.1        .0     320.2     138.2 100000.00
      1.34       .00      4.02       .00      .000      .040      .000      .000   2328.90    146.43
    .006413     140.      140.      140.         3         0         0       .00    463.57    610.00


*SECNO 56230.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     630.0  TYPE=       1  TARGET=      629.999
 56230.000       .91   2333.41   2333.41       .00   2333.87       .46      2.46       .06   2350.00
    2939.0         .0    2939.0        .0        .0     541.9        .0     323.4     140.9 100000.00
      1.35       .00      5.42       .00      .000      .040      .000      .000   2332.50     34.15
    .024241     220.      220.      220.         4        11         0       .00    595.85    630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.07

 56420.000      1.42   2335.72       .00       .00   2335.91       .19      1.96       .08   2348.00
    2939.0         .0    2939.0        .0        .0     837.6        .0     326.4     143.5   2348.00
      1.36       .00      3.51       .00      .000      .040      .000      .000   2334.30    116.84
    .005669     190.      190.      190.         5         0         0       .00    595.68    712.51


*SECNO 56487.000
 56487.000      1.20   2336.17       .00       .00   2336.44       .27       .49       .04   2348.67
    2939.0         .0    2939.0        .0        .0     709.5        .0     327.6     144.4   2348.67
      1.37       .00      4.14       .00      .000      .040      .000      .000   2334.97    117.47
    .009832      67.       67.       67.         3         0         0       .00    594.51    711.98


T1      FEMA 50-YEAR HEC-2 ANALYSIS
1
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T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      MIDDLE NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                 3                                                                          2121.5

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      2                    -1

1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
```

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2
0

CCHV= .100 CEHV= .300
*SECNO 28903.000
3720 CRITICAL DEPTH ASSUMED

28903.000	8.91	2123.31	2123.31	2121.50	2126.65	3.35	.00	.00	2145.00
6751.0	.0	6751.0	.0	.0	459.9	.0	.0	.0	2126.60
.00	.00	14.68	.00	.000	.025	.000	.000	2114.40	1040.58
.005331	0.	0.	0.	0	10	0	.00	69.83	1110.42

*SECNO 29486.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

29486.000	8.93	2127.75	2127.75	.00	2131.07	3.33	3.09	.00	2149.42
6751.0	.0	6751.0	.0	.0	461.2	.0	6.2	.9	2131.02
.01	.00	14.64	.00	.000	.025	.000	.000	2118.82	1040.55
.005291	582.	582.	582.	3	5	0	.00	69.90	1110.45

*SECNO 30067.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

30067.000	8.92	2132.16	2132.16	.00	2135.49	3.33	3.08	.00	2153.84
6751.0	.0	6751.0	.0	.0	460.7	.0	12.3	1.9	2135.44
.02	.00	14.65	.00	.000	.025	.000	.000	2123.24	1040.56
.005306	582.	582.	582.	3	5	0	.00	69.87	1110.44

*SECNO 30650.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2144.00 ELREA= 2145.00

30650.000	9.03	2136.53	2136.53	.00	2139.91	3.38	3.08	.01	2145.00
6751.0	.0	6751.0	.0	.0	457.3	.0	18.5	2.8	2145.00
.03	.00	14.76	.00	.000	.025	.000	.000	2127.50	1030.77
.005271	582.	582.	582.	3	5	0	.00	67.85	1098.63

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2144.00 ELREA= 2145.23

30680.000	9.01	2136.74	2136.74	.00	2140.14	3.40	.16	.01	2145.23
6751.0	.0	6751.0	.0	.0	456.1	.0	18.8	2.8	2145.23
.03	.00	14.80	.00	.000	.025	.000	.000	2127.73	1030.81
.005312	30.	30.	30.	2	5	0	.00	67.78	1098.59

*SECNO 30765.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.03

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2142.90 ELREA= 2142.00

30765.000	12.91	2140.81	.00	.00	2141.13	.32	.07	.92	2142.00
6751.0	.0	6751.0	.0	.0	1487.2	.0	20.7	3.1	2142.00
.04	.00	4.54	.00	.000	.025	.000	.000	2127.90	1019.76
.000327	85.	85.	85.	3	0	0	.00	168.27	1188.04

*SECNO 30935.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2142.34 ELREA= 2142.34

30935.000	12.62	2140.86	.00	.00	2141.20	.34	.06	.01	2142.34
6751.0	.0	6751.0	.0	.0	1438.0	.0	26.4	3.7	2142.34
.05	.00	4.69	.00	.000	.025	.000	.000	2128.24	1020.94
.000359	170.	170.	170.	2	0	0	.00	165.92	1186.86

CCHV= .100 CEHV= .300
*SECNO 31235.000
3280 CROSS SECTION 31235.00 EXTENDED 5.16 FEET

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
31235.000	12.05	2141.16	.00	.00	2141.34	.18	.12	.02	2136.00
6751.0	125.9	6390.1	235.0	81.7	1833.9	118.6	38.3	5.1	2136.00
.07	1.54	3.48	1.98	.040	.040	.040	.000	2129.10	1157.60
.000419	300.	300.	300.	2	0	0	.00	242.40	1400.00

CCHV= .100 CEHV= .300
*SECNO 31500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

31500.000	9.17	2141.17	.00	.00	2141.59	.42	.18	.07	2136.00
6751.0	244.6	5815.7	690.7	86.8	1071.1	199.9	48.6	6.5	2136.00
.09	2.82	5.43	3.46	.040	.040	.040	.000	2132.00	1134.67
.001343	265.	265.	265.	2	0	0	.00	222.90	1357.57

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	5.72	2143.22	2143.22	.00	2144.92	1.70	1.76	.39	2157.30
6751.0	.0	6751.0	.0	.0	644.8	.0	61.1	9.1	2157.30
.10	.00	10.47	.00	.000	.040	.000	.000	2137.50	1078.71
.016259	544.	544.	544.	20	14	0	.00	195.24	1273.95

*SECNO 33671.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

3495 *OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=* 2176.20 ELREA= 2173.80

33671.000	8.69	2161.69	.00	.00	2163.06	1.37	18.10	.03	2176.20
6751.0	.0	6751.0	.0	.0	719.7	.0	86.6	15.6	2173.80
.15	.00	9.38	.00	.000	.040	.000	.000	2153.00	1257.73
.008091	1627.	1627.	1627.	5	0	0	.00	148.42	1406.15

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 35645.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	8.26	2177.76	.00	.00	2178.83	1.07	15.74	.03	2191.90
6751.0	.0	6751.0	.0	.0	813.0	.0	121.4	23.5	2186.40
.22	.00	8.30	.00	.000	.040	.000	.000	2169.50	1098.80
.007857	1974.	1974.	1974.	4	0	0	.00	200.09	1298.88

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	7.45	2186.75	.00	.00	2187.73	.98	8.89	.01	2207.90
6751.0	.0	6751.0	.0	.0	851.8	.0	143.8	29.0	2207.60
.26	.00	7.93	.00	.000	.040	.000	.000	2179.30	1191.18
.007268	1177.	1177.	1177.	3	0	0	.00	213.29	1404.47

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	4.32	2200.42	.00	.00	2201.46	1.04	13.71	.02	2224.10
6751.0	.0	6751.0	.0	.0	825.3	.0	174.4	37.7	2223.90
.31	.00	8.18	.00	.000	.040	.000	.000	2196.10	1087.10
.010430	1588.	1588.	1588.	4	0	0	.00	260.06	1347.15

*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

```
 39519.000      6.89   2209.89       .00       .00   2210.89       .99      9.42       .00   2233.60
    6751.0         .0    6751.0        .0        .0     844.6        .0     195.7      43.6   2232.40
       .35        .00      7.99       .00      .000      .040      .000      .000   2203.00   1177.14
   .007050      1109.      1109.     1109.         4         0         0       .00    202.28   1379.42


*SECNO 40616.000
1
    15APR98      13:31:06                                                                          PAGE   22

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2244.10 ELREA=      2235.50

 40616.000      5.95   2219.65       .00       .00   2220.77      1.13      9.85       .04   2244.10
    6751.0         .0    6751.0        .0        .0     792.8        .0     216.3      49.3   2235.50
       .39        .00      8.52       .00      .000      .040      .000      .000   2213.70   1192.24
   .011819      1097.      1097.     1097.         3         0         0       .00    257.12   1449.36


*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2238.80 ELREA=      2254.30

 42138.000      7.53   2232.33       .00       .00   2232.85       .52     12.01       .06   2238.80
    6751.0         .0    6751.0        .0        .0    1171.2        .0     250.6      60.7   2254.30
       .46        .00      5.76       .00      .000      .040      .000      .000   2224.80   1260.40
   .005641      1522.      1522.     1522.         5         0         0       .00    392.09   1652.49


*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2261.00 ELREA=      2254.30

 43231.000      6.68   2240.38       .00       .00   2241.50      1.12      8.47       .18   2261.00
    6751.0         .0    6751.0        .0        .0     794.8        .0     275.3      68.7   2254.30
       .49        .00      8.49       .00      .000      .040      .000      .000   2233.70   1186.11
   .011305      1093.      1093.     1093.         4         0         0       .00    248.61   1434.72


*SECNO 44345.000

3265 DIVIDED FLOW

1
    15APR98      13:31:06                                                                          PAGE   23

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2254.80 ELREA=      2265.40

 44345.000      7.34   2250.14       .00       .00   2251.20      1.06      9.70       .01   2254.80
    6751.0         .0    6751.0        .0        .0     815.5        .0     295.9      74.2   2265.40
       .53        .00      8.28       .00      .000      .040      .000      .000   2242.80   1233.22
   .006912      1114.      1114.     1114.         3         0         0       .00    182.21   1460.44


*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2279.80 ELREA=      2276.30

 45725.000      6.54   2259.54       .00       .00   2260.09       .55      8.83       .05   2279.80
    6751.0         .0    6751.0        .0        .0    1136.0        .0     326.8      83.1   2276.30
       .60        .00      5.94       .00      .000      .040      .000      .000   2253.00   1040.08
   .005941      1380.      1380.     1380.         5         0         0       .00    378.45   1418.52


*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2274.90 ELREA=      2273.20

 46746.000      6.54   2265.34       .00       .00   2265.83       .49      5.74       .01   2274.90
    6751.0         .0    6751.0        .0        .0    1203.9        .0     354.2      92.3   2273.20
       .65        .00      5.61       .00      .000      .040      .000      .000   2258.80   1115.52
   .005320      1021.      1021.     1021.         4         0         0       .00    401.99   1517.51
```

*SECNO 48046.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	6.41	2273.31	.00	.00	2273.99	.69	8.11	.06	2288.70
6751.0	.0	6751.0	.0	.0	1014.7	.0	387.3	103.3	2279.90
.70	.00	6.65	.00	.000	.040	.000	.000	2266.90	1098.81
.007411	1300.	1300.	1300.	4	0	0	.00	336.05	1434.87

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 49654.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	6.48	2287.58	2287.13	.00	2288.45	.88	14.40	.06	2308.10
6751.0	.0	6751.0	.0	.0	899.0	.0	422.6	115.6	2307.20
.76	.00	7.51	.00	.000	.040	.000	.000	2281.10	1068.51
.011045	1608.	1608.	1608.	15	11	0	.00	332.61	1401.12

*SECNO 50964.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	5.53	2296.93	.00	.00	2297.42	.49	8.92	.04	2312.30
6751.0	.0	6751.0	.0	.0	1203.1	.0	454.2	126.0	2313.40
.83	.00	5.61	.00	.000	.040	.000	.000	2291.40	1093.64
.004616	1310.	1310.	1310.	5	0	0	.00	358.16	1458.51

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	5.64	2302.64	.00	.00	2303.50	.86	5.97	.11	2326.20
6751.0	.0	6751.0	.0	.0	906.8	.0	479.8	133.3	2325.90
.87	.00	7.45	.00	.000	.040	.000	.000	2297.00	1077.30
.007088	1056.	1056.	1056.	3	0	0	.00	245.52	1322.83

*SECNO 53183.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	6.58	2312.28	2311.77	.00	2312.90	.62	9.38	.02	2324.60
6751.0	.0	6751.0	.0	.0	1069.8	.0	506.2	142.6	2336.20
.92	.00	6.31	.00	.000	.040	.000	.000	2305.70	1050.30
.009259	1163.	1163.	1163.	7	8	0	.00	452.68	1502.98

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 54519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	4.89	2322.79	.00	.00	2323.53	.74	10.59	.04	2343.30
6751.0	.0	6751.0	.0	.0	979.2	.0	537.6	154.0	2347.40
.97	.00	6.89	.00	.000	.040	.000	.000	2317.90	1654.33
.006862	1336.	1336.	1336.	4	0	0	.00	290.24	1944.58

*SECNO 55570.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	6.36	2331.06	.00	.00	2331.71	.65	8.17	.01	2356.00
6751.0	.0	6751.0	.0	.0	1044.4	.0	562.0	162.5	2354.20
1.02	.00	6.46	.00	.000	.040	.000	.000	2324.70	1089.82
.008887	1051.	1051.	1051.	3	0	0	.00	415.39	1505.20

*SECNO 55870.000

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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.30

 55870.000      5.48   2332.18      .00      .00   2332.34      .16      .58      .05   2350.00
    6751.0        .0    6751.0       .0       .0    2127.8       .0    572.9    165.4    2336.00
      1.04       .00      3.17      .00     .000      .040     .000     .000  2326.70     178.18
   .000817       300.     300.      300.        3         0        0      .00   410.45     588.63


*SECNO 56010.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  .55


3470 ENCROACHMENT STATIONS=          .0     610.0  TYPE=      1  TARGET=     609.999
 56010.000      3.38   2332.28      .00      .00   2332.57      .29      .19      .04   2350.00
    6751.0        .0    6751.0       .0       .0    1570.1       .0    578.9    166.8 100000.00
      1.05       .00      4.30      .00     .000      .040     .000     .000  2328.90     141.72
   .002700       140.     140.      140.        2         0        0      .00   468.28     610.00


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   15APR98      13:31:06                                                                    PAGE   26

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     630.0  TYPE=      1  TARGET=     629.999
 56230.000      1.59   2334.09   2334.09      .00   2334.88      .79     1.27      .15   2350.00
    6751.0        .0    6751.0       .0       .0    946.7       .0    585.2    169.5 100000.00
      1.06       .00      7.13      .00     .000      .040     .000     .000  2332.50      32.75
   .020022       220.     220.      220.       20        11        0      .00   597.25     630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.79

 56420.000      2.26   2336.56      .00      .00   2336.95      .39     1.95      .12   2348.00
    6751.0        .0    6751.0       .0       .0    1346.0       .0    590.2    172.1    2348.00
      1.07       .00      5.02      .00     .000      .040     .000     .000  2334.30     114.63
   .006218       190.     190.      190.        3         0        0      .00   599.99     714.62


*SECNO 56487.000
 56487.000      2.04   2337.01      .00      .00   2337.49      .48      .49      .05   2348.67
    6751.0        .0    6751.0       .0       .0    1208.0       .0    592.2    173.0    2348.67
      1.07       .00      5.59      .00     .000      .040     .000     .000  2334.97     115.19
   .008893        67.      67.       67.        3         0        0      .00   598.86     714.05


T1       FEMA 100-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       MIDDLE NO. LAS VEGAS WASH

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  4                                                                          2125.0

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       3                    -1

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   15APR98      13:31:06                                                                    PAGE   27

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 3
0

 CCHV=      .100 CEHV=      .300
 *SECNO 28903.000
  28903.000     10.60   2125.00      .00   2125.00   2128.17     3.17      .00      .00   2145.00
     8343.0        .0    8343.0       .0       .0    583.8       .0       .0       .0    2126.60
        .00       .00     14.29      .00     .000      .025     .000     .000  2114.40     1037.20
    .004186         0.       0.        0.        0         0        0      .00    76.60     1113.80


 *SECNO 29486.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
 29486.000      10.08    2128.90    2128.90       .00    2132.55       3.65       2.68        .14    2149.42
    8343.0         .0     8343.0         .0         .0     544.4         .0        7.5        1.0    2131.02
       .01        .00      15.33        .00       .000      .025       .000       .000    2118.82    1038.24
   .005085       582.       582.       582.         20          8          0        .00      74.51    1112.76


*SECNO 30067.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000      10.04    2133.28    2133.28       .00    2136.97       3.69       2.98        .01    2153.84
    8343.0         .0     8343.0         .0         .0     541.2         .0       14.8        2.0    2135.44
       .02        .00      15.41        .00       .000      .025       .000       .000    2123.24    1038.33
   .005167       582.       582.       582.         20          5          0        .00      74.34    1112.67


*SECNO 30650.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000      10.17    2137.67    2137.67       .00    2141.41       3.74       2.99        .01    2145.00
    8343.0         .0     8343.0         .0         .0     537.7         .0       22.0        3.0    2145.00
       .03        .00      15.52        .00       .000      .025       .000       .000    2127.50    1028.64
   .005119       582.       582.       582.         20          5          0        .00      72.12    1100.76


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    15APR98      13:31:06                                                                                PAGE   28

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000      10.14    2137.87    2137.87       .00    2141.64       3.77        .15        .01    2145.23
    8343.0         .0     8343.0         .0         .0     535.6         .0       22.4        3.0    2145.23
       .03        .00      15.58        .00       .000      .025       .000       .000    2127.73    1028.69
   .005172        30.        30.        30.          2          5          0        .00      72.02    1100.71


*SECNO 30765.000
3280 CROSS SECTION  30765.00 EXTENDED        .37 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.10


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.90 ELREA=      2142.00

 30765.000      14.47    2142.37        .00        .00    2142.73        .37        .07       1.02    2142.00
    8537.0         .0     8537.0         .0         .0     1758.7         .0       24.6        3.3    2142.00
       .04        .00       4.85        .00       .000      .025       .000       .000    2127.90    1015.00
   .000323        85.        85.        85.          4          0          0        .00     177.80    1192.80


*SECNO 30935.000


3265 DIVIDED FLOW


3280 CROSS SECTION  30935.00 EXTENDED        .17 FEET

 30935.000      14.27    2142.51        .00        .00    2142.80        .30        .05        .02    2142.34
    8537.0      768.6     7768.4         .0      319.6     1723.8         .0       32.0        4.3    2142.34
       .05       2.41       4.51        .00       .025      .025       .000       .000    2128.24     721.20
   .000285        170.       170.       170.          2          0          0        .00     328.78    1192.80


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    15APR98      13:31:06                                                                                PAGE   29

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED      6.71 FEET

 31235.000      13.61    2142.71        .00        .00    2142.91        .21        .10        .01    2136.00
    8537.0      262.6     7931.9      342.5      146.0     2121.0      154.3       47.4        6.3    2136.00
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      .07      1.80      3.74      2.22      .040      .040      .040      .000   2129.10   1143.63
  .000397       300.      300.      300.         2         0         0       .00    256.37   1400.00


CCHV=     .100 CEHV=     .300
*SECNO 31500.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .61

 31500.000     10.72   2142.72       .00       .00   2143.14       .42       .16       .06   2136.00
    8537.0     452.9     7003.0    1081.2     146.0    1278.8     291.8      60.0       7.8   2136.00
       .09      3.10      5.48      3.71      .040      .040      .040      .000   2132.00   1124.98
  .001078       265.      265.      265.         2         0         0       .00    239.95   1364.93

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2157.30 ELREA=      2157.30

 32044.000      6.30   2143.80   2143.80       .00   2145.76      1.96      1.47       .46   2157.30
    8537.0        .0     8537.0        .0        .0     760.0        .0      75.5      10.5   2157.30
       .10       .00     11.23       .00      .000      .040      .000      .000   2137.50   1077.50
  .015617       544.      544.      544.        20        14         0       .00    200.79   1278.29


*SECNO 33671.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2176.20 ELREA=      2173.80

 33671.000      9.42   2162.42       .00       .00   2164.06      1.64     18.27       .03   2176.20
    8537.0        .0     8537.0        .0        .0     831.2        .0     105.2      17.2   2173.80
       .14       .00     10.27       .00      .000      .040      .000      .000   2153.00   1257.20
  .008461      1627.     1627.     1627.         5         0         0       .00    154.49   1411.69


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   15APR98      13:31:06                                                                    PAGE   30

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 35645.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2191.90 ELREA=      2186.40

 35645.000      9.00   2178.50       .00       .00   2179.72      1.22     15.61       .04   2191.90
    8537.0        .0     8537.0        .0        .0     963.8        .0     145.8      25.3   2186.40
       .20       .00      8.86       .00      .000      .040      .000      .000   2169.50   1097.37
  .007410      1974.     1974.     1974.         5         0         0       .00    205.91   1303.28


*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2207.90 ELREA=      2207.60

 36822.000      8.04   2187.34       .00       .00   2188.52      1.18      8.80       .00   2207.90
    8537.0        .0     8537.0        .0        .0     978.0        .0     172.1      31.1   2207.60
       .24       .00      8.73       .00      .000      .040      .000      .000   2179.30   1188.52
  .007544      1177.     1177.     1177.         3         0         0       .00    217.74   1406.26


*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2224.10 ELREA=      2223.90

 38410.000      4.90   2201.00       .00       .00   2202.19      1.19     13.67       .00   2224.10
    8537.0        .0     8537.0        .0        .0     975.2        .0     207.7      39.9   2223.90
       .29       .00      8.75       .00      .000      .040      .000      .000   2196.10   1081.81
  .009910      1588.     1588.     1588.         3         0         0       .00    267.04   1348.85


*SECNO 39519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2233.60 ELREA=      2232.40

 39519.000      7.46   2210.46       .00       .00   2211.69      1.23      9.49       .01   2233.60
    8537.0        .0     8537.0        .0        .0     960.5        .0     232.3      45.9   2232.40
       .33       .00      8.89       .00      .000      .040      .000      .000   2203.00   1175.53
  .007459      1109.     1109.     1109.         3         0         0       .00    204.34   1379.88


*SECNO 40616.000
1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
```

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2244.10 ELREA= 2235.50

40616.000	6.52	2220.22	.00	.00	2221.50	1.28	9.80	.02	2244.10
8537.0	.0	8537.0	.0	.0	939.7	.0	256.2	51.7	2235.50
.36	.00	9.08	.00	.000	.040	.000	.000	2213.70	1191.00
.010889	1097.	1097.	1097.	3	0	0	.00	259.89	1450.89

*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2238.80 ELREA= 2254.30

42138.000	7.95	2232.75	.00	.00	2233.38	.63	11.82	.07	2238.80
8537.0	.0	8537.0	.0	.0	1341.1	.0	296.1	63.2	2254.30
.43	.00	6.37	.00	.000	.040	.000	.000	2224.80	1258.46
.005813	1522.	1522.	1522.	5	0	0	.00	395.56	1654.02

*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2261.00 ELREA= 2254.30

43231.000	7.20	2240.90	.00	.00	2242.21	1.31	8.62	.21	2261.00
8537.0	.0	8537.0	.0	.0	928.0	.0	324.6	71.4	2254.30
.46	.00	9.20	.00	.000	.040	.000	.000	2233.70	1177.60
.011309	1093.	1093.	1093.	3	0	0	.00	257.47	1435.07

*SECNO 44345.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2254.80 ELREA= 2265.40

44345.000	8.03	2250.83	.00	.00	2252.09	1.26	9.88	.00	2254.80
8537.0	.0	8537.0	.0	.0	946.1	.0	348.5	77.1	2265.40
.49	.00	9.02	.00	.000	.040	.000	.000	2242.80	1231.41
.007140	1114.	1114.	1114.	5	0	0	.00	189.93	1461.31

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2279.80 ELREA= 2276.30

45725.000	7.10	2260.10	.00	.00	2260.72	.62	8.56	.06	2279.80
8537.0	.0	8537.0	.0	.0	1347.2	.0	384.8	86.2	2276.30
.55	.00	6.34	.00	.000	.040	.000	.000	2253.00	1038.98
.005444	1380.	1380.	1380.	6	0	0	.00	381.47	1420.45

*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2274.90 ELREA= 2273.20

46746.000	6.97	2265.77	.00	.00	2266.36	.60	5.64	.00	2274.90
8537.0	.0	8537.0	.0	.0	1378.0	.0	416.8	95.5	2273.20
.60	.00	6.20	.00	.000	.040	.000	.000	2258.80	1106.42
.005601	1021.	1021.	1021.	4	0	0	.00	411.79	1518.22

*SECNO 48046.000
3280 CROSS SECTION 48046.00 EXTENDED .42 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2288.70 ELREA= 2279.90

48046.000	6.91	2273.81	.00	.00	2274.62	.81	8.19	.06	2288.70
8537.0	.0	8537.0	.0	.0	1184.6	.0	455.0	106.7	2279.90
.65	.00	7.21	.00	.000	.040	.000	.000	2266.90	1097.51
.007138	1300.	1300.	1300.	4	0	0	.00	338.10	1435.61

*SECNO 49654.000
3280 CROSS SECTION 49654.00 EXTENDED .26 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	6.86	2287.96	2287.67	.00	2289.03	1.08	14.34	.08	2308.10
8537.0	.0	8537.0	.0	.0	1025.2	.0	495.8	119.0	2307.20
.70	.00	8.33	.00	.000	.040	.000	.000	2281.10	1067.99
.011451	1608.	1608.	1608.	14	10	0	.00	333.46	1401.45

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 50964.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.59

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	6.08	2297.48	.00	.00	2298.05	.57	8.97	.05	2312.30
8537.0	.0	8537.0	.0	.0	1406.7	.0	532.4	129.6	2313.40
.76	.00	6.07	.00	.000	.040	.000	.000	2291.40	1090.80
.004550	1310.	1310.	1310.	5	0	0	.00	367.91	1458.71

*SECNO 52020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	6.17	2303.17	.00	.00	2304.22	1.05	6.02	.14	2326.20
8537.0	.0	8537.0	.0	.0	1037.5	.0	562.0	137.1	2325.90
.80	.00	8.23	.00	.000	.040	.000	.000	2297.00	1075.53
.007363	1056.	1056.	1056.	3	0	0	.00	248.64	1324.17

*SECNO 53183.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	7.02	2312.72	.00	.00	2313.43	.70	9.17	.03	2324.60
8537.0	.0	8537.0	.0	.0	1268.2	.0	592.8	146.5	2336.20
.85	.00	6.73	.00	.000	.040	.000	.000	2305.70	1048.68
.008464	1163.	1163.	1163.	5	0	0	.00	455.22	1503.90

*SECNO 54519.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	5.31	2323.21	.00	.00	2324.14	.93	10.64	.07	2343.30
8537.0	.0	8537.0	.0	.0	1100.7	.0	629.1	157.9	2347.40
.90	.00	7.76	.00	.000	.040	.000	.000	2317.90	1653.06
.007513	1336.	1336.	1336.	3	0	0	.00	292.55	1945.61

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55570.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	6.88	2331.58	.00	.00	2332.29	.71	8.13	.02	2356.00
8537.0	.0	8537.0	.0	.0	1264.5	.0	657.6	166.7	2354.20
.94	.00	6.75	.00	.000	.040	.000	.000	2324.70	1074.00
.007961	1051.	1051.	1051.	2	0	0	.00	433.82	1507.83

*SECNO 55870.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.88

55870.000	6.07	2332.77	.00	.00	2332.97	.20	.63	.05	2350.00
8537.0	.0	8537.0	.0	.0	2375.9	.0	670.2	169.7	2336.00
.96	.00	3.59	.00	.000	.040	.000	.000	2326.70	172.27
.000957	300.	300.	300.	3	0	0	.00	428.20	600.46

*SECNO 56010.000

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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62


3470 ENCROACHMENT STATIONS=         .0     610.0  TYPE=      1  TARGET=      609.999
 56010.000       3.99   2332.89        .00        .00   2333.22        .33        .20        .04   2350.00
    8537.0         .0    8537.0         .0         .0    1854.7         .0     677.0     171.1 100000.00
       .97        .00      4.60        .00       .000       .040       .000       .000    2328.90     138.99
   .002502       140.       140.       140.          2          0          0        .00     471.01     610.00


*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=         .0     630.0  TYPE=      1  TARGET=      629.999
 56230.000       1.85   2334.35    2334.35        .00   2335.28        .93       1.19        .18   2350.00
    8537.0         .0    8537.0         .0         .0    1103.3         .0     684.5     173.8 100000.00
       .98        .00      7.74        .00       .000       .040       .000       .000    2332.50      32.21
   .019253       220.       220.       220.         20         14          0        .00     597.79     630.00


CCHV=      .300 CEHV=      .500
*SECNO 56420.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

 56420.000       2.59   2336.89        .00        .00   2337.36        .48       1.95        .14   2348.00
    8537.0         .0    8537.0         .0         .0    1542.1         .0     690.2     176.4   2348.00
       .99        .00      5.54        .00       .000       .040       .000       .000    2334.30     113.84
   .006342       190.       190.       190.          3          0          0        .00     601.59     715.43


*SECNO 56487.000
 56487.000       2.36   2337.33        .00        .00   2337.91        .57        .49        .05   2348.67
    8537.0         .0    8537.0         .0         .0    1404.2         .0     692.5     177.3   2348.67
       .99        .00      6.08        .00       .000       .040       .000       .000    2334.97     114.40
   .008644        67.        67.        67.          3          0          0        .00     600.46     714.86


T1       FEMA 500-YEAR HEC-2 ANALYSIS
T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3       MIDDLE NO. LAS VEGAS WASH

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                 5                                                                          2129.0

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      4                    -1



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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 4
0

 CCHV=      .100 CEHV=      .300
 *SECNO 28903.000
  28903.000      14.60   2129.00        .00   2129.00   2131.22       2.22        .00        .00   2145.00
    11017.0         .0   10983.5       33.5         .0     916.7       11.5         .0         .0   2126.60
       .00        .00     11.98       2.91       .000       .025       .025       .000    2114.40    1029.27
   .001952          0.         0.         0.          0          0          0        .00      97.43    1126.70


 *SECNO 29486.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  29486.000      11.70   2130.52    2130.52        .00   2134.71       4.20       1.72        .59   2149.42
    11017.0         .0   11017.0         .0         .0     670.2         .0       10.7        1.2   2131.02
       .01        .00     16.44        .00       .000       .025       .000       .000    2118.82    1035.01
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   .004980      582.      582.      582.       20        15         0       .00     80.99   1115.99


*SECNO 30067.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 30067.000     11.71   2134.95   2134.95       .00   2139.13      4.18      2.89       .00   2153.84
   11017.0        .0   11017.0        .0        .0     671.4        .0      19.6       2.3   2135.44
       .02       .00     16.41       .00      .000      .025      .000      .000   2123.24   1034.98
   .004958      582.      582.      582.       20         5         0       .00     81.04   1116.02


*SECNO 30650.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.00

 30650.000     11.87   2139.37   2139.37       .00   2143.63      4.25      2.88       .02   2145.00
   11017.0        .0   11017.0        .0        .0     665.6        .0      28.6       3.3   2145.00
       .03       .00     16.55       .00      .000      .025      .000      .000   2127.50   1025.47
   .004933      582.      582.      582.       20         5         0       .00     78.45   1103.93


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 30680.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2144.00 ELREA=      2145.23

 30680.000     11.84   2139.57   2139.57       .00   2143.86      4.29       .15       .02   2145.23
   11017.0        .0   11017.0        .0        .0     662.8        .0      29.0       3.4   2145.23
       .03       .00     16.62       .00      .000      .025      .000      .000   2127.73   1025.54
   .004992       30.       30.       30.         2         5         0       .00     78.32   1103.86


*SECNO 30765.000
3280 CROSS SECTION  30765.00 EXTENDED      2.21 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.84

 30765.000     16.31   2144.21       .00       .00   2145.00       .79       .09      1.05   2142.00
   19217.0    3247.0   15970.0        .0     901.8    2086.6        .0      32.6       4.0   2142.00
       .03      3.60      7.65       .00      .025      .025      .000      .000   2127.90    682.29
   .000648       85.       85.       85.         6         0         0       .00    510.51   1192.80


*SECNO 30935.000
3280 CROSS SECTION  30935.00 EXTENDED      1.95 FEET

 30935.000     16.05   2144.29       .00       .00   2145.15       .86       .12       .03   2142.34
   19217.0    3010.9   16206.1        .0     817.1    2040.6        .0      44.0       5.9   2142.34
       .04      3.68      7.94       .00      .025      .025      .000      .000   2128.24    691.80
   .000717       170.      170.      170.         3         0         0       .00    501.00   1192.80


CCHV=      .100 CEHV=      .300
*SECNO 31235.000
3280 CROSS SECTION  31235.00 EXTENDED      8.72 FEET

 31235.000     15.62   2144.72       .00       .00   2145.43       .71       .27       .02   2136.00
   19217.0     953.0   17412.5     851.5     275.2    2494.1     200.6      64.1       8.7   2136.00
       .05      3.46      6.98      4.24      .040      .040      .040      .000   2129.10   1088.57
   .001115       300.      300.      300.         2         0         0       .00    311.43   1400.00


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 31500.000

3301 HV CHANGED MORE THAN HVINS
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3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

31500.000	12.77	2144.77	.00	.00	2146.02	1.24	.43	.16	2136.00
19217.0	1429.8	14864.1	2923.1	249.6	1554.0	432.9	79.9	10.5	2136.00
.06	5.73	9.57	6.75	.040	.040	.040	.000	2132.00	1106.72
.002537	265.	265.	265.	2	0	0	.00	272.96	1379.67

*SECNO 32044.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2157.30 ELREA= 2157.30

32044.000	9.09	2146.59	2146.59	.00	2149.45	2.86	2.70	.48	2157.30
19217.0	.0	19217.0	.0	.0	1416.4	.0	102.7	13.8	2157.30
.07	.00	13.57	.00	.000	.040	.000	.000	2137.50	1071.72
.013710	544.	544.	544.	3	19	0	.00	255.02	1326.73

*SECNO 33671.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2176.20 ELREA= 2173.80

33671.000	12.51	2165.51	.00	.00	2168.74	3.23	19.18	.11	2176.20
19217.0	.0	19217.0	.0	.0	1333.2	.0	154.1	21.8	2173.80
.10	.00	14.41	.00	.000	.040	.000	.000	2153.00	1255.00
.010244	1627.	1627.	1627.	5	0	0	.00	170.69	1425.68

*SECNO 35645.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2191.90 ELREA= 2186.40

35645.000	12.61	2182.11	.00	.00	2183.98	1.87	15.11	.14	2191.90
19217.0	.0	19217.0	.0	.0	1751.2	.0	224.0	30.8	2186.40
.15	.00	10.97	.00	.000	.040	.000	.000	2169.50	1090.40
.005935	1974.	1974.	1974.	5	0	0	.00	228.80	1319.20

*SECNO 36822.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2207.90 ELREA= 2207.60

36822.000	10.74	2190.04	.00	.00	2192.32	2.28	8.22	.12	2207.90
19217.0	.0	19217.0	.0	.0	1585.2	.0	269.0	37.0	2207.60
.18	.00	12.12	.00	.000	.040	.000	.000	2179.30	1183.36
.008328	1177.	1177.	1177.	2	0	0	.00	231.16	1414.53

*SECNO 38410.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2224.10 ELREA= 2223.90

38410.000	7.56	2201.66	.00	.00	2205.61	1.96	13.26	.03	2224.10
19217.0	.0	19217.0	.0	.0	1712.6	.0	329.1	46.4	2223.90
.22	.00	11.22	.00	.000	.040	.000	.000	2196.10	1073.32
.008369	1588.	1588.	1588.	3	0	0	.00	283.47	1356.79

*SECNO 39519.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2233.60 ELREA= 2232.40

39519.000	10.00	2213.00	.00	.00	2215.58	2.58	9.78	.19	2233.60
19217.0	.0	19217.0	.0	.0	1489.6	.0	369.9	52.7	2232.40
.24	.00	12.90	.00	.000	.040	.000	.000	2203.00	1169.58
.009304	1109.	1109.	1109.	2	0	0	.00	212.32	1381.91

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*SECNO 40616.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2244.10 ELREA=      2235.50

 40616.000      9.43   2223.13       .00       .00   2225.07      1.94      9.43       .06   2244.10
   19217.0        .0   19217.0        .0        .0    1718.4        .0     410.3      58.8   2235.50
       .27       .00     11.18       .00      .000      .040      .000      .000   2213.70   1184.65
   .007962     1097.      1097.     1097.         3         0         0       .00    274.11   1458.75


*SECNO 42138.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2238.80 ELREA=      2254.30

 42138.000      9.98   2234.78       .00       .00   2236.01      1.23     10.87       .07   2238.80
   19217.0        .0   19217.0        .0        .0    2157.5        .0     478.0      70.9   2254.30
       .32       .00      8.91       .00      .000      .040      .000      .000   2224.80   1246.25
   .006442     1522.      1522.     1522.         4         0         0       .00    414.94   1661.19


*SECNO 43231.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2261.00 ELREA=      2254.30

 43231.000      9.51   2243.21       .00       .00   2245.58      2.37      9.23       .34   2261.00
   19217.0        .0   19217.0        .0        .0    1555.8        .0     524.6      79.6   2254.30
       .34       .00     12.35       .00      .000      .040      .000      .000   2233.70   1156.06
   .011536     1093.      1093.     1093.         3         0         0       .00    280.56   1436.62


*SECNO 44345.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2254.80 ELREA=      2265.40

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 44345.000     11.14   2253.94       .00       .00   2256.02      2.09     10.41       .03   2254.80
   19217.0        .0   19217.0        .0        .0    1657.8        .0     565.7      86.3   2265.40
       .37       .00     11.59       .00      .000      .040      .000      .000   2242.80   1223.42
   .007727     1114.      1114.     1114.         3         0         0       .00    241.75   1465.17


*SECNO 45725.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2279.80 ELREA=      2276.30

 45725.000      9.82   2262.82       .00       .00   2263.81       .99      7.68       .11   2279.80
   19217.0        .0   19217.0        .0        .0    2408.2        .0     630.1      96.4   2276.30
       .42       .00      7.98       .00      .000      .040      .000      .000   2253.00   1033.58
   .004200     1380.      1380.     1380.         3         0         0       .00    396.31   1429.89


*SECNO 46746.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2274.90 ELREA=      2273.20

 46746.000      9.00   2267.80       .00       .00   2268.95      1.14      5.09       .05   2274.90
   19217.0        .0   19217.0        .0        .0    2238.4        .0     684.6     106.1   2273.20
       .45       .00      8.59       .00      .000      .040      .000      .000   2258.80   1090.33
   .006001     1021.      1021.     1021.         3         0         0       .00    431.23   1521.56


*SECNO 48046.000
3280 CROSS SECTION  48046.00 EXTENDED      2.65 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2288.70 ELREA=      2279.90

 48046.000      9.15   2276.05       .00       .00   2277.56      1.51      8.50       .11   2288.70
   19217.0        .0   19217.0        .0        .0    1949.1        .0     747.0     117.7   2279.90
       .49       .00      9.86       .00      .000      .040      .000      .000   2266.90   1091.75
   .007153     1300.      1300.     1300.         4         0         0       .00    347.15   1438.90


*SECNO 49654.000
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 49654.00 EXTENDED 2.24 FEET

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2308.10 ELREA= 2307.20

49654.000	8.84	2289.94	.00	.00	2291.95	2.01	14.24	.15	2308.10
19217.0	.0	19217.0	.0	.0	1688.9	.0	814.2	130.4	2307.20
.53	.00	11.38	.00	.000	.040	.000	.000	2281.10	1065.28
.011248	1608.	1608.	1608.	4	0	0	.00	337.88	1403.15

*SECNO 50964.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.57

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2312.30 ELREA= 2313.40

50964.000	8.50	2299.90	.00	.00	2300.99	1.08	8.95	.09	2312.30
19217.0	.0	19217.0	.0	.0	2300.6	.0	874.2	141.0	2313.40
.57	.00	8.35	.00	.000	.040	.000	.000	2291.40	1087.19
.004584	1310.	1310.	1310.	4	0	0	.00	372.43	1459.62

*SECNO 52020.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2326.20 ELREA= 2325.90

52020.000	8.61	2305.61	.00	.00	2307.69	2.08	6.40	.30	2326.20
19217.0	.0	19217.0	.0	.0	1661.8	.0	922.2	148.7	2325.90
.60	.00	11.56	.00	.000	.040	.000	.000	2297.00	1067.37
.008393	1056.	1056.	1056.	3	0	0	.00	263.00	1330.37

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 53183.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2324.60 ELREA= 2336.20

53183.000	9.27	2314.97	.00	.00	2316.05	1.08	8.26	.10	2324.60
19217.0	.0	19217.0	.0	.0	2305.3	.0	975.2	158.5	2336.20
.63	.00	8.34	.00	.000	.040	.000	.000	2305.70	1040.35
.006087	1163.	1163.	1163.	5	0	0	.00	468.26	1508.61

*SECNO 54519.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2343.30 ELREA= 2347.40

54519.000	7.03	2324.93	.00	.00	2327.13	2.20	10.74	.34	2343.30
19217.0	.0	19217.0	.0	.0	1614.4	.0	1035.3	170.3	2347.40
.67	.00	11.90	.00	.000	.040	.000	.000	2317.90	1647.77
.011110	1336.	1336.	1336.	2	0	0	.00	302.10	1949.87

*SECNO 55570.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.44

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2356.00 ELREA= 2354.20

55570.000	9.34	2334.04	.00	.00	2335.06	1.02	7.82	.12	2356.00
19217.0	.0	19217.0	.0	.0	2370.7	.0	1083.3	179.5	2354.20
.70	.00	8.11	.00	.000	.040	.000	.000	2324.70	1059.20
.005331	1051.	1051.	1051.	2	0	0	.00	457.03	1516.23

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55870.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.90

55870.000	8.75	2335.45	.00	.00	2335.88	.44	.76	.06	2350.00
19217.0	.0	19217.0	.0	.0	3628.3	.0	1104.0	182.8	2336.00
.72	.00	5.30	.00	.000	.040	.000	.000	2326.70	145.47
.001473	300.	300.	300.	2	0	0	.00	504.95	650.42

*SECNO 56010.000

3470 ENCROACHMENT STATIONS= .0 610.0 TYPE= 1 TARGET= 609.999

56010.000	6.70	2335.60	.00	.00	2336.18	.58	.25	.04	2350.00
19217.0	.0	19217.0	.0	.0	3154.3	.0	1114.9	184.4	100000.00
.72	.00	6.09	.00	.000	.040	.000	.000	2328.90	120.56
.002289	140.	140.	140.	2	0	0	.00	489.43	610.00

*SECNO 56230.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .46

3470 ENCROACHMENT STATIONS= .0 630.0 TYPE= 1 TARGET= 629.999

56230.000	3.57	2336.07	.00	.00	2337.33	1.26	.95	.20	2350.00
19217.0	.0	19217.0	.0	.0	2135.1	.0	1128.3	187.1	100000.00
.73	.00	9.00	.00	.000	.040	.000	.000	2332.50	28.67
.010938	220.	220.	220.	2	0	0	.00	601.33	630.00

CCHV= .300 CEHV= .500
*SECNO 56420.000

56420.000	3.84	2338.14	.00	.00	2339.23	1.09	1.84	.05	2348.00
19217.0	.0	19217.0	.0	.0	2295.9	.0	1137.9	189.8	2348.00
.74	.00	8.37	.00	.000	.040	.000	.000	2334.30	110.83
.008654	190.	190.	190.	3	0	0	.00	607.70	718.53

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 56487.000

56487.000	3.74	2338.71	.00	.00	2339.86	1.15	.60	.03	2348.67
19217.0	.0	19217.0	.0	.0	2237.7	.0	1141.4	190.7	2348.67
.74	.00	8.59	.00	.000	.040	.000	.000	2334.97	111.06
.009416	67.	67.	67.	2	0	0	.00	607.23	718.29

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THIS RUN EXECUTED 15APR98 13:31:08

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MIDDLE NO. LAS VEGAS WAS

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	28903.000	.00	.00	.00	2114.40	2939.00	2119.92	2119.92	2122.13	59.75	11.94	246.19	380.22
*	28903.000	.00	.00	.00	2114.40	6751.00	2123.31	2123.31	2126.65	53.31	14.68	459.93	924.66

	28903.000	.00	.00	.00	2114.40	8343.00	2125.00	.00	2128.17	41.86	14.29	583.82	1289.49
	28903.000	.00	.00	.00	2114.40	11017.00	2129.00	.00	2131.22	19.52	11.98	928.20	2493.55
*	29486.000	582.20	.00	.00	2118.82	2939.00	2124.34	2124.34	2126.55	59.75	11.94	246.19	380.22
*	29486.000	582.20	.00	.00	2118.82	6751.00	2127.75	2127.75	2131.07	52.91	14.64	461.15	928.12
*	29486.000	582.20	.00	.00	2118.82	8343.00	2128.90	2128.90	2132.55	50.85	15.33	544.36	1170.00
*	29486.000	582.20	.00	.00	2118.82	11017.00	2130.52	2130.52	2134.71	49.80	16.44	670.25	1561.10
*	30067.000	582.20	.00	.00	2123.24	2939.00	2128.76	2128.76	2130.97	59.75	11.94	246.19	380.22
*	30067.000	582.20	.00	.00	2123.24	6751.00	2132.16	2132.16	2135.49	53.06	14.65	460.68	926.77
*	30067.000	582.20	.00	.00	2123.24	8343.00	2133.28	2133.28	2136.97	51.67	15.41	541.23	1160.66
*	30067.000	582.20	.00	.00	2123.24	11017.00	2134.95	2134.95	2139.13	49.58	16.41	671.35	1564.66
*	30650.000	582.20	.00	.00	2127.50	2939.00	2133.07	2133.07	2135.30	59.31	12.00	244.86	381.63
*	30650.000	582.20	.00	.00	2127.50	6751.00	2136.53	2136.53	2139.91	52.71	14.76	457.34	929.90
*	30650.000	582.20	.00	.00	2127.50	8343.00	2137.67	2137.67	2141.41	51.19	15.52	537.65	1166.11
*	30650.000	582.20	.00	.00	2127.50	11017.00	2139.37	2139.37	2143.63	49.33	16.55	665.64	1568.64
*	30680.000	30.00	.00	.00	2127.73	2939.00	2133.28	2133.28	2135.53	59.75	12.03	244.23	380.21
*	30680.000	30.00	.00	.00	2127.73	6751.00	2136.74	2136.74	2140.14	53.12	14.80	456.09	926.31
*	30680.000	30.00	.00	.00	2127.73	8343.00	2137.87	2137.87	2141.64	51.72	15.58	535.65	1160.05
*	30680.000	30.00	.00	.00	2127.73	11017.00	2139.57	2139.57	2143.86	49.92	16.62	662.77	1559.29
*	30765.000	85.00	.00	.00	2127.90	2939.00	2136.00	.00	2136.22	3.92	3.82	769.89	1485.08
*	30765.000	85.00	.00	.00	2127.90	6751.00	2140.81	.00	2141.13	3.27	4.54	1487.24	3734.28
*	30765.000	85.00	.00	.00	2127.90	8537.00	2142.37	.00	2142.73	3.23	4.85	1758.68	4751.48
*	30765.000	85.00	.00	.00	2127.90	19217.00	2144.21	.00	2145.00	6.48	7.65	2988.34	7551.52
	30935.000	170.00	.00	.00	2128.24	2939.00	2136.06	.00	2136.31	4.48	4.00	734.12	1388.00
	30935.000	170.00	.00	.00	2128.24	6751.00	2140.86	.00	2141.20	3.59	4.69	1438.04	3564.36
	30935.000	170.00	.00	.00	2128.24	8537.00	2142.51	.00	2142.80	2.85	4.51	2043.39	5053.86
	30935.000	170.00	.00	.00	2128.24	19217.00	2144.29	.00	2145.15	7.17	7.94	2857.70	7177.01

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	31235.000	300.00	.00	.00	2129.10	2939.00	2136.34	.00	2136.49	8.09	3.11	951.80	1033.23
	31235.000	300.00	.00	.00	2129.10	6751.00	2141.16	.00	2141.34	4.19	3.48	2034.18	3299.52
	31235.000	300.00	.00	.00	2129.10	8537.00	2142.71	.00	2142.91	3.97	3.74	2421.22	4283.55
	31235.000	300.00	.00	.00	2129.10	19217.00	2144.72	.00	2145.43	11.15	6.98	2969.87	5754.17
*	31500.000	265.00	.00	.00	2132.00	2939.00	2136.44	.00	2137.13	67.62	6.70	446.10	357.40
*	31500.000	265.00	.00	.00	2132.00	6751.00	2141.17	.00	2141.59	13.43	5.43	1357.71	1842.23
*	31500.000	265.00	.00	.00	2132.00	8537.00	2142.72	.00	2143.14	10.78	5.48	1716.54	2599.76
*	31500.000	265.00	.00	.00	2132.00	19217.00	2144.77	.00	2146.02	25.37	9.57	2236.45	3815.12
*	32044.000	544.00	.00	.00	2137.50	2939.00	2141.63	2141.53	2142.69	163.70	8.28	354.96	229.71
*	32044.000	544.00	.00	.00	2137.50	6751.00	2143.22	2143.22	2144.92	162.59	10.47	644.76	529.45
*	32044.000	544.00	.00	.00	2137.50	8537.00	2143.80	2143.80	2145.76	156.17	11.23	759.97	683.13
*	32044.000	544.00	.00	.00	2137.50	19217.00	2146.59	2146.59	2149.45	137.10	13.57	1416.36	1641.21
*	33671.000	1627.00	.00	.00	2153.00	2939.00	2159.27	.00	2160.13	75.39	7.42	396.28	338.48
*	33671.000	1627.00	.00	.00	2153.00	6751.00	2161.69	.00	2163.06	80.91	9.38	719.65	750.51
	33671.000	1627.00	.00	.00	2153.00	8537.00	2162.42	.00	2164.06	84.61	10.27	831.17	928.12
	33671.000	1627.00	.00	.00	2153.00	19217.00	2165.51	.00	2168.74	102.44	14.41	1333.17	1898.64
	35645.000	1974.00	.00	.00	2169.50	2939.00	2175.70	.00	2176.43	90.76	6.88	427.49	308.50
	35645.000	1974.00	.00	.00	2169.50	6751.00	2177.76	.00	2178.83	78.57	8.30	812.99	761.64
	35645.000	1974.00	.00	.00	2169.50	8537.00	2178.50	.00	2179.72	74.10	8.86	963.81	991.73
	35645.000	1974.00	.00	.00	2169.50	19217.00	2182.11	.00	2183.98	59.35	10.97	1751.23	2494.44
	36822.000	1177.00	.00	.00	2179.30	2939.00	2185.14	.00	2185.64	67.81	5.70	515.26	356.90
	36822.000	1177.00	.00	.00	2179.30	6751.00	2186.75	.00	2187.73	72.68	7.93	851.80	791.87
	36822.000	1177.00	.00	.00	2179.30	8537.00	2187.34	.00	2188.52	75.44	8.73	977.97	982.87
	36822.000	1177.00	.00	.00	2179.30	19217.00	2190.04	.00	2192.32	83.28	12.12	1585.17	2105.85
	38410.000	1588.00	.00	.00	2196.10	2939.00	2199.01	.00	2199.61	118.13	6.26	469.31	270.41
	38410.000	1588.00	.00	.00	2196.10	6751.00	2200.42	.00	2201.46	104.30	8.18	825.26	661.04
	38410.000	1588.00	.00	.00	2196.10	8537.00	2201.00	.00	2202.19	99.10	8.75	975.18	857.57
	38410.000	1588.00	.00	.00	2196.10	19217.00	2203.66	.00	2205.61	83.69	11.22	1712.60	2100.59
	39519.000	1109.00	.00	.00	2203.00	2939.00	2208.31	.00	2208.79	60.97	5.56	528.49	376.39
	39519.000	1109.00	.00	.00	2203.00	6751.00	2209.89	.00	2210.89	70.50	7.99	844.56	804.05
	39519.000	1109.00	.00	.00	2203.00	8537.00	2210.46	.00	2211.69	74.59	8.89	960.46	988.48
	39519.000	1109.00	.00	.00	2203.00	19217.00	2213.00	.00	2215.58	93.04	12.90	1489.60	1992.24
*	40616.000	1097.00	.00	.00	2213.70	2939.00	2218.16	.00	2218.89	151.89	6.85	429.13	238.47
	40616.000	1097.00	.00	.00	2213.70	6751.00	2219.65	.00	2220.77	118.19	8.52	792.82	620.98
	40616.000	1097.00	.00	.00	2213.70	8537.00	2220.22	.00	2221.50	108.89	9.08	939.74	818.11
	40616.000	1097.00	.00	.00	2213.70	19217.00	2223.13	.00	2225.07	79.62	11.18	1718.44	2153.67
*	42138.000	1522.00	.00	.00	2224.80	2939.00	2230.95	.00	2231.25	50.22	4.44	661.72	414.74
*	42138.000	1522.00	.00	.00	2224.80	6751.00	2232.33	.00	2232.85	56.41	5.76	1171.21	898.83
	42138.000	1522.00	.00	.00	2224.80	8537.00	2232.75	.00	2233.38	58.13	6.37	1341.10	1119.72
	42138.000	1522.00	.00	.00	2224.80	19217.00	2234.78	.00	2236.01	64.42	8.91	2157.46	2394.25

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	43231.000	1093.00	.00	.00	2233.70	2939.00	2238.79	.00	2239.52	121.72	6.82	430.98	266.40
	43231.000	1093.00	.00	.00	2233.70	6751.00	2240.38	.00	2241.50	113.05	8.49	794.77	634.95
	43231.000	1093.00	.00	.00	2233.70	8537.00	2240.90	.00	2242.21	113.09	9.20	928.02	802.78
	43231.000	1093.00	.00	.00	2233.70	19217.00	2243.21	.00	2245.58	115.36	12.35	1555.80	1789.19

* 44345.000	1114.00	.00	.00	2242.80	2939.00	2248.24	.00	2248.80	60.37	6.00	489.84	378.25
44345.000	1114.00	.00	.00	2242.80	6751.00	2250.14	.00	2251.20	69.12	8.28	815.52	812.02
44345.000	1114.00	.00	.00	2242.80	8537.00	2250.83	.00	2252.09	71.40	9.02	946.12	1010.31
44345.000	1114.00	.00	.00	2242.80	19217.00	2253.94	.00	2256.02	77.27	11.59	1657.80	2186.18
45725.000	1380.00	.00	.00	2253.00	2939.00	2257.83	.00	2258.27	78.59	5.36	548.76	331.53
45725.000	1380.00	.00	.00	2253.00	6751.00	2259.54	.00	2260.09	59.41	5.94	1136.02	875.85
45725.000	1380.00	.00	.00	2253.00	8537.00	2260.10	.00	2260.72	54.44	6.34	1347.15	1157.07
45725.000	1380.00	.00	.00	2253.00	19217.00	2262.82	.00	2263.81	42.00	7.98	2408.15	2965.25
46746.000	1021.00	.00	.00	2258.80	2939.00	2263.94	.00	2264.23	44.78	4.27	687.89	439.20
46746.000	1021.00	.00	.00	2258.80	6751.00	2265.34	.00	2265.83	53.20	5.61	1203.89	925.57
46746.000	1021.00	.00	.00	2258.80	8537.00	2265.77	.00	2266.36	56.01	6.20	1378.03	1140.70
46746.000	1021.00	.00	.00	2258.80	19217.00	2267.80	.00	2268.95	60.01	8.59	2238.42	2480.62
* 48046.000	1300.00	.00	.00	2266.90	2939.00	2271.97	.00	2272.39	93.16	5.17	568.82	304.51
48046.000	1300.00	.00	.00	2266.90	6751.00	2273.31	.00	2273.99	74.11	6.65	1014.73	784.23
48046.000	1300.00	.00	.00	2266.90	8537.00	2273.81	.00	2274.62	71.38	7.21	1184.58	1010.45
48046.000	1300.00	.00	.00	2266.90	19217.00	2276.05	.00	2277.56	71.53	9.86	1949.05	2272.16
49654.000	1608.00	.00	.00	2281.10	2939.00	2286.35	2285.80	2286.83	86.45	5.55	529.54	316.10
49654.000	1608.00	.00	.00	2281.10	6751.00	2287.58	2287.13	2288.45	110.45	7.51	899.02	642.37
49654.000	1608.00	.00	.00	2281.10	8537.00	2287.96	2287.67	2289.03	114.51	8.33	1025.21	797.77
49654.000	1608.00	.00	.00	2281.10	19217.00	2289.94	.00	2291.95	112.48	11.38	1688.92	1811.95
50964.000	1310.00	.00	.00	2291.40	2939.00	2295.20	.00	2295.52	52.35	4.57	642.69	406.19
* 50964.000	1310.00	.00	.00	2291.40	6751.00	2296.93	.00	2297.42	46.16	5.61	1203.08	993.65
* 50964.000	1310.00	.00	.00	2291.40	8537.00	2297.48	.00	2298.05	45.50	6.07	1406.67	1265.68
* 50964.000	1310.00	.00	.00	2291.40	19217.00	2299.90	.00	2300.99	45.84	8.35	2300.56	2838.41
52020.000	1056.00	.00	.00	2297.00	2939.00	2301.15	.00	2301.59	62.65	5.30	554.51	371.30
52020.000	1056.00	.00	.00	2297.00	6751.00	2302.64	.00	2303.50	70.88	7.45	906.76	801.86
52020.000	1056.00	.00	.00	2297.00	8537.00	2303.17	.00	2304.22	73.63	8.23	1037.54	994.91
52020.000	1056.00	.00	.00	2297.00	19217.00	2305.61	.00	2307.69	81.93	11.56	1661.85	2097.56
53183.000	1163.00	.00	.00	2305.70	2939.00	2311.06	2310.66	2311.52	122.99	5.47	536.85	265.01
53183.000	1163.00	.00	.00	2305.70	6751.00	2312.28	2311.77	2312.90	92.59	6.31	1069.83	701.59
53183.000	1163.00	.00	.00	2305.70	8537.00	2312.72	.00	2313.43	84.64	6.73	1268.22	927.92
53183.000	1163.00	.00	.00	2305.70	19217.00	2314.97	.00	2316.05	60.87	8.34	2305.32	2463.07
* 54519.000	1336.00	.00	.00	2317.90	2939.00	2321.59	.00	2321.92	53.52	4.63	634.30	401.76
54519.000	1336.00	.00	.00	2317.90	6751.00	2322.79	.00	2323.53	68.62	6.89	979.15	814.96
54519.000	1336.00	.00	.00	2317.90	8537.00	2323.21	.00	2324.14	75.13	7.76	1100.66	984.90
54519.000	1336.00	.00	.00	2317.90	19217.00	2324.93	.00	2327.13	111.10	11.90	1614.37	1823.16

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	55570.000	1051.00	.00	.00	2324.70	2939.00	2329.47	.00	2329.99	117.34	5.84	503.39	271.32
	55570.000	1051.00	.00	.00	2324.70	6751.00	2331.06	.00	2331.71	88.87	6.46	1044.40	716.12
	55570.000	1051.00	.00	.00	2324.70	8537.00	2331.58	.00	2332.29	79.61	6.75	1264.47	956.79
*	55570.000	1051.00	.00	.00	2324.70	19217.00	2334.04	.00	2335.06	53.31	8.11	2370.73	2632.02
*	55870.000	300.00	.00	.00	2326.70	2939.00	2330.43	.00	2330.49	5.57	2.06	1426.22	1245.47
*	55870.000	300.00	.00	.00	2326.70	6751.00	2332.18	.00	2332.34	8.17	3.17	2127.83	2361.76
*	55870.000	300.00	.00	.00	2326.70	8537.00	2332.77	.00	2332.97	9.57	3.59	2375.88	2759.38
*	55870.000	300.00	.00	.00	2326.70	19217.00	2335.45	.00	2335.88	14.73	5.30	3628.26	5007.12
*	56010.000	140.00	.00	.00	2328.90	2939.00	2330.48	.00	2330.73	64.13	4.02	731.12	367.01
*	56010.000	140.00	.00	.00	2328.90	6751.00	2332.28	.00	2332.57	27.00	4.30	1570.13	1299.24
*	56010.000	140.00	.00	.00	2328.90	8537.00	2332.89	.00	2333.22	25.02	4.60	1854.71	1706.81
	56010.000	140.00	.00	.00	2328.90	19217.00	2335.60	.00	2336.18	22.89	6.09	3154.29	4016.55
*	56230.000	220.00	.00	.00	2332.50	2939.00	2333.41	2333.41	2333.87	242.41	5.42	541.92	188.77
*	56230.000	220.00	.00	.00	2332.50	6751.00	2334.09	2334.09	2334.88	200.22	7.13	946.66	477.11
*	56230.000	220.00	.00	.00	2332.50	8537.00	2334.35	2334.35	2335.28	192.53	7.74	1103.33	615.25
*	56230.000	220.00	.00	.00	2332.50	19217.00	2336.07	.00	2337.33	109.38	9.00	2135.14	1837.44
*	56420.000	190.00	.00	.00	2334.30	2939.00	2335.72	.00	2335.91	56.69	3.51	837.62	390.35
*	56420.000	190.00	.00	.00	2334.30	6751.00	2336.56	.00	2336.95	62.18	5.02	1346.02	856.17
*	56420.000	190.00	.00	.00	2334.30	8537.00	2336.89	.00	2337.36	63.42	5.54	1542.13	1071.96
	56420.000	190.00	.00	.00	2334.30	19217.00	2338.14	.00	2339.23	86.54	8.37	2295.86	2065.73
	56487.000	67.00	.00	.00	2334.97	2939.00	2336.17	.00	2336.44	98.32	4.14	709.48	296.40
	56487.000	67.00	.00	.00	2334.97	6751.00	2337.01	.00	2337.49	88.93	5.59	1208.02	715.89
	56487.000	67.00	.00	.00	2334.97	8537.00	2337.33	.00	2337.91	86.44	6.08	1404.20	918.21
	56487.000	67.00	.00	.00	2334.97	19217.00	2338.71	.00	2339.86	94.16	8.59	2237.73	1980.39

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MIDDLE NO. LAS VEGAS WAS

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	28903.000	2939.00	2119.92	.00	.00	4.82	56.27	.00
*	28903.000	6751.00	2123.31	3.39	.00	1.81	69.83	.00
	28903.000	8343.00	2125.00	1.69	.00	.00	76.60	.00
	28903.000	11017.00	2129.00	4.00	.00	.00	97.43	.00
*	29486.000	2939.00	2124.34	.00	4.42	.00	56.27	582.20

*	29486.000	6751.00	2127.75	3.41	4.44	.00	69.90	582.20
*	29486.000	8343.00	2128.90	1.15	3.90	.00	74.51	582.20
*	29486.000	11017.00	2130.52	1.62	1.52	.00	80.99	582.20
*	30067.000	2939.00	2128.76	.00	4.42	.00	56.27	582.20
*	30067.000	6751.00	2132.16	3.40	4.41	.00	69.87	582.20
*	30067.000	8343.00	2133.28	1.12	4.38	.00	74.34	582.20
*	30067.000	11017.00	2134.95	1.67	4.43	.00	81.04	582.20
*	30650.000	2939.00	2133.07	.00	4.31	.00	54.97	582.20
*	30650.000	6751.00	2136.53	3.46	4.37	.00	67.85	582.20
*	30650.000	8343.00	2137.67	1.15	4.40	.00	72.12	582.20
*	30650.000	11017.00	2139.37	1.70	4.42	.00	78.45	582.20
*	30680.000	2939.00	2133.28	.00	.22	.00	54.93	30.00
*	30680.000	6751.00	2136.74	3.45	.21	.00	67.78	30.00
*	30680.000	8343.00	2137.87	1.14	.20	.00	72.02	30.00
*	30680.000	11017.00	2139.57	1.69	.19	.00	78.32	30.00
*	30765.000	2939.00	2136.00	.00	2.71	.00	129.85	85.00
*	30765.000	6751.00	2140.81	4.82	4.08	.00	168.27	85.00
*	30765.000	8537.00	2142.37	1.55	4.49	.00	177.80	85.00
*	30765.000	19217.00	2144.21	1.84	4.64	.00	510.51	85.00
	30935.000	2939.00	2136.06	.00	.06	.00	127.63	170.00
	30935.000	6751.00	2140.86	4.80	.05	.00	165.92	170.00
	30935.000	8537.00	2142.51	1.65	.14	.00	328.78	170.00
	30935.000	19217.00	2144.29	1.78	.08	.00	501.00	170.00
	31235.000	2939.00	2136.34	.00	.29	.00	210.06	300.00
	31235.000	6751.00	2141.16	4.81	.29	.00	242.40	300.00
	31235.000	8537.00	2142.71	1.55	.20	.00	256.37	300.00
	31235.000	19217.00	2144.72	2.02	.43	.00	311.43	300.00
*	31500.000	2939.00	2136.44	.00	.09	.00	159.22	265.00
*	31500.000	6751.00	2141.17	4.74	.02	.00	222.90	265.00
*	31500.000	8537.00	2142.72	1.55	.02	.00	239.95	265.00
*	31500.000	19217.00	2144.77	2.05	.05	.00	272.96	265.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	32044.000	2939.00	2141.63	.00	5.19	.00	153.94	544.00
*	32044.000	6751.00	2143.22	1.59	2.05	.00	195.24	544.00
*	32044.000	8537.00	2143.80	.58	1.08	.00	200.79	544.00
*	32044.000	19217.00	2146.59	2.79	1.82	.00	255.02	544.00
*	33671.000	2939.00	2159.27	.00	17.64	.00	110.47	1627.00
*	33671.000	6751.00	2161.69	2.42	18.47	.00	148.42	1627.00
	33671.000	8537.00	2162.42	.73	18.62	.00	154.49	1627.00
	33671.000	19217.00	2165.51	3.09	18.92	.00	170.69	1627.00
	35645.000	2939.00	2175.70	.00	16.43	.00	155.62	1974.00
	35645.000	6751.00	2177.76	2.06	16.06	.00	200.09	1974.00
	35645.000	8537.00	2178.50	.74	16.07	.00	205.91	1974.00
	35645.000	19217.00	2182.11	3.61	16.60	.00	228.80	1974.00
	36822.000	2939.00	2185.14	.00	9.44	.00	200.92	1177.00
	36822.000	6751.00	2186.75	1.62	9.00	.00	213.29	1177.00
	36822.000	8537.00	2187.34	.58	8.84	.00	217.74	1177.00
	36822.000	19217.00	2190.04	2.70	7.93	.00	231.16	1177.00
	38410.000	2939.00	2199.01	.00	13.87	.00	242.68	1588.00
	38410.000	6751.00	2200.42	1.42	13.67	.00	260.06	1588.00
	38410.000	8537.00	2201.00	.58	13.66	.00	267.04	1588.00
	38410.000	19217.00	2203.66	2.66	13.62	.00	283.47	1588.00
	39519.000	2939.00	2208.31	.00	9.30	.00	196.55	1109.00
	39519.000	6751.00	2209.89	1.59	9.47	.00	202.28	1109.00
	39519.000	8537.00	2210.46	.57	9.46	.00	204.34	1109.00
	39519.000	19217.00	2213.00	2.54	9.34	.00	212.32	1109.00
*	40616.000	2939.00	2218.16	.00	9.85	.00	233.03	1097.00
	40616.000	6751.00	2219.65	1.49	9.75	.00	257.12	1097.00
	40616.000	8537.00	2220.22	.57	9.76	.00	259.89	1097.00
	40616.000	19217.00	2223.13	2.91	10.13	.00	274.11	1097.00
*	42138.000	2939.00	2230.95	.00	12.79	.00	299.91	1522.00
*	42138.000	6751.00	2232.33	1.38	12.68	.00	392.09	1522.00
	42138.000	8537.00	2232.75	.42	12.53	.00	395.56	1522.00
	42138.000	19217.00	2234.78	2.03	11.65	.00	414.94	1522.00
*	43231.000	2939.00	2238.79	.00	7.85	.00	198.28	1093.00
	43231.000	6751.00	2240.38	1.58	8.05	.00	248.61	1093.00
	43231.000	8537.00	2240.90	.52	8.14	.00	257.47	1093.00
	43231.000	19217.00	2243.21	2.31	8.43	.00	280.56	1093.00
*	44345.000	2939.00	2248.24	.00	9.44	.00	161.37	1114.00
	44345.000	6751.00	2250.14	1.90	9.76	.00	182.21	1114.00
	44345.000	8537.00	2250.83	.69	9.93	.00	189.93	1114.00
	44345.000	19217.00	2253.94	3.10	10.72	.00	241.75	1114.00

1

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	45725.000	2939.00	2257.83	.00	9.59	.00	263.41	1380.00
	45725.000	6751.00	2259.54	1.71	9.40	.00	378.45	1380.00
	45725.000	8537.00	2260.10	.56	9.27	.00	381.47	1380.00
	45725.000	19217.00	2262.82	2.73	8.89	.00	396.31	1380.00
	46746.000	2939.00	2263.94	.00	6.12	.00	303.35	1021.00
	46746.000	6751.00	2265.34	1.40	5.80	.00	401.99	1021.00
	46746.000	8537.00	2265.77	.43	5.67	.00	411.79	1021.00
	46746.000	19217.00	2267.80	2.03	4.98	.00	431.23	1021.00
*	48046.000	2939.00	2271.97	.00	8.03	.00	327.30	1300.00
	48046.000	6751.00	2273.31	1.34	7.97	.00	336.05	1300.00
	48046.000	8537.00	2273.81	.50	8.04	.00	338.10	1300.00
	48046.000	19217.00	2276.05	2.24	8.25	.00	347.15	1300.00
	49654.000	2939.00	2286.35	.00	14.38	.00	256.65	1608.00
	49654.000	6751.00	2287.58	1.23	14.27	.00	332.61	1608.00
	49654.000	8537.00	2287.96	.38	14.15	.00	333.46	1608.00
	49654.000	19217.00	2289.94	1.98	13.89	.00	337.88	1608.00
	50964.000	2939.00	2295.20	.00	8.84	.00	286.52	1310.00
*	50964.000	6751.00	2296.93	1.73	9.35	.00	358.16	1310.00
*	50964.000	8537.00	2297.48	.55	9.52	.00	367.91	1310.00
*	50964.000	19217.00	2299.90	2.42	9.97	.00	372.43	1310.00
	52020.000	2939.00	2301.15	.00	5.96	.00	228.14	1056.00
	52020.000	6751.00	2302.64	1.48	5.71	.00	245.52	1056.00
	52020.000	8537.00	2303.17	.53	5.69	.00	248.64	1056.00
	52020.000	19217.00	2305.61	2.44	5.71	.00	263.00	1056.00
	53183.000	2939.00	2311.06	.00	9.90	.00	347.44	1163.00
	53183.000	6751.00	2312.28	1.23	9.65	.00	452.68	1163.00
	53183.000	8537.00	2312.72	.44	9.55	.00	455.22	1163.00
	53183.000	19217.00	2314.97	2.25	9.36	.00	468.26	1163.00
*	54519.000	2939.00	2321.59	.00	10.53	.00	283.60	1336.00
	54519.000	6751.00	2322.79	1.20	10.51	.00	290.24	1336.00
	54519.000	8537.00	2323.21	.42	10.48	.00	292.55	1336.00
	54519.000	19217.00	2324.93	1.72	9.96	.00	302.10	1336.00
*	55570.000	2939.00	2329.47	.00	7.88	.00	287.11	1051.00
	55570.000	6751.00	2331.06	1.60	8.27	.00	415.39	1051.00
	55570.000	8537.00	2331.58	.52	8.38	.00	433.82	1051.00
*	55570.000	19217.00	2334.04	2.46	9.12	.00	457.03	1051.00
*	55870.000	2939.00	2330.43	.00	.96	.00	394.63	300.00
*	55870.000	6751.00	2332.18	1.76	1.12	.00	410.45	300.00
*	55870.000	8537.00	2332.77	.59	1.19	.00	428.20	300.00
*	55870.000	19217.00	2335.45	2.67	1.40	.00	504.95	300.00

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	56010.000	2939.00	2330.48	.00	.06	.00	463.57	140.00
*	56010.000	6751.00	2332.28	1.80	.10	.00	468.28	140.00
*	56010.000	8537.00	2332.89	.61	.11	.00	471.01	140.00
	56010.000	19217.00	2335.60	2.71	.16	.00	489.43	140.00
*	56230.000	2939.00	2333.41	.00	2.93	.00	595.85	220.00
*	56230.000	6751.00	2334.09	.68	1.81	.00	597.25	220.00
*	56230.000	8537.00	2334.35	.26	1.47	.00	597.79	220.00
*	56230.000	19217.00	2336.07	1.72	.47	.00	601.33	220.00
*	56420.000	2939.00	2335.72	.00	2.30	.00	595.68	190.00
*	56420.000	6751.00	2336.56	.84	2.47	.00	599.99	190.00
*	56420.000	8537.00	2336.89	.33	2.54	.00	601.59	190.00
	56420.000	19217.00	2338.14	1.25	2.06	.00	607.70	190.00
	56487.000	2939.00	2336.17	.00	.45	.00	594.51	67.00
	56487.000	6751.00	2337.01	.84	.45	.00	598.86	67.00
	56487.000	8537.00	2337.33	.33	.44	.00	600.46	67.00
	56487.000	19217.00	2338.71	1.38	.58	.00	607.23	67.00

1

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO= 28903.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 28903.000  PROFILE= 2  CRITICAL DEPTH ASSUMED

CAUTION SECNO= 29486.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000  PROFILE= 2  MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000  PROFILE= 3  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000  PROFILE= 3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 29486.000  PROFILE= 3  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 29486.000  PROFILE= 4  CRITICAL DEPTH ASSUMED
CAUTION SECNO= 29486.000  PROFILE= 4  PROBABLE MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=  29486.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  30067.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30067.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
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 CAUTION SECNO=  30067.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30067.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  30650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=  30650.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=  30650.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30650.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  30650.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30650.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30650.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  30680.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  3  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  30680.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  30680.000  PROFILE=  4  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  30765.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  30765.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  31500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=  31500.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  31500.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  31500.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  32044.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  32044.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  32044.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  32044.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  32044.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  32044.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  32044.000  PROFILE=  4  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  33671.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  33671.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  40616.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  42138.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  42138.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  43231.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  44345.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  48046.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  50964.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  50964.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  50964.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  54519.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  55570.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55570.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  55870.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  55870.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  56010.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56010.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56010.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  56230.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  56230.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  56230.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  56230.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
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 WARNING SECNO=  56420.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56420.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  56420.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

Paper Copy D
Interstate 15 to North Las Vegas
Detention Basin

10- to 50-year flood event

```
1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    15APR98    TIME   13:28:01  *
 *******************************************
```

```
****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*       (916) 756-1104                 *
****************************************
```

```
                                        X     X  XXXXXXX   XXXXX              XXXXX
                                        X     X  X        X     X            X     X
                                        X     X  X        X                        X
                                        XXXXXXX  XXXX     X          XXXXX    XXXXX
                                        X     X  X        X                   X
                                        X     X  X        X     X             X
                                        X     X  XXXXXXX  XXXXX               XXXXXXX
```

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1
    15APR98      13:28:01                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 15APR98    13:28:01

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************



 SPLIT FLOW BEING PERFORMED


 SF


 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      3    6092    6397       -1       3
 WC      0  1924.6     133  1925.6     287  1926.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6397    6842       -1       3
 WC      0  1926.6     149  1927.6     297  1928.6     446  1929.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6842    7287       -1       3
 WC      0  1929.6     149  1930.6     297  1931.6     447  1932.6


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18472   18619       -1       3
 WC      0  2027.6      40  2026.6     147  2026.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18619   18710       -1       3
 WC      0  2026.6      71  2026.6      91  2028.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      5   18710   19020       -1       3
 WC      0  2028.6      20  2029.6     175  2031.6     265  2033.6     405  2035.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      4   19020   19215       -1       3
 WC      0  2035.6      55  2037.6     200  2039.6     270  2040.3
1
    15APR98      13:28:01                                                                    PAGE    2


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1      FEMA 10-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      LNLV WASH

 J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2                          .0033                                   1888.9

 J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                   -1

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150
```

```
**********************************************************************
12/31   rubble at section 18436
**********************************************************************

**********************************************************************
1/5   Inserted BSI channel improvements d/s of Lone Mountain Road
**********************************************************************

**********************************************************************
1/20  Added section 187+00 and 3 points to 18436
**********************************************************************

**********************************************************************
1/30  Removed flow upstream of 187+00 simulating breakout across Azure
**********************************************************************

**********************************************************************
1/30 Removed Sunrise Development Park and replaced with Kenny dropped section
**********************************************************************

**********************************************************************
2/10 ADDED SPECIAL CULVERT AT CRAIG
**********************************************************************

**********************************************************************
Debris pile at 184+36 lowered to EL. 2020 to account for erosion and CNLV wash
debris removal plan.  Weir flow leaving the wash is represented by the
split flow cards from 184+72 to 190+20
**********************************************************************

**********************************************************************
1
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3/4 Revised Lone Mountain Road Crossing
**********************************************************************

**********************************************************************
Model extends to the outlet of the NLVDB
**********************************************************************


QT        2       1025       1746

NC      .03        .03       .014         .1         .3

  Add xsec 1+50 from as-built plans (rectangular):
X1      150         12       1000     1035.1
X3       10
GR     1900        900       1897        910       1896       1000       1886    1000.01       1886     1017.1
GR     1896    1017.11       1896     1017.9       1886    1017.91       1886       1035       1896     1035.1
GR     1896       1060       1908       1120


X1    243.6          8       1000    1035.01       93.6       93.6       93.6
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1896.2    1017.11     1896.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01


X1    244.6          8       1000    1035.01          1          1          1
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1886.2    1017.11     1886.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01

  Duplicate 1+50 to 4+50 (beginning of transition):

X1      450          8       1000       1036      205.4      205.4      205.4                  1.0
X3       10
GR     1900        900       1897        910       1896       1000       1886       1001       1886       1035
GR     1896       1036       1896       1060       1908       1120

   Begin Transition XS 5+50 from As-Built Plans

X1      544          4       1000       1050         94         94         94
GR   1897.2       1000     1887.2       1015     1887.2       1035     1897.2       1050


X1      600          4       1000       1050         56         56         56
GR   1897.4       1000     1887.4       1015     1887.4       1035     1897.7       1050


X1      700          4       1000       1050        100        100        100
GR   1897.7       1000     1887.7       1015     1887.7       1035     1897.7       1050

1
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X1     1200          4       1000       1050        500        500        500
GR   1899.3       1000     1889.3       1015     1889.3       1035     1899.3       1050


X1     1700          4       1000       1050        500        500        500
GR     1901       1000       1891       1015       1891       1035       1901       1050
```

```
NC    0.030     0.030     0.014      0.1       0.3

X1     2000         4      1000      1050       300       300       300
GR     1902      1000      1892      1015      1892      1035      1902      1050


NC     .014      .014      .014
X1     2200         4      1000      1050       200       200       200
GR   1902.6      1000    1892.6      1015    1892.6      1035    1902.6      1050

  Duplicate 22+20 (beginning of transition):

NH        3      .035    1296.8      .014    1346.5      .035      1460
X1     3724        13    1296.8    1346.5      1524      1524      1524
X3       10         0         0    1220.1         0         0         0         0         0
GR   1904.6       700    1904.6       745      1904       755      1904       785      1908      1190
GR     1908      1222    1907.6    1296.8    1897.6    1311.8    1897.6    1331.5    1907.6    1346.5
GR     1908      1430      1912      1450    1912.3      1460


NC      .03       .03       .014       .1        .3

X1     3823         4      1000    1043.8        99        99
GR   1908.5      1000      1898   1000.01      1898      1028    1908.5    1043.8

  'N'-CHANNEL DIVERSION
    SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY

X1     4020        28    1603.14   1646.95       197       197       197
X3       10         0         0   1602.66    1914.9   1730.86         0         0         0
GR   1908.2       840      1908       900      1908       980      1904      1170    1907.2    1528.6
GR   1907.5    1550.5    1907.5    1570.6      1907   1595.27    1909.2   1603.14    1898.6    1603.2
GR   1898.6    1631.2    1909.1   1646.95      1909   1686.54    1912.3   1705.34      1913   1719.59
GR     1913   1740.66    1911.7   1747.43    1911.7   1757.13    1907.1   1771.7      1907   1781.99
GR   1910.6   1793.57    1910.7   1799.62    1910.3   1803.01    1910.1   1820.73      1912      2200
GR   1912.4      2480    1912.4      2510      1916      2900

  CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020

X1     4060        29      1604    1647.8        40        40        40
X3       10         0         0    1604.1         0   1720.21         0         0         0
GR   1908.2       840      1908       900      1908       980      1904      1170    1907.2    1528.6
GR   1907.5    1550.5    1907.5    1570.6      1907   1595.27    1909.3      1604   1898.76    1604.1
GR   1898.7      1632    1909.3    1647.8    1909.3   1657.51      1909   1686.54    1912.3   1705.34
GR     1913   1719.59      1913   1740.66    1911.7   1747.43    1911.7   1757.13    1907.1   1771.7
1
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GR     1907   1781.99    1910.6   1793.57    1910.7   1799.62    1910.3   1803.01    1910.1   1820.73
GR     1912      2200    1912.4      2480    1912.4      2510      1916      2900


NC                                    .3        .5
QT        2      1281      2183

NH        3      .035       840      .014   1657.51      .035      2900
    CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115        29      1604    1643.6        55        55        55
X3       10         0         0   1603.92         0   1721.64         0         0         0
GR   1908.2       840      1908       900      1908       980      1904      1170    1907.2    1528.6
GR   1907.5    1550.5    1907.5    1570.6      1907   1595.27    1909.3      1604    1898.8    1604.1
GR   1898.8    1643.5    1909.3    1643.6    1909.3   1657.51      1909   1686.54    1912.3   1705.34
GR     1913   1719.59      1913   1740.66    1911.7   1747.43    1911.7   1757.13    1907.1   1771.7
GR     1907   1781.99    1910.6   1793.57    1910.7   1799.62    1910.3   1803.01    1910.1   1820.73
GR     1912      2200    1912.4      2480    1912.4      2510      1916      2900


NC     .035      .035      .014       .3        .5

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     4188        17         0      52.9        73        73        73
X3        0         0         0         0         0      56.3         0         0         0
GR     1915         0    1899.4       0.1    1899.4      12.3    1899.4      13.5    1899.4      25.8
GR   1899.4        27    1899.4      39.3    1899.4      40.5    1899.4      52.8    1914.8      52.9
GR     1912        65      1912        85    1909.8       140      1912       300    1912.8       685
GR   1912.8       710      1916      1125

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL
  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125

X1     4189        18         0      52.9         1         1         1
X3       10
BT      -18         0    1914.8    1909.7       .01    1914.7    1909.7        .1    1914.8    1909.7
BT             12.3    1914.7    1909.7      12.31    1914.7    1899.4      13.5    1914.7    1899.4
BT            13.51    1914.7    1909.7      25.8     1914.7    1909.7     25.81    1914.7    1899.4
BT               27    1914.7    1899.4      27.01    1914.6    1909.7      39.3    1914.6    1909.7
BT            39.31    1914.6    1899.4      40.5     1914.6    1899.4     40.51    1914.6    1909.7
BT             52.8    1914.6    1909.7      52.81    1914.6    1909.7      52.9    1914.6    1909.7
GR   1914.8         0    1909.7       .01    1899.4       0.1    1899.4      12.3    1899.4      12.31
GR   1899.4      13.5    1899.4     13.51    1899.4      25.8    1899.4     25.81    1899.4        27
GR   1899.4     27.01    1899.4      39.3    1899.4     39.31    1899.4      40.5    1899.4     40.51
GR   1899.4      52.8    1909.7      52.81    1914.6      52.9


X1     4246        18         0      52.9        57        57        57
X3       10
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BT      -18          0       1915     1910.2       .01       1915     1910.2        .1       1915     1910.2
BT                12.3     1914.9     1910.2     12.31     1914.9     1899.9      13.5     1914.9     1899.9
BT               13.51     1914.9     1910.2      25.8     1914.9     1910.2     25.81     1914.9     1899.9
BT                  27     1914.9     1899.9     27.01     1914.8     1910.2      39.3     1914.8     1910.2
1
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BT               39.31     1914.8     1899.9      40.5     1914.8     1899.9     40.51     1914.8     1910.2
BT                52.8     1914.8     1910.2     52.81     1914.8     1910.2      52.9     1914.8     1910.2
GR     1915          0     1910.2        .01     1899.9        0.1     1899.9      12.3     1899.9     12.31
GR   1899.9        13.5     1899.9      13.51     1899.9       25.8     1899.9     25.81     1899.9         27
GR   1899.9       27.01     1899.9       39.3     1899.9      39.31     1899.9      40.5     1899.9      40.51
GR   1899.9        52.8     1910.2      52.81     1914.8       52.9
          .

X1     4247          10          0       52.9          1          1          1
GR     1915           0     1899.9        0.1     1899.9       12.3     1899.9      13.5     1899.9       25.8
GR   1899.9          27     1899.9       39.3     1899.9       40.5     1899.9      52.8     1914.8       52.9


NC       .03        .03        .014         .1          .3
  Left overbank topo from RR through Lone Mtn. should be extended/refined
   when additional mapping available:
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1     4360           4        1000       1057         113         113         113
GR   1911.4        1000     1900.9       1021      1900.9        1036      1911.4        1057


X1     4831           4        1000       1057         471         471         471
GR   1915.3        1000     1904.8       1021      1904.8        1036      1915.3        1057


X1     4920           4        1000       1057          89          89          89
GR     1916        1000     1905.5       1021      1905.5        1036        1916        1057


X1     5005           4        1000       1057          85          85          85
GR   1916.7        1000     1906.2       1021      1906.2        1036      1916.7        1057


X1     5105           4        1000    1035.01         100         100         100
GR   1919.2        1000     1908.2    1000.01      1908.2        1035      1919.2     1035.01


X1     5200           4        1000    1038.21          95          95          95
GR   1919.8        1000     1908.8    1000.01      1908.8      1038.2      1919.8     1038.21


X1     5500           4        1000    1048.21         300         300         300
GR   1921.8        1000     1910.8    1000.01      1910.8      1048.2      1921.8     1048.21

    CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)

X1     5852          21        1466    1522.34         352         352         352
GR   1922.5           0     1922.0        505      1924.8        1010      1923.5        1466     1912.7     1466.1
GR   1912.7     1473.66     1912.7    1474.33      1912.7     1481.66      1912.7     1482.33     1912.6     1489.66
GR   1912.6     1490.33     1912.6    1497.66      1912.6     1498.33      1912.6     1505.66     1912.6     1506.33
GR   1912.5     1513.66     1912.5    1514.33      1912.5     1521.66      1912.5     1522.33     1923.5     1522.34
GR   1926.6        2009

1
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NC       .015       .015       .015         0.3         0.5
X1     5853          21        1466    1522.34           1           1           1
X3       10
GR   1922.5           0     1922.0        505      1924.8        1010      1923.5        1466     1912.7     1466.1
GR   1912.7     1473.66     1912.7    1474.33      1912.7     1481.66      1912.7     1482.33     1912.6     1489.66
GR   1912.6     1490.33     1912.6    1497.66      1912.6     1498.33      1912.6     1505.66     1912.6     1506.33
GR   1912.5     1513.66     1912.5    1514.33      1912.5     1521.66      1912.5     1522.33     1923.5     1522.34
GR   1926.6        2009

X1     5973          21        1466    1522.34         120         120         120
X3       10
BT      -32           0     1922.5     1922.5         505        1922        1922        1010     1924.8     1924.8
BT                 1466     1924.1     1924.1      1466.1      1924.1      1921.7     1473.66     1924.1     1921.7
BT                1473.66   1924.1     1913.3      1474.33     1924.1      1913.3     1474.33     1924.1     1921.7
BT                1481.66   1924.1     1921.7      1481.66     1924.1      1913.3     1482.33     1924.1     1913.3
BT                1482.33   1924.1     1921.7      1489.66     1924.1      1921.6     1489.66     1924.1     1913.2
BT                1490.33   1924.1     1913.2      1490.33     1924.1      1921.6     1497.66     1924.1     1921.6
BT                1497.66   1924.1     1913.2      1498.33     1924.1      1913.2     1498.33     1924.1     1921.6
BT                1505.66   1924.1     1921.6      1505.66     1924.1      1913.2     1506.33     1924.1     1913.2
BT                1506.33   1924.1     1921.6      1513.66     1924.1      1921.6     1513.66     1924.1     1913.1
BT                1514.33   1924.1     1913.1      1514.33     1924.1      1921.6     1522.33     1924.1     1921.5
BT                1522.34   1924.1     1924.1         2009     1926.6      1926.6
GR   1922.5           0     1922.0        505      1924.8        1010      1924.1        1466     1913.3     1466.1
GR   1913.3     1473.66     1913.3    1474.33      1913.3     1481.66      1913.3     1482.33     1913.2     1489.66
GR   1913.2     1490.33     1913.2    1497.66      1913.2     1498.33      1913.2     1505.66     1913.2     1506.33
GR   1913.1     1513.66     1913.1    1514.33      1913.1     1521.66      1913.1     1522.33     1924.1     1522.34
GR   1926.6        2009

NC       .015       .015       .015          .1          .3
X1     5974          17          0       56.34           1           1           1
GR   1923.2           0     1913.3         0.1      1913.3        7.66      1913.3        8.33     1913.3     15.66
GR   1913.3       16.33     1913.2       23.66      1913.2       24.33      1913.2       31.66     1913.2     32.33
```

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GR   1913.2      39.66     1913.2      40.33     1913.1      47.66     1913.1      48.33     1913.1      55.66
GR   1913.1      56.33     1923.1      56.34

NC      .03        .03        .03         .1          .3
  ****************************************************************
  BSI Channel Plans
  ****************************************************************

   11+27
X1     6092         13       1727      1823.2         126         126         126                 -2.4
GR     1927       1000       1926        1363        1925        1644        1925        1718        1925        1727
GR   1916.4       1745     1916.4        1805      1925.5      1823.2        1926        1984        1927        2233
GR     1928       2483       1929        2740        1930        2990
   14+05
1
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X1     6370         11       1732        1834         278         278         278                 -2.4

GR     1929       1000       1928        1328        1927        1607      1927.8        1730      1927.8        1732
GR   1917.2       1753     1917.2        1813      1927.8        1834        1928        2025        1929        2250
GR     1930       2495

   18+63

X1     6828         11       1775        1880         458         458         458                 -2.4
GR     1932       1000       1931        1310        1930        1573      1929.3        1773      1929.3        1775
GR   1918.6       1797     1918.6        1857      1930.4        1880        1931        2009        1932        2216
GR     1933       2430
   23+00

X1     7265         11       1762        1870         437         437         437                 -2.4
GR     1935       1000       1934        1313        1933        1575      1932.4        1760      1932.4        1762
GR   1920.9       1785     1920.9        1845      1933.3        1870        1934        2025        1935        2324
GR     1936       2523

NC      .03        .03        .03         .1          .3

   27+65
X1     7730          9       1830      1939.4         465         465         465                 -2.4
GR     1938       1000       1937        1264        1936        1506        1936        1574      1935.9        1653
GR   1935.9       1830     1923.9        1854      1923.9        1914      1936.6      1939.4

   33+58

X1     8323         14       2257        2369         593         593         593                 -2.4
GR     1948       1000       1946        1160        1944        1300        1942        1375        1941        1400
GR     1941       1415       1940        1455        1940        1510        1940        1555      1940.3        1577
GR   1940.3       2257     1927.6        2282      1927.6        2342      1941.3        2369

   37+08

X1     8673          4       1000      1114.0         350         350         350                 -2.4
GR   1942.3       1000     1929.8        1025      1929.8        1085      1944.3      1114.0

NC      .015       .015       .015         0.3         0.5
   LONE MOUNTAIN BRIDGE SECTION  (JUST DOWNSTREAM) WIDTHS FROM BRIDGE PLANS
   ELEVATION OF TOP OF DECK AND INVERT FROM KENNY AERIAL
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     8754         10          0        43.4          81          81          81                 -0.5
X3       10          0          0           0           0           0           0           0           0
GR   1942.1          0     1936.8         0.1      1936.8           1      1928.4       13.67      1928.4       20.33
GR   1928.4       21.67     1928.4          29      1936.8        42.3      1936.8        43.3      1942.3        43.4
1
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X1     8755         20       1000      1043.4           1           1           1
X3       10
BT       -9       1000     1941.6      1941.6      1000.1      1941.6      1940.2      1020.33      1941.7      1940.2
BT             1020.33     1941.7      1927.9      1021.67     1941.7      1927.9      1021.67      1941.7      1940.2
BT             1043.3      1941.8      1940.4      1043.4      1941.8      1941.8        1580         1944        1944
GR   1941.6       1000     1936.3      1000.1      1936.3        1001      1927.9      1013.67      1927.9      1020.33
GR   1927.9     1021.67     1927.9        1029      1936.3      1042.3      1936.3      1043.3      1941.8      1043.4
GR     1944       1580     1945.9        1705      1946.2        1805      1946.9        1856      1947.1        1905
GR   1947.5       1955     1947.7        2005      1948.2        2055      1948.5        2105      1948.8        2155
   ****************************************************************************
   STATION EQUATION USED IN MAPPING  STA 8834.5 BACK = STA 8860 FORWARD
   ****************************************************************************
   EXTENDED CROSS SECTION BEGINING AT 580 ENDING 1155

X1     8860         20       1000      1043.4          79          79          79
X3       10
BT      -14       1000     1942.1      1940.6      1000.1      1942.1      1940.6        1001      1942.1      1940.6
BT             1013.67     1942.1      1940.6      1020.33      1942.2      1940.7      1020.33      1942.2      1928.4
BT             1021.67     1942.2      1928.4      1021.67      1942.2      1940.7        1029      1942.2      1940.7
BT              1042.3     1942.2      1940.7      1043.3      1942.3      1940.9      1043.3      1942.3      1940.9
BT              1043.4     1942.3      1942.3        1580        1944        1944
GR   1942.1       1000     1936.8      1000.1      1936.8        1001      1928.4      1013.67      1928.4      1020.33
GR   1928.4     1021.67     1928.4        1029      1936.8      1042.3      1936.8      1043.3      1942.3      1043.4
GR     1944       1580     1945.9        1705      1946.2        1805      1946.9        1856      1947.1        1905
GR   1947.5       1955     1947.7        2005      1948.2        2055      1948.5        2105      1948.8        2155
```

EXTENDED CROSS SECTION BEGINING AT 580 ENDING 1155

X1	8861	20	0	1155	1	1	1			
X3	10	0	0	0	0	0	0	0	0	
GR	1942.1	0	1936.8	0.1	1936.8	1	1928.4	13.67	1928.4	20.33
GR	1928.4	21.67	1928.4	29	1936.8	42.3	1936.8	43.3	1942.3	43.4
GR	1944	580	1945.9	705	1946.2	805	1946.9	856	1947.1	905
GR	1947.5	955	1947.7	1005	1948.2	1055	1948.5	1105	1948.8	1155
NH	3	.035	1804.76	.015	1954.26	.035	2930.0			
X1	9120	45	1660.36	2136.88	259	259	259			
X3	10		0	1661.33	0	2712.5	0	0	0	
GR	1938.9	1000	1938.4	1022.44	1939.4	1050.83	1939.8	1109.61	1940.4	1185.31
GR	1941.1	1255.73	1941.4	1329.84	1941.9	1406.09	1942.3	1476.83	1942.7	1527.08
GR	1943.1	1593.17	1944.1	1622.98	1945.2	1660.36	1944.3	1668.77	1944.1	1695.47
GR	1943.4	1751.09	1943.4	1804.76	1942.6	1841.55	1941.1	1849.31	1941.2	1871.11
GR	1931.6	1888.31	1930.9	1902.34	1941	1922.71	1940.5	1934.27	1942.7	1954.26
GR	1943.1	1985.88	1944	2016.07	1944.6	2058.89	1945.1	2091.74	1945.5	2136.88
GR	1945.7	2189.84	1945.5	2239.5	1945.5	2313.35	1948.7	2328.55	1948.9	2355.38
GR	1946.9	2377.76	1948.5	2413.91	1947.4	2476.49	1948.2	2508.5	1948.8	2533.66
GR	1949.2	2564.44	1949	2623.1	1949.6	2704.24	1949.3	2783.03	1948.3	2930

1

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NC	.045	.045	.045	0.1	0.3					
	CROSS SECTION CUT FROM KENNY TOPO 9-16-97									
X1	9237	19	1900	2580	117	117	117			
X3	10	0	0		0		0	0	0	
GR	1944	1000	1940.9	1220	1941.9	1250	1941	1270	1944	1560
GR	1948	1900	1944	2123	1940	2140	1940	2155	1940.5	2240
GR	1944	2515	1948	2570	1950	2580	1948	2623	1948	2630
GR	1948.6	2760	1950.8	3055	1948	3195	1952	3275		
	CROSS SECTION CUT FROM KENNY TOPO 9-16-97									
X1	9429	24	1775	2330	192	192	192			
X3	10	0	0	1573	0	0	0	0	0	
GR	1948	850	1944	920	1944	1000	1948	1058	1948.4	1100
GR	1948	1200	1947.8	1270	1948	1330	1949.9	1510	1950.5	1560
GR	1948	1695	1948	1775	1944	1855	1942.1	1900	1942.3	2000
GR	1944	2280	1948	2315	1949.1	2330	1948	2350	1948	2382
GR	1949	2470	1949.9	2565	1950.3	2664	1952	2815		
X1	10155	39	2117.61	2420	726	726	726			
X3	10	0	0	1567.24	0	0	0	0	0	
GR	1950.2	1000	1950.5	1089.5	1951.3	1173.63	1952	1264.68	1952.6	1341.06
GR	1953	1418.64	1953	1482.79	1953.7	1509.3	1954.2	1533.43	1954.2	1567.24
GR	1953.7	1645.43	1953.4	1728.2	1951.4	1742.62	1950.6	1774.96	1951.3	1799.01
GR	1953.2	1821.33	1953.3	1893.3	1952.9	1957.65	1952.3	2022.96	1952.3	2050.45
GR	1953.3	2062.52	1953	2082.16	1952.7	2105.51	1953.7	2117.61	1953	2162.78
GR	1953.1	2184.83	1952.6	2209.21	1951.7	2274.07	1948.7	2286.68	1952.9	2302.13
GR	1950.9	2322.64	1953.3	2334.66	1953.5	2396.66	1951.7	2407.52	1953.8	2420
GR	1955.1	2455.16	1955.7	2508.22	1955.8	2563.46	1956.7	2685.29		
X1	10962	51	1440.93	1695.93	807	807	807			
X3	10	0	0		0		0	0	0	
GR	1963.6	1000	1963.2	1026.45	1961.4	1061.7	1958.3	1120.54	1958.3	1142.66
GR	1959.8	1170.46	1961.9	1193.68	1962	1224.14	1960.1	1235.84	1959.8	1256.52
GR	1957.3	1274.17	1956.1	1322.35	1955.8	1365.42	1959.1	1375.51	1959.1	1386.44
GR	1957.3	1392.19	1959.6	1414.44	1959.9	1440.93	1957.6	1456.6	1958	1488.58
GR	1956.9	1523.04	1958.3	1535.33	1956.7	1550.46	1958.6	1560.22	1957.9	1569.99
GR	1959	1583.95	1959.2	1604.04	1957.9	1630.23	1959	1643.16	1958.7	1682.16
GR	1959.3	1695.93	1958.8	1743.65	1958.2	1795.77	1957.4	1813.41	1955.9	1824.29
GR	1955.3	1842.84	1957.2	1851.64	1958.8	1891.67	1955.5	1902.15	1959.2	1911.85
GR	1959.3	1942.31	1954.9	1955.14	1958.7	1962.51	1959.2	2014.23	1959.5	2081.38
GR	1960	2149.42	1960.7	2223.54	1961.5	2269.13	1961.8	2309.63	1962.4	2347.97
GR	1963.2	2447.12								
X1	11614	31	1060.74	1621.25	652	652	652			
X3	10	0	0		0		0	0	0	
GR	1968.5	1000	1968.5	1016.77	1965.9	1031.5	1965.5	1037.26	1966.9	1060.74
GR	1966.5	1082.27	1964.7	1108.37	1964.2	1144.42	1963.6	1165.29	1964.2	1204.22
GR	1964	1257.43	1960.3	1277.59	1961.9	1298.65	1963.6	1327.11	1963.6	1344.72
GR	1964.6	1354.9	1964.5	1388.25	1964.7	1426.54	1965.2	1464.8	1965	1516.16
GR	1965.3	1552.81	1965	1601.59	1965.5	1621.25	1964.9	1637.89	1964.6	1659.07
GR	1965	1682	1965	1710.33	1966.1	1767	1966.5	1831.92	1966.5	1883.35
GR	1968	1980								

1

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X1	12202	39	1416.33	1531.53	588	588	588			
GR	1973.5	1000	1973.9	1041.1	1972.6	1049.1	1972.3	1055.57	1973.5	1078.41
GR	1973.2	1102.18	1971.8	1117.54	1971	1136.36	1972.7	1151.28	1972.1	1159.6
GR	1972.4	1180.73	1973.1	1194.37	1972.7	1209.54	1972.8	1239.18	1972.2	1280.99
GR	1971.6	1315.18	1971.4	1359.1	1971.4	1416.33	1962.7	1437.46	1963.5	1446.89
GR	1964.3	1491.07	1967.2	1507.08	1974.3	1531.53	1971.7	1550.54	1972.2	1562.12
GR	1969.8	1576.39	1969.9	1600.21	1969.6	1662.22	1969.7	1729.13	1968.1	1735.53
GR	1969.8	1750.2	1968.1	1791.98	1969.1	1799.86	1967.7	1808.69	1969.9	1822.11
GR	1969.8	1885.59	1974	1909.53	1974.1	1930.2	1972.2	1957.33		
X1	13094	34	1507.22	1754.18	892	892	892			
X3	10	0	0	0	0	0	0	0	0	
GR	1980.1	1000	1980.2	1028.38	1979.8	1031.96	1981	1052.72	1980.7	1076.61

```
GR   1979.6   1099.46   1978.5   1123.34     1980   1128.65     1980   1136.28   1977.8   1145.37
GR   1980.6   1153.56   1979.4   1161.62   1978.9   1198.7    1978.6   1271.71   1978.1   1318.1
GR   1978.4   1368.29   1978.3   1434.68     1978   1507.22   1964.9    1530.8   1964.7   1554.39
GR   1965.3   1602.79     1968   1610.61   1974.3   1658.31   1975.2   1678.04   1976.4   1711.3
GR   1977.6   1754.18   1976.8   1790.55   1977.8   1826.85   1978.5   1884.66   1978.4   1937.24
GR   1978.7   2013.58   1978.2   2063.28     1978   2130.51     1980      2400

X1     14167        45   1672.71   2003.74     1073      1073     1073
X3        10
GR   1989.9      1000   1990.5   1040.67   1990.3   1060.84   1989.9   1069.03   1990.6   1091.31
GR   1990.4   1118.27   1988.9   1140.74   1988.5   1163.72   1988.7   1187.86   1988.4   1236.13
GR   1988.8   1269.36   1987.5   1275.64   1990.8   1283.64   1989.5   1291.56   1988.8   1321.74
GR   1988.4   1390.82   1988.6   1465.28   1988.4   1531.6    1987.8   1590.63   1987.5      1656
GR   1987.8   1672.71   1970.3   1708.36   1970.6   1765.73     1973   1781.86   1979.9   1802.41
GR   1979.9   1820.98   1983.2   1834.21   1983.4   1869.28   1983.8   1911.87   1983.5   1953.67
GR   1984.2   2003.74     1984   2066.64   1983.5   2081.1      1984   2122.85   1985.2    2166.7
GR   1985.7   2206.72   1986.2   2266.33   1985.9   2315.3    1985.9   2372.26   1984.4   2391.21
GR     1989   2407.95     1989   2413.66   1990.6   2419.39     1989   2424.37   1989.4   2456.46

   SECTION 14368 CUT FROM CNLV TOPO

X1     14368        15      1540      1625      201       201      201                -2.4
GR      1994      1000      1994      1100     1992      1300     1990      1520     1988      1540
GR      1986      1545      1985      1560     1985      1600     1986      1620     1988      1625
GR      1990      1975      1990      2025     1990      2125     1992      2290     1994      2307


X1     15114        41   1574.57   1764.17      746       746      746
X3        10         0         0         0        0         0        0         0        0
GR   1995.8      1000    1995.7   1016.07   1994.6   1024.33   1998.4   1031.82   1997.1   1038.62
GR   1997.5   1045.61    1997.1   1066.88   1997.7   1100.17   1997.1   1105.06   1995.7   1143.88
GR   1999.3   1154.57    1997.8   1161.14   1997.2   1212.87   1995.8   1279.05   1994.5    1342.8
GR   1993.5   1403.18    1992.7   1471.87   1992.4   1512.27   1991.9   1574.57   1990.6   1628.15
GR   1989.7   1649.09    1980.6    1683.4   1981.4   1710.99   1980.9   1747.36   1988.4   1764.17
GR   1989.7   1825.53    1989.9   1910.87   1990.3   1988.92   1990.3   2014.51   1989.6   2113.37
GR   1991.8   2134.73    1991.8   2175.51   1991.5   2213.67     1992   2272.76   1993.1   2287.01
GR   1993.1   2302.85    1991.5   2319.43   1991.7   2362.97   1991.1   2406.64   1993.4    2420.8
GR   1993.5   2469.97

   SECTION 15667 CUT FROM CNLV TOPO
1
    15APR98       13:28:01                                                    PAGE   12


X1     15667        19      1505      1672      553       553      553                -2.4
X3        10
GR      2006      1000      2004      1010     2002      1030     2002      1040     2002      1150
GR      2000      1170      1998      1240     1996      1505     1992      1530     1992      1580
GR      1994      1660      1996      1672     1997      1950     1997      2180     1998      2315
GR      2000      2385    2000.5      2500     2002      2750     2004      2830

X1     16546        51   1033.85   2193.69      879       879      879
X3        10
GR   2006.9      1000    2006.8   1010.78   2006.1    1016.3   2006.7   1024.48   2006.8   1033.85
GR   2005.8   1039.27    2006.4   1045.74   2005.4   1105.06   2005.9   1124.21   2004.8    1165.3
GR   2004.5   1207.41    2003.2    1248.7   2002.7   1303.12   2003.2   1323.23   2003.7   1363.28
GR     2003   1384.95    2002.4   1422.56   2002.9   1449.26   2002.1   1478.94   2001.6   1523.77
GR   1999.6    1542.4    1994.6   1560.28   1994.9   1595.91     1993   1611.38   1993.5   1666.94
GR   1994.8   1684.76    2001.8   1696.43   2002.6   1732.45   2002.1   1766.78   2003.9   1784.85
GR   2006.1   1817.89      2007   1842.65   2007.4   1867.41   2006.7   1892.85   2009.1   1918.63
GR   2008.6   1957.57    2008.3   2006.72   2008.7   2052.44   2009.6   2074.93   2009.6   2122.66
GR   2013.1   2156.53    2013.9   2193.69   2010.8   2246.21   2011.1    2266.5   2009.9   2285.66
GR   2011.5   2296.24    2014.4   2329.51   2009.4   2361.01   2013.7   2373.12   2009.6   2383.61
GR   2008.7   2409.39

NC     .045      .045      .045       0.1       0.3
X1     17058        43   1359.48   1938.16       512       512      512
X3        10         0         0         0        0         0        0         0        0
GR      2013      1000      2013   1073.16    2013.6   1143.99   2013.8   1197.07   2013.8   1251.55
GR    2013.8   1308.43    2013.8   1359.48    2013.3    1403.3   2012.6   1443.16   2010.6   1475.15
GR    2011.5   1499.88    2007.2   1508.86    2006.6   1524.38   2011.1   1542.91   2004.9   1561.98
GR    2006.2   1588.21    2004.6   1623.75    2006.7   1633.73   2005.4    1671.7   2005.6   1712.49
GR    2010.9   1735.99      2013    1760.7    2014.1   1799.91   2016.4   1839.49     2018   1893.93
GR      2019   1938.16    2018.8   1979.65    2017.8   2023.12   2016.8   2052.36   2016.9   2076.96
GR    2019.5   2097.45    2019.4   2117.17    2016.7   2144.75   2015.5    2171.7   2016.4   2196.52
GR    2018.6   2219.04    2017.6   2235.65    2015.1   2278.14   2016.4   2314.03     2014   2356.58
GR    2012.9   2417.09    2009.4   2453.61    2008.7   2504.6


X1     17612        47   1599.17   2107.09       554       554      554
X3        10
GR   2017.5      1000    2017.9   1014.14    2019.1   1061.46   2018.6   1107.82   2018.6   1146.75
GR   2019.4   1149.73      2018   1156.88    2018.9   1169.22   2019.4   1218.1    2019.3   1281.77
GR   2019.5   1337.02    2019.2   1373.49    2020.2   1403.28   2019.5   1447.41   2020.7   1473.98
GR   2020.2   1530.55    2018.8    1547.3    2018.2   1568.04   2019.6   1578.58   2020.2   1599.17
GR   2019.8   1621.27    2015.4   1638.14    2013.6   1657.35   2014.7   1708.33   2011.3   1714.43
GR   2014.2   1726.74    2014.4   1742.41    2013.8   1761.75   2014.8    1779.7     2011   1804.57
GR   2009.2   1843.45    2009.5   1862.85    2013.9   1873.55   2016.8   1894.29   2017.7    1912.3
GR   2017.3   1950.29    2019.1   1985.62    2019.6   2028.19   2020.6   2041.68     2022   2084.98
GR   2023.6   2107.09    2022.4   2120.89    2022.4   2158.33     2024   2187.61     2025   2213.62
GR   2025.4   2259.48    2025.1      2309

     ADDED 3 POINTS TO LEFT BANK FROM KENNY TOPO 1/20
1
    15APR98       13:28:01                                                    PAGE   13
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X1    18436        44    1374.86    2012.84       824       824       824
X3       10
GR     2024       780       2024        880      2024       965    2025.8      1000    2025.9    1060.03
GR   2025.5   1101.54     2025.5    1161.04    2025.7   1213.91    2026.5   1261.85    2026.7   1291.71
GR   2027.2   1333.82     2028.2    1374.86    2027.8   1416.23    2027.8   1469.12    2027.2   1499.51
GR   2025.6   1535.68     2023.2    1577.09    2021.5   1611.73    2019.6    1648.4    2019.1   1670.38
GR   2019.3   1692.62     2021.2    1722.68    2021.8   1742.03    2022.1   1774.31    2022.2   1800.18
GR     2024   1831.25     2025.3    1850.91    2025.3   1882.76    2025.1   1914.54    2026.7   1942.83
GR   2027.8   1971.11     2028.2    2012.84    2027.5   2047.72      2028   2090.73    2028.8   2121.56
GR     2029   2161.18     2028.7    2214.59    2029.6   2257.8     2031.1   2294.58      2033    2320.6
GR   2034.6   2346.17     2034.6    2360.41    2033.6   2385.33    2030.5   2447.19

  DEBRIS REPRESENTED BY CROSS SECTIONS 18462 AND 18472
  SECTION 18462 CUT FROM CNLV TOPO

X1    18462        14        32        429        26        26        26                 -2.4
GR     2032         0      2032         32      2030        42      2028        57      2026        70
GR   2022.4       131    2022.4        194      2024       209      2024       232      2026       234
GR     2028       336      2030        341      2032       429      2034       479

  SECTION 18462 DUPLICATED 10' U/S

X1    18472        14        32        429        10        10        10                 -2.4
GR     2032         0      2032         32      2030        42      2028        57      2026        70
GR   2022.4       131    2022.4        194      2024       209      2024       232      2026       234
GR     2028       336      2030        341      2032       429      2034       479

  SECTION 18619 CUT FROM CNLV TOPO

X1    18619        25         0        397       147       147       147                 -2.4
GR     2029         0      2028         50      2026        80      2024       102      2024       128
GR     2026       180      2027        215      2027       227      2026       248      2024       264
GR     2024       342      2026        347      2028       364      2030       370      2032       397
GR     2032       418      2030        430      2028       465      2028       491      2030       555
GR     2031       590      2032        709      2034       789      2034       797      2034       894

  CUT SECTION FROM CNLV TOPO

X1    18710        23      1000       1700        91        91        91                 -2.4
GR     2031      1000      2030       1070      2030      1125      2028      1160      2026      1180
GR     2026      1210      2030       1220      2030      1240      2018      1260      2018      1310
GR     2020      1345      2022       1380      2024      1410      2026      1435      2028      1450
GR     2030      1535      2032       1580      2032      1700      2038      1735      2038      1745
GR     2034      1770      2034       1865      2036      2095

  CUT SECTION FROM CNLV TOPO

X1    19020        13      1000       1470       310       310       310                 -2.4
GR     2032      1000      2030       1050      2028      1090      2026      1110      2024      1130
GR     2022      1155      2020       1180      2020      1370      2022      1430      2030      1465
GR     2032      1470      2034       1575      2036      1610

  CUT SECTION FROM CNLV TOPO
1
   15APR98      13:28:01                                                                  PAGE   14


X1    19215        13      1000       1330       195       195       195                 -2.4
GR     2036      1000      2034       1025      2032      1038      2032      1070      2030      1089
GR     2028      1098      2028       1119      2030      1125      2032      1160      2032      1260
GR     2034      1272      2038       1300      2040      1330



X1    19802        46    1510.5    2179.13       587       587       587
X3       10
GR   2041.6      1000    2041.5    1046.48    2039.3   1081.39    2038.7   1110.52    2039.7   1154.42
GR   2040.5   1184.19     2038.7    1210.92    2034.8   1249.33    2032.9   1287.07    2031.9   1300.58
GR     2032   1315.86     2034.6    1346.74    2036.8    1373.6    2039.7   1416.99    2042.4   1448.51
GR   2044.4   1482.22     2044.4    1510.5     2043.7   1540.75    2043.7   1569.59    2040.9   1599.88
GR   2039.5   1643.73     2038.4    1703.43    2038.9   1715.29    2037.5   1725.92    2034.5   1762.3
GR   2034.3    1780.5     2032.5    1794.35      2032   1814.83    2032.2   1837.85    2032.7   1857.1
GR   2033.5   1881.06     2034.3    1914.07    2036.2   1954.17    2036.5   1979.88    2038.2   2000.14
GR   2039.5   2048.44     2040.8    2101.47    2041.2   2137.26    2041.3   2179.13    2040.3   2206.98
GR   2040.1   2282.34     2040.5    2296.63      2041   2352.88    2041.4   2379.33    2041.7   2393.79
GR   2046.5   2440.08

X1    20595        30    1175.03    1780.94       793       793       793
X3       10
GR   2053.4      1000    2050.3     1053.9    2049.5   1072.42    2048.6   1147.63    2048.5   1175.03
GR   2047.3    1213.4    2042.3    1233.31    2041.5   1252.21    2041.7   1278.91    2040.3   1292.04
GR   2040.8   1307.82     2040.3    1315.35    2041.5   1329.05    2041.5    1367.1    2039.4   1374.77
GR   2039.3   1391.01     2042.2    1402.49    2042.1   1412.56    2043.6   1428.19    2043.8   1441.31
GR   2045.9   1463.28     2045.7     1509.8      2046   1549.61    2046.9   1571.99    2046.6   1606.16
GR   2046.3   1620.17     2046.5    1666.78    2047.3   1701.91      2047    1730.5    2048.2   1780.94

X1    21291        40    1082.37    1603.93       696       696       696
X3       10
GR   2057.5      1000    2055.7    1041.47    2054.1   1052.27    2054.9   1065.72    2056.1   1082.37
GR   2055.6   1096.57     2049.8    1121.39    2050.1   1157.01    2050.9   1186.54    2050.7   1226.18
GR   2049.7   1271.29     2048.6    1312.57    2046.2   1326.33    2045.8   1342.04    2048.1   1357.87
GR   2048.9   1388.15       2049    1432.26    2045.4   1440.93    2045.4   1453.12    2046.2   1460.09
GR   2047.4   1479.88     2046.7    1508.66    2048.6   1525.56    2047.4   1541.05    2049.2   1557.32
GR   2054.2   1580.56     2055.5    1603.93    2055.3   1614.05    2050.1   1634.03    2051.5   1646.85
GR   2050.2   1662.75     2053.2    1691.04    2054.7   1703.17    2054.1   1717.68    2054.8   1740.29
GR   2054.2   1755.38     2055.3    1779.76    2056.9   1804.58    2059.6   1840.52    2058.5   1875.28

X1    22138        45    1153.02     1845.3       847       847       847
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```
X3       10
GR     2065        1000      2064.2     1028.21      2064.2     1044.93      2064.8     1062.86        2065     1122.17
GR   2065.1     1153.02      2063.6     1171.24        2057     1198.51      2056.9     1209.25      2055.3     1220.44
GR   2055.9        1233        2055     1254.99      2055.5     1267.43      2054.9     1288.54      2052.6     1299.22
GR     2054     1331.64      2053.4     1343.77      2054.8     1353.31      2053.5     1364.18      2055.4     1376.62
GR   2055.7     1393.52      2056.7     1440.89      2057.5     1492.61      2057.6     1551.85      2057.4     1558.95
GR   2057.5     1574.03      2059.6     1587.92      2057.9     1602.87      2058.3     1624.73      2058.9        1664
GR     2059     1681.88      2061.6     1696.4         2061     1715.37      2064.1        1752        2066     1780.08
GR   2066.5     1808.11      2066.7      1845.3      2065.3     1884.82      2064.3     1915.48      2063.9     1951.16
GR   2062.8     1987.23      2061.8     2019.52      2060.2     2043.65      2059.3     2078.64      2058.5     2091.44
1
    15APR98       13:28:01                                                                                  PAGE   15


X1    23230          27     1139.83     1531.88        1092        1092        1092
X3       10
GR   2076.7        1000      2076.1     1016.84      2074.9     1061.89      2068.1     1081.86      2075.4     1111.27
GR   2075.5     1139.83      2074.2     1166.71      2066.5     1193.41      2065.6     1213.71      2066.8     1235.89
GR   2064.9     1255.54      2065.5     1264.15      2064.8     1280.17      2065.2     1292.98      2065.1      1311.7
GR   2063.6     1322.89      2063.2     1333.84      2064.3     1352.07      2063.1     1361.54      2064.2     1397.04
GR   2065.5     1403.83      2065.5     1425.63      2066.5     1435.79      2066.6     1449.87      2072.1     1482.47
GR     2082     1514.37      2082.3     1531.88

X1    24530          24     1057.36     1506.91        1300        1300        1300
X3       10
GR   2089.3        1000      2089.1     1057.36      2088.1        1097      2087.5     1131.87      2079.2     1157.95
GR   2079.2     1170.13      2077.3     1177.86      2078.6     1189.17        2079     1212.67      2077.7     1231.33
GR   2076.5     1287.94      2077.2      1303.9      2078.3     1319.85      2078.3     1331.35      2077.1     1340.46
GR   2076.8     1364.53      2077.8     1380.92      2077.8     1409.89      2075.6     1424.15      2075.4     1434.07
GR   2085.4     1460.45      2105.9     1487.26      2106.5     1506.91      2104.8     1528.79

X1    25616          35     1184.78     1836.38        1086        1086        1086
X3       10
GR   2101.4        1000        2101     1045.55      2099.9     1064.96      2098.8     1097.76      2100.6      1140.3
GR   2100.5     1184.78      2100.1     1232.97      2098.8     1266.02      2095.4     1298.04      2093.6     1320.41
GR   2090.3     1337.94      2088.6      1351.7      2085.1      1366.4      2085.5     1380.16        2088     1389.21
GR     2088     1401.52      2086.9     1411.19      2086.2     1423.94      2087.8     1440.11      2088.3     1475.16
GR   2089.9     1536.61      2090.5     1565.47      2089.9     1577.62      2091.1     1606.85      2095.5      1630.6
GR   2096.8      1656.2      2092.3      1681.9        2092     1698.26      2094.5     1711.86      2095.2     1722.18
GR     2098     1749.32        2098     1767.19      2099.3        1795      2100.6     1836.38      2099.8     1884.62

X1    26383          35     1170.09     1701.35         767         767         767
X3       10
GR   2113.1        1000      2111.6     1036.82      2109.6     1062.2       2108.4     1109.45      2106.8     1118.94
GR   2109.3     1139.73      2109.8     1170.09      2108.5     1193.39      2105.4     1226.56      2095.8     1254.34
GR   2096.8     1269.86      2095.3     1278.59      2094.3     1298.05      2092.4      1307.9      2091.9     1327.03
GR   2090.2     1338.57        2090     1360.32      2092.4     1367.29      2093.1     1381.56      2092.1     1414.58
GR   2091.1     1427.75      2096.3     1445.95      2101.5     1471.22      2102.6     1501.08      2101.3        1515
GR   2100.7     1570.49      2102.6     1604.17      2103.1     1638.74      2103.7     1673.36      2105.6     1701.35
GR     2106     1729.64      2104.9     1761.13      2107.4     1791.33      2107.1     1828.72      2106.3      1856.7

NC      .045        .045        .030
     SECTION CUT FROM TOPO
X1    27000           5          51         117         617         617         617
GR     2112           0        2112          51      2101.5          72      2101.5          96        2112         117
    SECTION CUT FROM TOPO

X1    27303           5          51         117         303         303         303
GR     2115           0        2115          51      2104.5          72      2104.5          96        2115         117


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 1

 CCHV=      .100 CEHV=      .300
 *SECNO 150.000

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

    150.000       3.02    1889.02    1889.02    1888.90    1890.55       1.53        .00        .00    1896.00
     1025.0         .0     1025.0         .0         .0      103.4         .0         .0         .0    1896.00
        .00        .00       9.91        .00       .000       .014       .000       .000    1886.00    1000.01
    .002986         0.         0.         0.          0          8          0        .00      34.22    1035.03


 *SECNO 243.600

 3265 DIVIDED FLOW

    243.600       3.43    1889.63        .00        .00    1890.81       1.18        .23        .03    1896.20
     1025.0         .0     1025.0         .0         .0      117.7         .0         .2         .1    1896.20
        .00        .00       8.71        .00       .000       .014       .000       .000    1886.20    1000.01
    .002033         94.        94.        94.          5          0          0        .00      34.19    1035.00
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*SECNO 244.600
   244.600      3.60   1889.80       .00       .00   1890.83      1.03       .00       .02   1896.20
    1025.0        .0    1025.0        .0        .0     126.0        .0        .2        .1   1896.20
       .00       .00      8.14       .00      .000      .014      .000      .000   1886.20   1000.01
   .001366        1.        1.        1.         3         0         0       .00     35.00   1035.00


*SECNO 450.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

   450.000      3.03   1890.03   1890.03       .00   1891.54      1.51       .37       .14   1897.00
    1025.0        .0    1025.0        .0        .0     104.0        .0        .8        .2   1897.00
       .01       .00      9.85       .00      .000      .014      .000      .000   1887.00   1000.70
   .002416       205.      205.      205.        20        11         0       .00     34.61   1035.30


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   544.000      3.90   1891.10   1891.10       .00   1892.71      1.61       .21       .03   1897.20
    1025.0        .0    1025.0        .0        .0     100.7        .0       1.0        .3   1897.20
       .01       .00     10.18       .00      .000      .014      .000      .000   1887.20   1009.15
   .002165        94.       94.       94.        20        11         0       .00     31.69   1040.85


*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   600.000      3.91   1891.31   1891.31       .00   1892.92      1.61       .12       .00   1897.40
    1025.0        .0    1025.0        .0        .0     100.7        .0       1.1        .4   1897.70
       .01       .00     10.18       .00      .000      .014      .000      .000   1887.40   1009.14
   .002156        56.       56.       56.         3         5         0       .00     31.55   1040.69


*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   700.000      3.90   1891.60   1891.60       .00   1893.21      1.61       .22       .00   1897.70
    1025.0        .0    1025.0        .0        .0     100.8        .0       1.4        .4   1897.70
       .02       .00     10.17       .00      .000      .014      .000      .000   1887.70   1009.15
   .002163       100.      100.      100.         2         5         0       .00     31.69   1040.85


*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1200.000      3.90   1893.20   1893.20       .00   1894.81      1.60      1.08       .00   1899.30
    1025.0        .0    1025.0        .0        .0     100.8        .0       2.5        .8   1899.30
       .03       .00     10.17       .00      .000      .014      .000      .000   1889.30   1009.15
   .002158       500.      500.      500.        20         5         0       .00     31.70   1040.85


*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1700.000      3.90   1894.90   1894.90       .00   1896.51      1.61      1.08       .00   1901.00
    1025.0        .0    1025.0        .0        .0     100.8        .0       3.7       1.2   1901.00
       .04       .00     10.17       .00      .000      .014      .000      .000   1891.00   1009.15
   .002160       500.      500.      500.        20         5         0       .00     31.70   1040.85


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 CCHV=      .100 CEHV=      .300
 *SECNO 2000.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  2000.000      3.90   1895.90   1895.90       .00   1897.51      1.61       .65       .00   1902.00
    1025.0        .0    1025.0        .0        .0     100.8        .0       4.4       1.4   1902.00
       .05       .00     10.17       .00      .000      .014      .000      .000   1892.00   1009.15
   .002160       300.      300.      300.        20         5         0       .00     31.70   1040.85
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*SECNO 2200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000      3.90   1896.50   1896.50       .00   1898.11      1.61       .43       .00   1902.60
    1025.0        .0    1025.0        .0        .0     100.8        .0       4.8       1.5   1902.60
       .06        .00     10.17       .00      .000      .014      .000      .000   1892.60   1009.15
   .002160       200.      200.      200.         4         5         0       .00     31.70   1040.85


1490 NH CARD USED
*SECNO 3724.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      3.94   1901.54   1901.54       .00   1903.14      1.61      3.28       .00   1907.60
    1025.0        .0    1025.0        .0        .0     100.8        .0       8.4       2.6   1907.60
       .10        .00     10.17       .00      .000      .014      .000      .000   1897.60   1305.90
   .002147      1524.     1524.     1524.         3         5         0       .00     31.51   1337.40


CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  3823.000      4.55   1902.55       .00       .00   1903.35       .80       .13       .08   1908.50
    1025.0        .0    1025.0        .0        .0     142.6        .0       8.6       2.7   1908.50
       .10        .00      7.19       .00      .000      .014      .000      .000   1898.00   1000.01
   .000863       99.       99.       99.         3         0         0       .00     34.83   1034.83


*SECNO 4020.000

3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=       1  TARGET=      128.200
 ELENCL=   1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      3.96   1902.56       .00       .00   1903.64      1.08       .21       .08   1909.20
    1025.0        .0    1025.0        .0        .0     122.8        .0       9.2       2.9   1909.10
       .11        .00      8.35       .00      .000      .014      .000      .000   1898.60   1603.18
   .001344      197.      197.      197.         3         0         0       .00     33.97   1637.15


*SECNO 4060.000

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=       1  TARGET=      116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1909.30

  4060.000      3.85   1902.55       .00       .00   1903.73      1.18       .06       .03 100000.00
    1025.0        .0    1025.0        .0        .0     117.8        .0       9.3       2.9   1909.30
       .11        .00      8.70       .00      .000      .014      .000      .000   1898.70   1604.10
   .001519       40.       40.       40.         2         0         0       .00     33.65   1637.75


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3470 ENCROACHMENT STATIONS=     1603.9    1721.6  TYPE=       1  TARGET=      117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      4.06   1902.86       .00       .00   1903.85      1.00       .07       .05   1909.30
    1281.0        .0    1281.0        .0        .0     160.0        .0       9.5       2.9   1909.30
       .11        .00      8.01       .00      .000      .014      .000      .000   1898.80   1604.06
   .001127       55.       55.       55.         3         0         0       .00     39.48   1643.54


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.40


3470 ENCROACHMENT STATIONS=          .0      56.3  TYPE=      1  TARGET=       56.299
  4188.000      4.10   1903.50       .00       .00   1904.05       .54       .06       .14   1915.00
    1281.0        .0    1281.0        .0        .0     216.3        .0       9.8       3.0   1914.80
       .12        .00      5.92       .00       .000      .014      .000      .000   1899.40       .07
   .000575       73.       73.       73.         2         0         0       .00     52.75     52.83


*SECNO 4189.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.60 MAX ELLC=  1909.70


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1914.80 ELREA=       1914.60

  4189.000      4.05   1903.45       .00       .00   1904.10       .64       .00       .05   1914.80
    1281.0        .0    1281.0        .0        .0     199.2        .0       9.8       3.0   1914.60
       .12        .00      6.43       .00       .000      .014      .000      .000   1899.40       .06
   .000695         1.        1.        1.         2         0         0    -14.47     52.74     52.80


*SECNO 4246.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.80 MAX ELLC=  1910.20


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1915.00 ELREA=       1914.80

  4246.000      3.49   1903.39       .00       .00   1904.26       .87       .05       .11   1915.00
    1281.0        .0    1281.0        .0        .0     171.6        .0      10.1       3.1   1914.80
       .12        .00      7.46       .00       .000      .014      .000      .000   1899.90       .07
   .001114        57.       57.       57.         3         0         0    -12.47     52.73     52.80


*SECNO 4247.000
  4247.000      3.78   1903.68       .00       .00   1904.32       .64       .00       .07   1915.00
    1281.0        .0    1281.0        .0        .0     199.5        .0      10.1       3.1   1914.80
       .12        .00      6.42       .00       .000      .014      .000      .000   1899.90       .07
   .000742         1.        1.        1.         3         0         0       .00     52.75     52.83
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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CCHV=      .100 CEHV=      .300
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4360.000      4.86   1905.76   1905.76       .00   1907.53      1.77       .13       .34   1911.40
    1281.0        .0    1281.0        .0        .0     120.0        .0      10.5       3.2   1911.40
       .12        .00     10.67       .00       .000      .014      .000      .000   1900.90   1011.29
   .002085       113.      113.      113.        20        11         0       .00     34.43   1045.71


*SECNO 4831.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4831.000      4.86   1909.66   1909.66       .00   1911.43      1.76       .98       .00   1915.30
    1281.0        .0    1281.0        .0        .0     120.2        .0      11.8       3.6   1915.30
       .13        .00     10.66       .00       .000      .014      .000      .000   1904.80   1011.28
   .002075       471.      471.      471.        20         5         0       .00     34.45   1045.72


*SECNO 4920.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4920.000      4.86   1910.36   1910.36       .00   1912.13      1.76       .18       .00   1916.00
    1281.0        .0    1281.0        .0        .0     120.2        .0      12.0       3.6   1916.00
       .13        .00     10.66       .00       .000      .014      .000      .000   1905.50   1011.28
   .002077        89.       89.       89.        20         5         0       .00     34.44   1045.72


*SECNO 5005.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5005.000      4.86   1911.06   1911.06       .00   1912.83      1.76       .18       .00   1916.70
    1281.0        .0    1281.0        .0        .0     120.2        .0      12.3       3.7   1916.70
       .14        .00     10.66       .00       .000      .014      .000      .000   1906.20   1011.28
   .002077        85.       85.       85.        20         5         0       .00     34.44   1045.72
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	3.46	1911.66	1911.66	.00	1913.40	1.73	.22	.00	1919.20
1281.0	.0	1281.0	.0	.0	121.2	.0	12.6	3.8	1919.20
.14	.00	10.57	.00	.000	.014	.000	.000	1908.20	1000.01
.002404	100.	100.	100.	20	15	0	.00	35.00	1035.00

*SECNO 5200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5200.000	3.26	1912.06	1912.06	.00	1913.70	1.65	.23	.01	1919.80
1281.0	.0	1281.0	.0	.0	124.4	.0	12.8	3.9	1919.80
.14	.00	10.30	.00	.000	.014	.000	.000	1908.80	1000.01
.002406	95.	95.	95.	2	11	0	.00	38.20	1038.20

*SECNO 5500.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5500.000	2.79	1913.59	1913.59	.00	1915.00	1.41	.72	.02	1921.80
1281.0	.0	1281.0	.0	.0	134.6	.0	13.7	4.2	1921.80
.15	.00	9.51	.00	.000	.014	.000	.000	1910.80	1000.01
.002363	300.	300.	300.	20	11	0	.00	48.20	1048.20

*SECNO 5852.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5852.000	2.63	1915.13	1915.13	.00	1916.40	1.27	.84	.01	1923.50
1281.0	.0	1281.0	.0	.0	141.5	.0	14.8	4.6	1923.50
.16	.00	9.05	.00	.000	.014	.000	.000	1912.50	1466.08
.002383	352.	352.	352.	20	11	0	.00	56.25	1522.33

CCHV= .300 CEHV= .500
*SECNO 5853.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1923.50 ELREA= 1923.50

5853.000	2.64	1915.14	1915.13	.00	1916.41	1.27	.00	.00	1923.50
1281.0	.0	1281.0	.0	.0	141.8	.0	14.8	4.6	1923.50
.16	.00	9.03	.00	.000	.015	.000	.000	1912.50	1466.08
.002716	1.	1.	1.	0	5	0	.00	56.26	1522.33

*SECNO 5973.000

3370 NORMAL BRIDGE, NRD= 32 MIN ELTRD= 1922.00 MAX ELLC= 1924.10

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1924.10 ELREA= 1924.10

5973.000	2.76	1915.86	1915.86	.00	1917.19	1.33	.43	.03	1924.10
1281.0	.0	1281.0	.0	.0	138.2	.0	15.2	4.7	1924.10
.17	.00	9.27	.00	.000	.015	.000	.000	1913.10	1466.08
.004886	120.	120.	120.	20	15	0	-10.62	56.26	1522.33

CCHV= .100 CEHV= .300
*SECNO 5974.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.07

5974.000	3.42	1916.52	.00	.00	1917.26	.74	.00	.06	1923.20
1281.0	.0	1281.0	.0	.0	186.1	.0	15.2	4.7	1923.10
.17	.00	6.88	.00	.000	.015	.000	.000	1913.10	.07
.001135	1.	1.	1.	5	0	0	.00	56.27	56.33

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CCHV=      .100 CEHV=      .300
*SECNO 6092.000
1
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    SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          HL          OLOSS       L-BANK ELEV
    Q           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA         R-BANK ELEV
    TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
    SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .44

  6092.000       2.77    1916.77        .00         .00    1917.54         .77         .28         .01    1922.60
    1281.0          .0    1281.0          .0          .0      181.6         .0        15.8         4.9    1923.10
       .17         .00       7.05        .00        .000       .030        .000        .000    1914.00    1739.21
   .005968        126.        126.        126.           3          0           0         .00       71.32    1810.53


*SECNO 6370.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

  6370.000       3.41    1918.21        .00         .00    1918.70         .49        1.13         .03    1925.40
    1281.0          .0    1281.0          .0          .0      227.4         .0        17.1         5.4    1925.40
       .18         .00       5.63        .00        .000       .030        .000        .000    1914.80    1746.25
   .002955        278.        278.        278.           2          0           0         .00       73.50    1819.75


*SECNO 6828.000
  6828.000       3.38    1919.58        .00         .00    1920.08         .50        1.37         .00    1926.90
    1281.0          .0    1281.0          .0          .0      225.5         .0        19.4         6.2    1928.00
       .21         .00       5.68        .00        .000       .030        .000        .000    1916.20    1790.06
   .003038        458.        458.        458.           2          0           0         .00       73.53    1863.58


*SECNO 7265.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

  7265.000       2.72    1921.22        .00         .00    1922.03         .81        1.86         .09    1930.00
    1281.0          .0    1281.0          .0          .0      177.8         .0        21.5         6.9    1930.90
       .22         .00       7.20        .00        .000       .030        .000        .000    1918.50    1779.57
   .006359        437.        437.        437.           2          0           0         .00       70.91    1850.48


CCHV=      .100 CEHV=      .300
*SECNO 7730.000
  7730.000       2.71    1924.21        .00         .00    1925.02         .82        2.99         .00    1933.50
    1281.0          .0    1281.0          .0          .0      176.4         .0        23.4         7.6    1934.20
       .24         .00       7.26        .00        .000       .030        .000        .000    1921.50    1848.61
   .006520        465.        465.        465.           1          0           0         .00       70.79    1919.39


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   15APR98       13:28:01                                                                    PAGE   25

    SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          HL          OLOSS       L-BANK ELEV
    Q           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA         R-BANK ELEV
    TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
    SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST


*SECNO 8323.000
  8323.000       2.76    1927.96        .00         .00    1928.74         .78        3.71         .00    1937.90
    1281.0          .0    1281.0          .0          .0      180.8         .0        25.8         8.6    1938.90
       .26         .00       7.09        .00        .000       .030        .000        .000    1925.20    2276.56
   .006017        593.        593.        593.           2          0           0         .00       70.88    2347.44


*SECNO 8673.000
  8673.000       2.71    1930.11        .00         .00    1930.92         .81        2.17         .01    1939.90
    1281.0          .0    1281.0          .0          .0      177.7         .0        27.2         9.2    1941.90
       .28         .00       7.21        .00        .000       .030        .000        .000    1927.40    1019.57
   .006367        350.        350.        350.           1          0           0         .00       70.86    1090.43


CCHV=      .300 CEHV=      .500
*SECNO 8754.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLBA=      1941.60 ELRBA=      1941.80

  8754.000       5.02    1932.92    1932.92         .00    1934.82        1.89         .30         .54    1941.60
    1281.0          .0    1281.0          .0          .0      116.0         .0        27.5         9.3    1941.80
       .28         .00      11.04        .00        .000       .015        .000        .000    1927.90       6.09
   .002401         81.         81.         81.          20          14          0         .00       30.86      36.95


*SECNO 8755.000
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 3370 NORMAL BRIDGE, NRD=   9 MIN ELTRD=  1941.60 MAX ELLC=  1941.80

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

   8755.000      5.21   1933.11   1933.11       .00   1935.04      1.93       .00       .02   1941.60
     1281.0        .0    1281.0        .0        .0     114.8        .0      27.5       9.3   1941.80
        .28       .00     11.16       .00      .000      .015      .000      .000   1927.90   1005.82
    .003491        1.        1.        1.         3        19         0     -6.98     31.43   1037.24


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 8860.000

 3370 NORMAL BRIDGE, NRD=  14 MIN ELTRD=  1942.10 MAX ELLC=  1942.30

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1942.30

   8860.000      5.21   1933.61   1933.61       .00   1935.54      1.93       .28       .00   1942.10
     1281.0        .0    1281.0        .0        .0     114.8        .0      27.7       9.3   1942.30
        .28       .00     11.16       .00      .000      .015      .000      .000   1928.40   1005.82
    .003491       79.       79.       79.         3        19          0     -6.98     31.43   1037.24


 *SECNO 8861.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.97

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1948.80

   8861.000      6.51   1934.91   1933.43       .00   1935.84       .93       .00       .30   1942.10
     1281.0        .0    1281.0        .0        .0     165.4        .0      27.7       9.3   1948.80
        .28       .00      7.75       .00      .000      .015      .000      .000   1928.40      3.85
    .000900        1.        1.        1.        25         8         0       .00     35.46     39.31


 1490 NH CARD USED
 *SECNO 9120.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      1661.3    2712.5  TYPE=      1  TARGET=     1051.170
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1945.50

   9120.000      5.35   1936.25   1936.25       .00   1938.07      1.82       .36       .44 100000.00
     1281.0        .0    1281.0        .0        .0     118.4        .0      28.6       9.5   1945.50
        .29       .00     10.82       .00      .000      .015      .000      .000   1930.90   1879.98
    .002405       259.      259.      259.        20        15         0       .00     33.15   1913.13


 CCHV=      .100 CEHV=      .300
 *SECNO 9237.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

   9237.000      1.73   1941.73   1941.73       .00   1942.27       .54       .68       .13   1948.00
     1281.0        .0    1281.0        .0        .0     216.9        .0      29.0       9.8   1950.00
        .29       .00      5.91       .00      .000      .045      .000      .000   1940.00   2132.66
    .029466       117.      117.      117.        20        17         0       .00     203.73   2336.39
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*SECNO 9429.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.47

3470 ENCROACHMENT STATIONS= 1573.0 2815.0 TYPE= 1 TARGET= -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1949.10

9429.000	1.99	1944.09	.00	.00	1944.19	.10	1.88	.04	1948.00
1281.0	.0	1281.0	.0	.0	502.2	.0	30.6	11.2	1949.10
.32	.00	2.55	.00	.000	.045	.000	.000	1942.10	1853.06
.004820	192.	192.	192.	4	0	0	.00	427.79	2280.85

*SECNO 10155.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1567.2 2685.3 TYPE= 1 TARGET= -1567.240

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1953.70 ELREA= 1953.80

10155.000	4.50	1953.20	1953.20	.00	1953.78	.58	7.34	.14	1953.70
1281.0	.0	1281.0	.0	.0	209.1	.0	36.5	16.5	1953.80
.35	.00	6.13	.00	.000	.045	.000	.000	1948.70	2150.03
.033231	726.	726.	726.	13	23	0	.00	202.06	2416.42

*SECNO 10962.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1959.90 ELREA= 1959.30

10962.000	2.60	1959.30	1959.13	.00	1959.37	.07	4.39	22.65	1959.90
1281.0	.0	418.8	862.2	.0	265.0	366.2	44.3	23.8	1959.30
.45	.00	1.58	2.35	.000	.045	.045	.000	1956.70	1445.00
.002138	807.	807.	807.	20	14	0	.00	592.26	2037.26

*SECNO 11614.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1966.90 ELREA= 1965.50

11614.000	4.04	1964.34	1964.34	.00	1964.90	.56	3.56	.15	1966.90
1281.0	.0	1281.0	.0	.0	213.6	.0	50.6	29.9	1965.50
.48	.00	6.00	.00	.000	.045	.000	.000	1960.30	1134.22
.034027	652.	652.	652.	20	15	0	.00	218.05	1352.27

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 12202.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.70

12202.000	5.62	1968.32	.00	.00	1968.56	.24	3.62	.03	1971.40
1281.0	.0	1278.9	2.1	.0	326.1	3.5	54.3	32.1	1974.30
.53	.00	3.92	.62	.000	.045	.045	.000	1962.70	1423.81
.002486	588.	588.	588.	4	0	0	.00	104.68	1812.47

*SECNO 13094.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	5.28	1969.98	.00	.00	1970.12	.14	1.55	.01	1978.00

1281.0	.0	1281.0	.0	.0	426.8	.0	62.0	34.2	1977.60
.61	.00	3.00	.00	.000	.045	.000	.000	1964.70	1521.67
.001286	892.	892.	892.	2	0	0	.00	103.90	1625.56

*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .26

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	2.64	1972.94	.00	.00	1971.84	.90	3.49	.23	1987.80
1281.0	.0	1281.0	.0	.0	168.5	.0	69.4	36.5	1984.20
.65	.00	7.60	.00	.000	.045	.000	.000	1970.10	1702.98
.019382	1073.	1073.	1073.	2	0	0	.00	78.50	1781.47

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
14368.000	2.31	1984.91	1984.91	.00	1985.90	.99	4.33	.03	1985.60
1281.0	.0	1281.0	.0	.0	160.2	.0	70.1	36.8	1985.60
.66	.00	8.00	.00	.000	.045	.000	.000	1982.60	1541.72
.024049	201.	201.	201.	20	11	0	.00	81.56	1623.28

*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 6.16

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1991.90 ELREA= 1988.40

15114.000	6.70	1987.30	.00	.00	1987.40	.09	1.40	.09	1991.90
1281.0	.0	1281.0	.0	.0	527.6	.0	76.0	38.4	1988.40
.74	.00	2.43	.00	.000	.045	.000	.000	1980.60	1658.16
.000635	746.	746.	746.	6	0	0	.00	103.54	1761.69

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1993.60 ELREA= 1993.60

15667.000	2.00	1991.60	1991.60	.00	1992.29	.69	1.06	.18	1993.60
1281.0	.0	1281.0	.0	.0	192.3	.0	80.6	40.0	1993.60
.76	.00	6.66	.00	.000	.045	.000	.000	1989.60	1517.51
.027308	553.	553.	553.	20	17	0	.00	142.44	1659.95

*SECNO 16546.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	3.99	1996.99	.00	.00	1997.15	.16	4.81	.05	2006.80
1281.0	.0	1281.0	.0	.0	399.9	.0	86.6	42.8	2013.90
.84	.00	3.20	.00	.000	.045	.000	.000	1993.00	1551.72
.002273	879.	879.	879.	6	0	0	.00	136.70	1688.42

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CCHV=      .100 CEHV=      .300
*SECNO 17058.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2013.80 ELREA=      2019.00

 17058.000      2.31   2006.91   2006.91       .00   2007.52       .61      2.84       .14   2013.80
    1281.0        .0    1281.0        .0        .0     203.9        .0      90.1      44.6   2019.00
       .86       .00      6.28       .00       .000      .045      .000      .000   2004.60   1516.30
   .028984       512.      512.      512.        20        14         0       .00    171.89   1718.31


*SECNO 17612.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2020.20 ELREA=      2023.60

 17612.000      4.24   2013.44       .00       .00   2013.82       .37      6.27       .02   2020.20
    1281.0        .0    1281.0        .0        .0     261.7        .0      93.1      46.3   2023.60
       .89       .00      4.90       .00       .000      .045      .000      .000   2009.20   1710.59
   .005981       554.      554.      554.         5         0         0       .00     96.80   1872.44


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 18436.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .53

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2028.20 ELREA=      2028.20

 18436.000      2.63   2021.73       .00       .00   2022.36       .64      8.47       .08   2028.20
    1281.0        .0    1281.0        .0        .0     200.2        .0      97.4      48.5   2028.20
       .93       .00      6.40       .00       .000      .045      .000      .000   2019.10   1607.23
   .021630       824.      824.      824.         3         0         0       .00    132.25   1739.48


*SECNO 18462.000
 18462.000      2.37   2022.37       .00       .00   2022.81       .45       .43       .02   2029.60
    1281.0        .0    1281.0        .0        .0     239.0        .0      97.6      48.6   2029.60
       .93       .00      5.36       .00       .000      .045      .000      .000   2020.00     90.77
   .013212        26.       26.       26.         2         0         0       .00    142.00    232.77


*SECNO 18472.000
 18472.000      2.59   2022.59       .00       .00   2022.93       .35       .11       .01   2029.60
    1281.0        .0    1281.0        .0        .0     270.8        .0      97.6      48.6   2029.60
       .93       .00      4.73       .00       .000      .045      .000      .000   2020.00     87.03
   .009046        10.       10.       10.         2         0         0       .00    145.96    232.99


*SECNO 18619.000

3265 DIVIDED FLOW

 18619.000      2.25   2023.85       .00       .00   2024.05       .20      1.10       .01   2026.60
    1281.0        .0    1281.0        .0        .0     354.0        .0      98.7      49.2   2029.60
       .94       .00      3.62       .00       .000      .045      .000      .000   2021.60     76.34
   .006336       147.      147.      147.         2         0         0       .00    218.41    349.08


*SECNO 18710.000

3265 DIVIDED FLOW

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   15APR98      13:28:01                                                                    PAGE   33

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.36

 18710.000      8.49   2024.09       .00       .00   2024.11       .02       .04       .02   2028.60
    1281.0        .0    1281.0        .0        .0    1098.2        .0     100.2      49.7   2029.60
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      .96       .00      1.17       .00      .000      .045      .000      .000   2015.60   1175.09
   .000157       91.       91.       91.         5         0         0       .00    228.97   1438.68


*SECNO 19020.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.87

 19020.000      6.53   2024.13       .00       .00   2024.14       .01       .02       .00   2029.60
    1281.0        .0    1281.0        .0        .0    1875.3        .0     110.8      51.7   2029.60
      1.09       .00       .68       .00      .000      .045      .000      .000   2017.60   1104.72
   .000045       310.      310.      310.         2         0         0       .00    345.09   1449.81


*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 19215.000      3.65   2029.25   2029.25       .00   2030.34      1.09       .03       .32   2033.60
    1281.0        .0    1281.0        .0        .0     152.9        .0     115.3      52.7   2037.60
      1.10       .00      8.38       .00      .000      .045      .000      .000   2025.60   1073.35
   .027650       195.      195.      195.        20        14         0       .00     80.47   1153.82


*SECNO 19802.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.54


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2044.40 ELREA=      2041.30

 19802.000      3.44   2035.44       .00       .00   2035.62       .18      5.19       .09   2044.40
    1281.0        .0    1281.0        .0        .0     373.7        .0     118.9      54.5   2041.30
      1.14       .00      3.43       .00      .000      .045      .000      .000   2032.00   1750.85
   .004300       587.      587.      587.         3         0         0       .00    187.36   1938.21


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 20595.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2048.50 ELREA=      2048.20

 20595.000      2.99   2042.29   2042.29       .00   2042.85       .56      6.96       .11   2048.50
    1281.0        .0    1281.0        .0        .0     212.8        .0     124.2      57.8   2048.20
      1.18       .00      6.02       .00      .000      .045      .000      .000   2039.30   1233.65
   .026928       793.      793.      793.         5        10         0       .00    180.85   1414.50


*SECNO 21291.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.39


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2056.10 ELREA=      2055.50

 21291.000      3.85   2049.25       .00       .00   2049.40       .14      6.51       .04   2056.10
    1281.0        .0    1281.0        .0        .0     421.7        .0     129.3      61.4   2055.50
      1.25       .00      3.04       .00      .000      .045      .000      .000   2045.40   1287.83
   .004698       696.      696.      696.         5         0         0       .00    269.77   1557.60


*SECNO 22138.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .52


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2065.10 ELREA=      2066.70

 22138.000      3.37   2055.97       .00       .00   2056.39       .42      6.91       .08   2065.10
    1281.0        .0    1281.0        .0        .0     247.2        .0     135.8      65.9   2066.70
      1.29       .00      5.18       .00      .000      .045      .000      .000   2052.60   1215.71
   .017536       847.      847.      847.         4         0         0       .00    190.89   1406.60


*SECNO 23230.000

3265 DIVIDED FLOW

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.74

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	3.35	2066.45	.00	.00	2066.64	.18	10.22	.02	2075.50
1281.0	.0	1281.0	.0	.0	371.5	.0	143.5	71.2	2082.30
1.38	.00	3.45	.00	.000	.045	.000	.000	2063.10	1194.34
.005810	1092.	1092.	1092.	2	0	0	.00	231.21	1435.37

*SECNO 24530.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2089.10 ELREA= 2106.50

24530.000	3.04	2078.44	2078.20	.00	2078.79	.35	12.10	.05	2089.10
1281.0	.0	1281.0	.0	.0	270.3	.0	153.1	78.2	2106.50
1.45	.00	4.74	.00	.000	.045	.000	.000	2075.40	1173.25
.017275	1300.	1300.	1300.	13	9	0	.00	235.71	1442.07

*SECNO 25616.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.62

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2100.50 ELREA= 2100.60

25616.000	4.41	2089.51	.00	.00	2089.76	.25	10.96	.01	2100.50
1281.0	.0	1281.0	.0	.0	322.0	.0	160.5	83.3	2100.60
1.53	.00	3.98	.00	.000	.045	.000	.000	2085.10	1344.31
.006608	1086.	1086.	1086.	4	0	0	.00	177.42	1521.74

*SECNO 26383.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2109.80 ELREA= 2105.60

26383.000	4.12	2094.12	.00	.00	2094.39	.27	4.62	.01	2109.80
1281.0	.0	1281.0	.0	.0	308.9	.0	166.1	86.1	2105.60
1.58	.00	4.15	.00	.000	.045	.000	.000	2090.00	1298.93
.005522	767.	767.	767.	3	0	0	.00	139.43	1438.36

*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27000.000	3.97	2105.47	2105.47	.00	2107.05	1.59	4.39	.40	2112.00
1281.0	.0	1281.0	.0	.0	126.6	.0	169.1	87.4	2112.00
1.60	.00	10.12	.00	.000	.030	.000	.000	2101.50	64.07
.009498	617.	617.	617.	20	8	0	.00	39.86	103.93

*SECNO 27303.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

27303.000	3.95	2108.45	2108.45	.00	2110.05	1.60	2.90	.00	2115.00
1281.0	.0	1281.0	.0	.0	126.1	.0	170.0	87.7	2115.00
1.61	.00	10.16	.00	.000	.030	.000	.000	2104.50	64.10
.009614	303.	303.	303.	2	5	0	.00	39.81	103.90

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TW LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	1916.772	1918.292	6092.000	6397.000

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 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  1918.292   1919.630   6397.000   6842.000


 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  1919.630   1921.362   6842.000   7287.000


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  2022.585   2023.848  18472.000  18619.000


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  2023.848   2024.091  18619.000  18710.000


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  2024.091   2024.130  18710.000  19020.000


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS       DSSNO      USSNO
    .00         .00        .00        .00        .00         .00          2  2024.130   2029.247  19020.000  19215.000

 T1      FEMA 50-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      LNLV WASH WITH DIVERSION

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0         3                               .0033                                      1890.1

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2                    -1


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    15APR98       13:28:01                                                                                    PAGE    38

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *PROF 2

 CCHV=      .100 CEHV=      .300
 *SECNO 150.000

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

    150.000       4.31    1890.31    1890.31    1890.10    1892.49       2.18        .00        .00    1896.00
     1746.0         .0     1746.0         .0         .0      147.5         .0         .0         .0    1896.00
        .00        .00      11.84        .00       .000       .014       .000       .000    1886.00    1000.01
    .003054         0.         0.         0.          0          8          0        .00      34.24    1035.04


 *SECNO 243.600

 3265 DIVIDED FLOW

    243.600       4.85    1891.05        .00        .00    1892.77       1.73        .24        .04    1896.20
     1746.0         .0     1746.0         .0         .0      165.5         .0         .3         .1    1896.20
        .00        .00      10.55        .00       .000       .014       .000       .000    1886.20    1000.01
    .002193        94.        94.        94.          6          0          0        .00      34.20    1035.00


 *SECNO 244.600
    244.600       5.13    1891.33        .00        .00    1892.80       1.47        .00        .03    1896.20
     1746.0         .0     1746.0         .0         .0      179.4         .0         .3         .1    1896.20
        .00        .00       9.73        .00       .000       .014       .000       .000    1886.20    1000.00
    .001339         1.         1.         1.          3          0          0        .00      35.00    1035.01


 *SECNO 450.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
450.000	4.32	1891.32	1891.32	.00	1893.46	2.14	.35	.20	1897.00
1746.0	.0	1746.0	.0	.0	148.8	.0	1.1	.2	1897.00
.01	.00	11.73	.00	.000	.014	.000	.000	1887.00	1000.57
.002311	205.	205.	205.	4	11	0	.00	34.86	1035.43

*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

544.000	5.35	1892.55	1892.55	.00	1894.66	2.11	.20	.00	1897.20
1746.0	.0	1746.0	.0	.0	149.9	.0	1.4	.3	1897.20
.01	.00	11.65	.00	.000	.014	.000	.000	1887.20	1006.98
.002020	94.	94.	94.	20	11	0	.00	36.05	1043.02

*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

600.000	5.37	1892.77	1892.77	.00	1894.87	2.11	.11	.00	1897.40
1746.0	.0	1746.0	.0	.0	149.9	.0	1.6	.4	1897.70
.01	.00	11.65	.00	.000	.014	.000	.000	1887.40	1006.95
.002012	56.	56.	56.	3	5	0	.00	35.86	1042.81

*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

700.000	5.35	1893.05	1893.05	.00	1895.16	2.11	.20	.00	1897.70
1746.0	.0	1746.0	.0	.0	150.0	.0	2.0	.4	1897.70
.01	.00	11.64	.00	.000	.014	.000	.000	1887.70	1006.97
.002017	100.	100.	100.	3	5	0	.00	36.05	1043.03

*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1200.000	5.35	1894.65	1894.65	.00	1896.76	2.10	1.01	.00	1899.30
1746.0	.0	1746.0	.0	.0	150.1	.0	3.7	.9	1899.30
.03	.00	11.63	.00	.000	.014	.000	.000	1889.30	1006.97
.002013	500.	500.	500.	20	5	0	.00	36.06	1043.03

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1700.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1700.000	5.35	1896.35	1896.35	.00	1898.46	2.10	1.01	.00	1901.00
1746.0	.0	1746.0	.0	.0	150.1	.0	5.4	1.3	1901.00
.04	.00	11.63	.00	.000	.014	.000	.000	1891.00	1006.97
.002013	500.	500.	500.	20	5	0	.00	36.06	1043.03

CCHV= .100 CEHV= .300
*SECNO 2000.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2000.000	5.35	1897.35	1897.35	.00	1899.46	2.10	.60	.00	1902.00
1746.0	.0	1746.0	.0	.0	150.1	.0	6.5	1.5	1902.00
.04	.00	11.63	.00	.000	.014	.000	.000	1892.00	1006.97
.002013	300.	300.	300.	20	5	0	.00	36.06	1043.03

*SECNO 2200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2200.000	5.35	1897.95	1897.95	.00	1900.06	2.10	.40	.00	1902.60
1746.0	.0	1746.0	.0	.0	150.1	.0	7.1	1.7	1902.60
.05	.00	11.63	.00	.000	.014	.000	.000	1892.60	1006.97
.002013	200.	200.	200.	20	5	0	.00	36.06	1043.03

1490 NH CARD USED
*SECNO 3724.000

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3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1907.60 ELREA=       1907.60

  3724.000       5.40   1903.00   1903.00       .00   1905.10       2.10       3.06       .00   1907.60
    1746.0         .0    1746.0        .0        .0    150.1         .0       12.4        2.9   1907.60
       .09        .00     11.63       .00       .000    .014       .000       .000   1897.60   1303.70
   .002003     1524.      1524.     1524.        20       5          0        .00      35.90   1339.60


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47

  3823.000       6.14   1904.14       .00       .00   1905.32       1.18        .13       .09   1908.50
    1746.0         .0    1746.0        .0        .0    200.3         .0       12.8        3.0   1908.50
       .09        .00      8.72       .00       .000    .014       .000       .000   1898.00   1000.00
   .000927       99.       99.       99.          4        0          0        .00      37.24   1037.24


*SECNO 4020.000

3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=       1  TARGET=       128.200
 ELENCL=    1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.20 ELREA=       1909.10

  4020.000       5.54   1904.14       .00       .00   1905.63       1.49        .21       .09   1909.20
    1746.0         .0    1746.0        .0        .0    178.3         .0       13.6        3.2   1909.10
       .09        .00      9.79       .00       .000    .014       .000       .000   1898.60   1603.17
   .001299      197.      197.      197.          3        0          0        .00      36.34   1639.51


*SECNO 4060.000

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=       1  TARGET=       116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     100000.00 ELREA=       1909.30

  4060.000       5.42   1904.12       .00       .00   1905.72       1.59        .05       .03 100000.00
    1746.0         .0    1746.0        .0        .0    172.5         .0       13.8        3.2   1909.30
       .10        .00     10.12       .00       .000    .014       .000       .000   1898.70   1604.10
   .001428       40.       40.       40.          2        0          0        .00      35.99   1640.09


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=     1603.9    1721.6  TYPE=       1  TARGET=       117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.30 ELREA=       1909.30

  4115.000       5.37   1904.17       .00       .00   1905.82       1.65        .08       .03   1909.30
    2183.0         .0    2183.0        .0        .0    212.0         .0       14.0        3.3   1909.30
       .10        .00     10.30       .00       .000    .014       .000       .000   1898.80   1604.05
   .001377       55.       55.       55.          2        0          0        .00      39.50   1643.55


CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65


3470 ENCROACHMENT STATIONS=          .0      56.3  TYPE=       1  TARGET=        56.299
  4188.000       6.01   1905.41       .00       .00   1906.15        .74        .06       .27   1915.00
    2183.0         .0    2183.0        .0        .0    317.1         .0       14.5        3.4   1914.80
```

.10	.00	6.88	.00	.000	.014	.000	.000	1899.40	.06
.000505	73.	73.	73.	3	0	0	.00	52.78	52.84

*SECNO 4189.000

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.60 MAX ELLC= 1909.70

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	5.95	1905.35	.00	.00	1906.22	.86	.00	.06	1914.80
2183.0	.0	2183.0	.0	.0	292.5	.0	14.5	3.4	1914.60
.10	.00	7.46	.00	.000	.014	.000	.000	1899.40	.05
.000612	1.	1.	1.	2	0	0	-21.24	52.76	52.81

*SECNO 4246.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.80 MAX ELLC= 1910.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	5.40	1905.30	.00	.00	1906.35	1.05	.04	.09	1915.00
2183.0	.0	2183.0	.0	.0	265.8	.0	14.9	3.4	1914.80
.10	.00	8.21	.00	.000	.014	.000	.000	1899.90	.05
.000822	57.	57.	57.	2	0	0	-19.30	52.75	52.81

*SECNO 4247.000

4247.000	5.70	1905.60	.00	.00	1906.42	.82	.00	.07	1915.00
2183.0	.0	2183.0	.0	.0	301.0	.0	14.9	3.4	1914.80
.10	.00	7.25	.00	.000	.014	.000	.000	1899.90	.06
.000594	1.	1.	1.	2	0	0	.00	52.78	52.84

CCHV= .100 CEHV= .300
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4360.000	6.50	1907.40	1907.40	.00	1909.63	2.23	.11	.42	1911.40
2183.0	.0	2183.0	.0	.0	182.1	.0	15.5	3.5	1911.40
.10	.00	11.99	.00	.000	.014	.000	.000	1900.90	1007.99
.001923	113.	113.	113.	20	8	0	.00	41.01	1049.01

*SECNO 4831.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4831.000	6.49	1911.29	1911.29	.00	1913.53	2.25	.91	.00	1915.30
2183.0	.0	2183.0	.0	.0	181.5	.0	17.5	4.0	1915.30
.12	.00	12.03	.00	.000	.014	.000	.000	1904.80	1008.02
.001941	471.	471.	471.	20	5	0	.00	40.95	1048.98

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4920.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4920.000	6.49	1911.99	1911.99	.00	1914.23	2.24	.17	.00	1916.00
2183.0	.0	2183.0	.0	.0	181.7	.0	17.8	4.1	1916.00
.12	.00	12.02	.00	.000	.014	.000	.000	1905.50	1008.02
.001936	89.	89.	89.	20	5	0	.00	40.97	1048.98

*SECNO 5005.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5005.000	6.49	1912.69	1912.69	.00	1914.93	2.24	.16	.00	1916.70
2183.0	.0	2183.0	.0	.0	181.6	.0	18.2	4.2	1916.70
.12	.00	12.02	.00	.000	.014	.000	.000	1906.20	1008.02
.001939	85.	85.	85.	20	5	0	.00	40.96	1048.98

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*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000      4.93   1913.13   1913.13       .00   1915.62      2.49       .21       .07   1919.20
    2183.0        .0     2183.0        .0        .0    172.5        .0      18.6       4.2   1919.20
       .12       .00      12.66       .00      .000     .014      .000      .000   1908.20   1000.01
   .002360       100.      100.       100.       20       15         0       .00     35.00   1035.00


*SECNO 5200.000

3301 HV CHANGED MORE THAN HVINS

  5200.000      5.14   1913.94       .00       .00   1915.86      1.93       .19       .06   1919.80
    2183.0        .0     2183.0        .0        .0    196.0        .0      19.0       4.3   1919.80
       .12       .00      11.14       .00      .000     .014      .000      .000   1908.80   1000.01
   .001708       95.       95.        95.        3        0         0       .00     38.20   1038.20


*SECNO 5500.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3720 CRITICAL DEPTH ASSUMED
  5500.000      3.98   1914.78   1914.78       .00   1916.79      2.01       .58       .03   1921.80
    2183.0        .0     2183.0        .0        .0    191.8        .0      20.3       4.6   1921.80
       .13       .00      11.38       .00      .000     .014      .000      .000   1910.80   1000.01
   .002235       300.      300.       300.       20       15         0       .00     48.20   1048.20


*SECNO 5852.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5852.000      3.70   1916.20   1916.20       .00   1918.02      1.81       .78       .02   1923.50
    2183.0        .0     2183.0        .0        .0    201.9        .0      21.9       5.0   1923.50
       .14       .00      10.81       .00      .000     .014      .000      .000   1912.50   1466.07
   .002215       352.      352.       352.       20       11         0       .00     56.27   1522.33


CCHV=      .300 CEHV=      .500
*SECNO 5853.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1923.50 ELREA=      1923.50

  5853.000      3.71   1916.21   1916.21       .00   1918.02      1.81       .00       .00   1923.50
    2183.0        .0     2183.0        .0        .0    202.3        .0      21.9       5.0   1923.50
       .14       .00      10.79       .00      .000     .015      .000      .000   1912.50   1466.07
   .002527         1.        1.         1.         0        5         0       .00     56.27   1522.33


*SECNO 5973.000

3370 NORMAL BRIDGE, NRD=  32 MIN ELTRD=  1922.00 MAX ELLC=  1924.10

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1924.10 ELREA=      1924.10

  5973.000      3.89   1916.99   1916.99       .00   1918.89      1.91       .43       .05   1924.10
    2183.0        .0     2183.0        .0        .0    197.0        .0      22.5       5.2   1924.10
       .14       .00      11.08       .00      .000     .015      .000      .000   1913.10   1466.07
   .005404       120.      120.       120.       20       19         0    -15.15     56.27   1522.33


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 5974.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.25

  5974.000      4.83   1917.93       .00       .00   1918.98      1.05       .00       .09   1923.20
    2183.0        .0     2183.0        .0        .0    265.5        .0      22.5       5.2   1923.10
       .14       .00       8.22       .00      .000     .015      .000      .000   1913.10       .05
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   .001070        1.        1.        1.         5         0         0       .00     56.28     56.33


CCHV=     .100 CEHV=     .300
*SECNO 6092.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .56

  6092.000      4.44   1918.44       .00       .00   1919.23       .78       .22       .03   1922.60
    2183.0        .0    2183.0        .0        .0     307.0        .0      23.3       5.4   1923.10
       .15       .00      7.11       .00      .000      .030      .000      .000   1914.00   1735.70
   .003442      126.      126.      126.         3         0         0       .00     78.19   1813.89


*SECNO 6370.000
  6370.000      4.60   1919.40       .00       .00   1920.14       .73       .90       .01   1925.40
    2183.0        .0    2183.0        .0        .0     318.2        .0      25.3       5.9   1925.40
       .16       .00      6.86       .00      .000      .030      .000      .000   1914.80   1743.88
   .003066      278.      278.      278.         2         0         0       .00     78.24   1822.12


*SECNO 6828.000
  6828.000      4.61   1920.81       .00       .00   1921.54       .73      1.40       .00   1926.90
    2183.0        .0    2183.0        .0        .0     318.8        .0      28.7       6.7   1928.00
       .18       .00      6.85       .00      .000      .030      .000      .000   1916.20   1787.53
   .003057      458.      458.      458.         0         0         0       .00     78.44   1865.98


*SECNO 7265.000
  7265.000      3.83   1922.33       .00       .00   1923.43      1.10      1.78       .11   1930.00
    2183.0        .0    2183.0        .0        .0     259.8        .0      31.6       7.5   1930.90
       .19       .00      8.40       .00      .000      .030      .000      .000   1918.50   1777.33
   .005709      437.      437.      437.         2         0         0       .00     75.41   1852.74


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=     .100 CEHV=     .300
*SECNO 7730.000
  7730.000      3.64   1925.14       .00       .00   1926.37      1.24      2.90       .04   1933.50
    2183.0        .0    2183.0        .0        .0     244.8        .0      34.3       8.3   1934.20
       .21       .00      8.92       .00      .000      .030      .000      .000   1921.50   1846.72
   .006849      465.      465.      465.         2         0         0       .00     74.55   1921.28


*SECNO 8323.000
  8323.000      3.81   1929.01       .00       .00   1930.13      1.12      3.74       .01   1937.90
    2183.0        .0    2183.0        .0        .0     257.5        .0      37.7       9.3   1938.90
       .23       .00      8.48       .00      .000      .030      .000      .000   1925.20   2274.49
   .005839      593.      593.      593.         2         0         0       .00     75.03   2349.52


*SECNO 8673.000
  8673.000      3.71   1931.11       .00       .00   1932.29      1.18      2.14       .02   1939.90
    2183.0        .0    2183.0        .0        .0     249.9        .0      39.7       9.9   1941.90
       .24       .00      8.73       .00      .000      .030      .000      .000   1927.40   1017.58
   .006421      350.      350.      350.         2         0         0       .00     74.83   1092.42


CCHV=     .300 CEHV=     .500
*SECNO 8754.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8754.000      6.77   1934.67   1934.67       .00   1937.10      2.43       .29       .62   1941.60
    2183.0        .0    2183.0        .0        .0     174.6        .0      40.1      10.0   1941.80
       .24       .00     12.50       .00      .000      .015      .000      .000   1927.90      3.46
   .002251       81.       81.       81.        20        14         0       .00     36.26     39.72


*SECNO 8755.000

3370 NORMAL BRIDGE, NRD=    9 MIN ELTRD=  1941.60 MAX ELLC=  1941.80

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 7185 MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1941.60 ELREA=      1941.80

  8755.000      7.00   1934.90   1934.90       .00   1937.35      2.46       .00       .02   1941.60
    2183.0        .0    2183.0        .0        .0     173.6        .0      40.1      10.0   1941.80
       .24       .00     12.58       .00      .000      .015      .000      .000   1927.90   1003.12
   .003378        1.        1.        1.         3        12         0     -9.38     36.96   1040.08


*SECNO 8860.000

3370 NORMAL BRIDGE, NRD=  14 MIN ELTRD=  1942.10 MAX ELLC=  1942.30

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1942.30

  8860.000      7.00   1935.40   1935.40       .00   1937.85      2.46       .27       .00   1942.10
    2183.0        .0    2183.0        .0        .0     173.6        .0      40.4      10.1   1942.30
       .24       .00     12.58       .00      .000      .015      .000      .000   1928.40   1003.12
   .003378       79.       79.       79.         3        12         0     -9.38     36.96   1040.08


*SECNO 8861.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.93

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1942.10 ELREA=      1948.80

  8861.000      8.62   1937.02   1935.18       .00   1938.23      1.21       .00       .37   1942.10
    2183.0        .0    2183.0        .0        .0     247.1        .0      40.4      10.1   1948.80
       .24       .00      8.83       .00      .000      .015      .000      .000   1928.40       .10
   .000909        1.        1.        1.        23         8         0       .00     43.21     43.30


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1661.3     2712.5  TYPE=       1  TARGET=     1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1945.50

  9120.000      7.02   1937.92   1937.92       .00   1940.23      2.31       .35       .55 100000.00
    2183.0        .0    2183.0        .0        .0     179.0        .0      41.7      10.3   1945.50
       .25       .00     12.19       .00      .000      .015      .000      .000   1930.90   1876.99
   .002248       259.      259.      259.        20        15         0       .00     39.51   1916.50


CCHV=      .100 CEHV=      .300
*SECNO 9237.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

  9237.000      2.23   1942.23   1942.23       .00   1942.91       .68       .64       .16   1948.00
    2183.0        .0    2183.0        .0        .0     329.0        .0      42.4      10.7   1950.00
       .25       .00      6.63       .00      .000      .045      .000      .000   1940.00   2130.54
   .027302       117.      117.      117.        20        17         0       .00    245.11   2375.65


*SECNO 9429.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.45

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=     1573.0     2815.0  TYPE=       1  TARGET=    -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1948.00 ELREA=       1949.10

  9429.000       2.48    1944.58        .00        .00    1944.73        .15       1.76        .05    1948.00
    2183.0         .0     2183.0         .0         .0      712.5         .0       44.7       12.2    1949.10
       .27        .00       3.06        .00       .000       .045       .000       .000    1942.10    1843.38
   .004552       192.       192.       192.          4          0          0        .00     441.70    2285.08


*SECNO 10155.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1567.2     2685.3  TYPE=       1  TARGET=    -1567.240
 10155.000       5.11    1953.81    1953.81        .00    1953.91        .10       2.97        .00    1953.70
    2183.0     1324.9      858.1         .0      499.5      372.6         .0       57.9       22.5    1953.80
       .35       2.65       2.30        .02       .045       .045       .000       .000    1948.70    1627.98
   .003707       726.       726.       726.         20         23          0        .00     792.33    2420.31


*SECNO 10962.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1959.90 ELREA=       1959.30

 10962.000       2.61    1959.31    1959.31        .00    1959.51        .20       3.77        .03    1959.90
    2183.0         .0      716.8     1466.2         .0      267.6      369.8       71.9       35.4    1959.30
       .41        .00       2.68       3.96       .000       .045       .045       .000    1956.70    1444.93
   .006064       807.       807.       807.         13         20          0        .00     594.65    2039.58


*SECNO 11614.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .62

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1966.90 ELREA=       1965.50

 11614.000       4.96    1965.26    1964.88        .00    1965.54        .28       6.00        .02    1966.90
    2183.0         .0     2183.0         .0         .0      517.8         .0       80.5       43.5    1965.50
       .46        .00       4.22        .00       .000       .045       .000       .000    1960.30    1100.24
   .015600       652.       652.       652.         13         15          0        .00     500.49    1611.85


*SECNO 12202.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   2.03

 12202.000       6.44    1969.14        .00        .00    1969.57        .43       3.99        .05    1971.40
    2183.0         .0     2130.0       53.0         .0      399.6       37.3       86.9       48.0    1974.30
       .49        .00       5.33       1.42       .000       .045       .045       .000    1962.70    1421.82
   .003771       588.       588.       588.          4          0          0        .00     156.15    1817.48


*SECNO 13094.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   1.57


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1978.00 ELREA=       1977.60

 13094.000       6.71    1971.41        .00        .00    1971.63        .22       2.04        .02    1978.00
    2183.0         .0     2183.0         .0         .0      586.0         .0       97.4       50.8    1977.60
       .55        .00       3.73        .00       .000       .045       .000       .000    1964.70    1519.08
   .001532       892.       892.       892.          2          0          0        .00     117.38    1636.45


*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .38
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
14167.000	4.10	1974.40	.00	.00	1975.29	.89	3.46	.20	1987.80
2183.0	.0	2183.0	.0	.0	288.6	.0	108.2	53.3	1984.20
.59	.00	7.56	.00	.000	.045	.000	.000	1970.30	1700.01
.010662	1073.	1073.	1073.	3	0	0	.00	86.03	1786.03

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14368.000	3.33	1985.93	1985.93	.00	1987.14	1.21	2.71	.10	1985.60
2183.0	.7	2169.9	12.4	.5	245.4	9.4	109.4	53.8	1985.60
.60	1.31	8.84	1.32	.045	.045	.045	.000	1982.60	1536.72
.017664	201.	201.	201.	20	8	0	.00	145.75	1682.46

*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1991.90 ELREA= 1988.40

15114.000	8.18	1988.78	.00	.00	1988.94	.16	1.70	.11	1991.90
2183.0	.0	2181.9	1.1	.0	687.6	3.4	117.6	56.2	1988.40
.66	.00	3.17	.32	.000	.045	.045	.000	1980.60	1652.56
.000844	746.	746.	746.	6	0	0	.00	129.51	1782.07

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
15667.000	2.59	1992.19	1992.19	.00	1993.14	.95	1.33	.24	1993.60
2183.0	.0	2183.0	.0	.0	279.2	.0	123.7	57.9	1993.60
.68	.00	7.82	.00	.000	.045	.000	.000	1989.60	1513.79
.024491	553.	553.	553.	20	17	0	.00	149.77	1663.56

*SECNO 16546.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.12

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	5.02	1998.02	.00	.00	1998.27	.25	5.06	.07	2006.80
2183.0	.0	2183.0	.0	.0	543.5	.0	132.0	60.9	2013.90
.75	.00	4.02	.00	.000	.045	.000	.000	1993.00	1548.04
.002509	879.	879.	879.	6	0	0	.00	142.10	1690.13

CCHV= .100 CEHV= .300
*SECNO 17058.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	2.85	2007.45	2007.45	.00	2008.27	.81	2.98	.17	2013.80
2183.0	.0	2183.0	.0	.0	301.5	.0	137.0	62.8	2019.00
.76	.00	7.24	.00	.000	.045	.000	.000	2004.60	1508.33
.025467	512.	512.	512.	20	11	0	.00	186.13	1720.70

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 17612.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.88

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2020.20 ELREA= 2023.60

17612.000	5.62	2014.82	.00	.00	2015.14	.32	6.82	.05	2020.20
2183.0	.0	2183.0	.0	.0	484.4	.0	142.0	65.5	2023.60
.80	.00	4.51	.00	.000	.045	.000	.000	2009.20	1644.30
.007236	554.	554.	554.	6	0	0	.00	235.84	1880.15

*SECNO 18436.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2028.20 ELREA= 2028.20

18436.000	3.62	2022.72	.00	.00	2023.21	.49	8.02	.05	2028.20
2183.0	.0	2183.0	.0	.0	388.4	.0	150.2	69.8	2028.20
.84	.00	5.62	.00	.000	.045	.000	.000	2019.10	1586.73
.013797	824.	824.	824.	4	0	0	.00	222.55	1809.28

*SECNO 18462.000

18462.000	2.95	2022.95	.00	.00	2023.66	.71	.38	.06	2029.60
2183.0	.0	2183.0	.0	.0	323.6	.0	150.4	70.0	2029.60
.84	.00	6.75	.00	.000	.045	.000	.000	2020.00	81.04
.015377	26.	26.	26.	3	0	0	.00	152.31	233.35

*SECNO 18472.000

18472.000	3.26	2023.26	.00	.00	2023.80	.54	.12	.02	2029.60
2183.0	.0	2183.0	.0	.0	371.4	.0	150.5	70.0	2029.60
.84	.00	5.88	.00	.000	.045	.000	.000	2020.00	75.81
.010194	10.	10.	10.	3	0	0	.00	157.85	233.66

*SECNO 18619.000

18619.000	3.09	2024.69	.00	.00	2024.92	.23	1.09	.03	2026.60
2183.0	.0	2183.0	.0	.0	567.2	.0	152.1	70.7	2029.60
.85	.00	3.85	.00	.000	.045	.000	.000	2021.60	63.69
.005638	147.	147.	147.	2	0	0	.00	292.55	156.24

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 18710.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.45

18710.000	9.36	2024.96	.00	.00	2025.01	.04	.07	.02	2028.60
2183.0	.0	2183.0	.0	.0	1306.2	.0	154.1	71.3	2029.60
.87	.00	1.67	.00	.000	.045	.000	.000	2015.60	1166.36
.000284	91.	91.	91.	4	0	0	.00	247.88	1445.23

*SECNO 19020.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.87

19020.000	7.44	2025.04	.00	.00	2025.05	.02	.04	.00	2029.60
2183.0	.0	2183.0	.0	.0	2194.1	.0	166.5	73.5	2029.60
.95	.00	.99	.00	.000	.045	.000	.000	2017.60	1095.65
.000081	310.	310.	310.	2	0	0	.00	358.13	1453.78

*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

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3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 19215.000      4.66   2030.26   2030.26       .00   2030.93       .67       .06       .20   2033.60
    2183.0        .0    2183.0        .0        .0     331.4        .0     172.2      74.8   2037.60
      .96        .00      6.59       .00      .000      .045      .000      .000   2025.60   1033.73
   .024592      195.      195.      195.        20        16         0       .00    230.20   1263.94


*SECNO 19802.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.25


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2044.40 ELREA=      2041.30

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    SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 19802.000      4.18   2036.18       .00        .00   2036.45       .27      5.48       .04   2044.40
    2183.0        .0    2183.0        .0        .0     520.3        .0     177.9      77.8   2041.30
      1.00       .00      4.20       .00      .000      .045      .000      .000   2032.00   1741.94
   .004877      587.      587.      587.         5         0         0       .00    211.78   1953.72


*SECNO 20595.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .49


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2048.50 ELREA=      2048.20

 20595.000      3.58   2042.88       .00        .00   2043.59       .71      7.01       .13   2048.50
    2183.0        .0    2183.0        .0        .0     323.4        .0     185.6      81.4   2048.20
      1.03       .00      6.75       .00      .000      .045      .000      .000   2039.30   1230.99
   .020662      793.      793.      793.         3         0         0       .00    189.72   1420.71


*SECNO 21291.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.99


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2056.10 ELREA=      2055.50

 21291.000      4.45   2049.85       .00        .00   2050.06       .21      6.42       .05   2056.10
    2183.0        .0    2183.0        .0        .0     589.1        .0     192.9      85.4   2055.50
      1.09       .00      3.71       .00      .000      .045      .000      .000   2045.40   1121.17
   .005206      696.      696.      696.         5         0         0       .00    302.23   1560.35


*SECNO 22138.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .59


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2065.10 ELREA=      2066.70

 22138.000      4.02   2056.62       .00        .00   2057.13       .51      6.98       .09   2065.10
    2183.0        .0    2183.0        .0        .0     381.8        .0     202.3      90.5   2066.70
      1.13       .00      5.72       .00      .000      .045      .000      .000   2052.60   1211.19
   .014968      847.      847.      847.         4         0         0       .00    225.99   1437.19


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    SECNO       DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q           QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 23230.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.53


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2075.50 ELREA=      2082.30

 23230.000      3.96   2067.06       .00        .00   2067.33       .27     10.17       .02   2075.50
    2183.0        .0    2183.0        .0        .0     522.9        .0     213.7      96.6   2082.30
      1.20       .00      4.17       .00      .000      .045      .000      .000   2063.10   1191.48
   .006353     1092.     1092.     1092.         4         0         0       .00    261.09   1452.57


*SECNO 24530.000
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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2089.10 ELREA=      2106.50

 24530.000      3.60   2079.00       .00       .00   2079.43       .43     12.06       .05   2089.10
    2183.0        .0    2183.0        .0        .0     413.3        .0     227.6     104.6   2106.50
      1.27       .00      5.28       .00      .000      .045      .000      .000   2075.40   1170.94
   .014791     1300.     1300.     1300.         4         0         0       .00    272.63   1443.57


*SECNO 25616.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2100.50 ELREA=      2100.60

 25616.000      5.18   2090.28       .00       .00   2090.60       .33     11.16       .01   2100.50
    2183.0        .0    2183.0        .0        .0     475.1        .0     238.7     110.9   2100.60
      1.33       .00      4.59       .00      .000      .045      .000      .000   2085.10   1338.12
   .007554     1086.     1086.     1086.         4         0         0       .00    233.47   1586.81


*SECNO 26383.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2109.80 ELREA=      2105.60

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 26383.000      5.10   2095.10       .00       .00   2095.46       .36      4.84       .01   2109.80
    2183.0        .0    2183.0        .0        .0     452.7        .0     246.9     114.3   2105.60
      1.38       .00      4.82       .00      .000      .045      .000      .000   2090.00   1282.49
   .005357      767.      767.      767.         2         0         0       .00    159.26   1441.75


*SECNO 27000.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27000.000      5.40   2106.90   2106.90       .00   2109.00      2.09      4.20       .52   2112.00
    2183.0        .0    2183.0        .0        .0     188.1        .0     251.4     115.8   2112.00
      1.39       .00     11.60       .00      .000      .030      .000      .000   2101.50     61.19
   .008921      617.      617.      617.        20         8         0       .00     45.62    106.81


*SECNO 27303.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 27303.000      5.41   2109.91   2109.91       .00   2112.00      2.08      2.70       .00   2115.00
    2183.0        .0    2183.0        .0        .0     188.5        .0     252.7     116.1   2115.00
      1.40       .00     11.58       .00      .000      .030      .000      .000   2104.50     61.18
   .008879      303.      303.      303.         2         5         0       .00     45.65    106.82


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  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP       ERRAC      TASQ        TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00         .00         .00         .00         .00         .00          2  1918.443   1919.488   6092.000   6397.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP       ERRAC      TASQ        TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00         .00         .00         .00         .00         .00          2  1919.488   1920.859   6397.000   6842.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ        QCOMP       ERRAC      TASQ        TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00         .00         .00         .00         .00         .00          2  1920.859   1922.467   6842.000   7287.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ        QCOMP       ERRAC      TASQ        TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00         .00         .00         .00         .00         .00          2  2023.262   2024.689  18472.000  18619.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ        QCOMP       ERRAC      TASQ        TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
        .00         .00         .00         .00         .00         .00          2  2024.689   2024.963  18619.000  18710.000
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TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2024.963	2025.037	18710.000	19020.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	.00	.00	.00	2	2025.037	2030.256	19020.000	19215.000

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THIS RUN EXECUTED 15APR98 13:28:05

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	150.000	.00	.00	.00	1886.00	1025.00	1889.02	1889.02	1890.55	29.86	9.91	103.40	187.58
*	150.000	.00	.00	.00	1886.00	1746.00	1890.31	1890.31	1892.49	30.54	11.84	147.47	315.97
	243.600	93.60	.00	.00	1886.20	1025.00	1889.63	.00	1890.81	20.33	8.71	117.69	227.31
	243.600	93.60	.00	.00	1886.20	1746.00	1891.05	.00	1892.77	21.93	10.55	165.54	372.88
	244.600	1.00	.00	.00	1886.20	1025.00	1889.80	.00	1890.83	13.66	8.14	126.00	277.35
	244.600	1.00	.00	.00	1886.20	1746.00	1891.33	.00	1892.80	13.39	9.73	179.43	477.19
*	450.000	205.40	.00	.00	1887.00	1025.00	1890.03	1890.03	1891.54	24.16	9.85	104.04	208.55
*	450.000	205.40	.00	.00	1887.00	1746.00	1891.32	1891.32	1893.46	23.11	11.73	148.82	363.19
*	544.000	94.00	.00	.00	1887.20	1025.00	1891.10	1891.10	1892.71	21.65	10.18	100.72	220.28
*	544.000	94.00	.00	.00	1887.20	1746.00	1892.55	1892.55	1894.66	20.20	11.65	149.88	388.47
*	600.000	56.00	.00	.00	1887.40	1025.00	1891.31	1891.31	1892.92	21.56	10.18	100.72	220.74
*	600.000	56.00	.00	.00	1887.40	1746.00	1892.77	1892.77	1894.87	20.12	11.65	149.86	389.26
*	700.000	100.00	.00	.00	1887.70	1025.00	1891.60	1891.60	1893.21	21.63	10.17	100.75	220.41
*	700.000	100.00	.00	.00	1887.70	1746.00	1893.05	1893.05	1895.16	20.17	11.64	149.95	388.73
*	1200.000	500.00	.00	.00	1889.30	1025.00	1893.20	1893.20	1894.81	21.58	10.17	100.82	220.63
*	1200.000	500.00	.00	.00	1889.30	1746.00	1894.65	1894.65	1896.76	20.13	11.63	150.08	389.18
*	1700.000	500.00	.00	.00	1891.00	1025.00	1894.90	1894.90	1896.51	21.60	10.17	100.80	220.54
*	1700.000	500.00	.00	.00	1891.00	1746.00	1896.35	1896.35	1898.46	20.13	11.63	150.08	389.18
*	2000.000	300.00	.00	.00	1892.00	1025.00	1895.90	1895.90	1897.51	21.60	10.17	100.80	220.54
*	2000.000	300.00	.00	.00	1892.00	1746.00	1897.35	1897.35	1899.46	20.13	11.63	150.08	389.18
*	2200.000	200.00	.00	.00	1892.60	1025.00	1896.50	1896.50	1898.11	21.60	10.17	100.80	220.54
*	2200.000	200.00	.00	.00	1892.60	1746.00	1897.95	1897.95	1900.06	20.13	11.63	150.08	389.18

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	3724.000	1524.00	.00	.00	1897.60	1025.00	1901.54	1901.54	1903.14	21.47	10.17	100.79	221.23
*	3724.000	1524.00	.00	.00	1897.60	1746.00	1903.00	1903.00	1905.10	20.03	11.63	150.08	390.10
*	3823.000	99.00	.00	.00	1898.00	1025.00	1902.55	.00	1903.35	8.63	7.19	142.57	348.89
*	3823.000	99.00	.00	.00	1898.00	1746.00	1904.14	.00	1905.32	9.27	8.72	200.34	573.55
	4020.000	197.00	.00	.00	1898.60	1025.00	1902.56	.00	1903.64	13.44	8.35	122.81	279.55
	4020.000	197.00	.00	.00	1898.60	1746.00	1904.14	.00	1905.63	12.99	9.79	178.31	484.52
	4060.000	40.00	.00	.00	1898.70	1025.00	1902.55	.00	1903.73	15.19	8.70	117.79	262.99
	4060.000	40.00	.00	.00	1898.70	1746.00	1904.12	.00	1905.72	14.28	10.12	172.46	462.07
*	4115.000	55.00	.00	.00	1898.80	1281.00	1902.86	.00	1903.85	11.27	8.01	160.02	381.62
	4115.000	55.00	.00	.00	1898.80	2183.00	1904.17	.00	1905.82	13.77	10.30	211.97	588.24
*	4188.000	73.00	.00	.00	1899.40	1281.00	1903.50	.00	1904.05	5.75	5.92	216.27	534.32
*	4188.000	73.00	.00	.00	1899.40	2183.00	1905.41	.00	1906.15	5.05	6.88	317.10	970.95
	4189.000	1.00	1914.60	1909.70	1899.40	1281.00	1903.45	.00	1904.10	6.95	6.43	199.24	485.75
	4189.000	1.00	1914.60	1909.70	1899.40	2183.00	1905.35	.00	1906.22	6.12	7.46	292.54	882.75
	4246.000	57.00	1914.80	1910.20	1899.90	1281.00	1903.39	.00	1904.26	11.14	7.46	171.61	383.80
	4246.000	57.00	1914.80	1910.20	1899.90	2183.00	1905.30	.00	1906.35	8.22	8.21	265.77	761.36

4247.000	1.00	.00	.00	1899.90	1281.00	1903.68	.00	1904.32	7.42	6.42	199.48	470.27
4247.000	1.00	.00	.00	1899.90	2183.00	1905.60	.00	1906.42	5.94	7.25	301.01	895.86
* 4360.000	113.00	.00	.00	1900.90	1281.00	1905.76	1905.76	1907.53	20.85	10.67	120.01	280.56
* 4360.000	113.00	.00	.00	1900.90	2183.00	1907.40	1907.40	1909.63	19.23	11.99	182.13	497.76
* 4831.000	471.00	.00	.00	1904.80	1281.00	1909.66	1909.66	1911.43	20.75	10.66	120.21	281.20
* 4831.000	471.00	.00	.00	1904.80	2183.00	1911.29	1911.29	1913.53	19.41	12.03	181.53	495.53
* 4920.000	89.00	.00	.00	1905.50	1281.00	1910.36	1910.36	1912.13	20.77	10.66	120.18	281.11
* 4920.000	89.00	.00	.00	1905.50	2183.00	1911.99	1911.99	1914.23	19.36	12.02	181.67	496.08
* 5005.000	85.00	.00	.00	1906.20	1281.00	1911.06	1911.06	1912.83	20.77	10.66	120.17	281.07
* 5005.000	85.00	.00	.00	1906.20	2183.00	1912.69	1912.69	1914.93	19.39	12.02	181.59	495.78
* 5105.000	100.00	.00	.00	1908.20	1281.00	1911.66	1911.66	1913.40	24.04	10.57	121.25	261.26
* 5105.000	100.00	.00	.00	1908.20	2183.00	1913.13	1913.13	1915.62	23.60	12.66	172.46	449.34
* 5200.000	95.00	.00	.00	1908.80	1281.00	1912.06	1912.06	1913.70	24.06	10.30	124.37	261.15
5200.000	95.00	.00	.00	1908.80	2183.00	1913.94	.00	1915.86	17.08	11.14	195.99	528.17
* 5500.000	300.00	.00	.00	1910.80	1281.00	1913.59	1913.59	1915.00	23.63	9.51	134.65	263.53
* 5500.000	300.00	.00	.00	1910.80	2183.00	1914.78	1914.78	1916.79	22.35	11.38	191.79	461.74
* 5852.000	352.00	.00	.00	1912.50	1281.00	1915.13	1915.13	1916.40	23.83	9.05	141.52	262.42
* 5852.000	352.00	.00	.00	1912.50	2183.00	1916.20	1916.20	1918.02	22.15	10.81	201.93	463.82

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
5853.000	1.00	.00	.00	1912.50	1281.00	1915.14	1915.13	1916.41	27.16	9.03	141.83	245.78
5853.000	1.00	.00	.00	1912.50	2183.00	1916.21	1916.21	1918.02	25.27	10.79	202.32	434.24
* 5973.000	120.00	1922.00	1924.10	1913.10	1281.00	1915.86	1915.86	1917.19	48.86	9.27	138.21	183.27
* 5973.000	120.00	1922.00	1924.10	1913.10	2183.00	1916.99	1916.99	1918.89	54.04	11.08	197.04	296.95
* 5974.000	1.00	.00	.00	1913.10	1281.00	1916.52	.00	1917.26	11.35	6.88	186.14	380.20
* 5974.000	1.00	.00	.00	1913.10	2183.00	1917.93	.00	1918.98	10.70	8.22	265.53	667.49
* 6092.000	126.00	.00	.00	1914.00	1281.00	1916.77	.00	1917.54	59.68	7.05	181.64	165.82
* 6092.000	126.00	.00	.00	1914.00	2183.00	1918.44	.00	1919.23	34.42	7.11	307.04	372.07
* 6370.000	278.00	.00	.00	1914.80	1281.00	1918.21	.00	1918.70	29.55	5.63	227.36	235.65
6370.000	278.00	.00	.00	1914.80	2183.00	1919.40	.00	1920.14	30.66	6.86	318.18	394.23
6828.000	458.00	.00	.00	1916.20	1281.00	1919.58	.00	1920.08	30.38	5.68	225.47	232.40
6828.000	458.00	.00	.00	1916.20	2183.00	1920.81	.00	1921.54	30.57	6.85	318.77	394.84
* 7265.000	437.00	.00	.00	1918.50	1281.00	1921.22	.00	1922.03	63.59	7.20	177.81	160.65
7265.000	437.00	.00	.00	1918.50	2183.00	1922.33	.00	1923.43	57.09	8.40	259.78	288.92
7730.000	465.00	.00	.00	1921.50	1281.00	1924.21	.00	1925.02	65.20	7.26	176.35	158.64
7730.000	465.00	.00	.00	1921.50	2183.00	1925.14	.00	1926.37	68.49	8.92	244.75	263.77
8323.000	593.00	.00	.00	1925.20	1281.00	1927.96	.00	1928.74	60.17	7.09	180.79	165.14
8323.000	593.00	.00	.00	1925.20	2183.00	1929.01	.00	1930.13	58.39	8.48	257.54	285.67
8673.000	350.00	.00	.00	1927.40	1281.00	1930.11	.00	1930.92	63.67	7.21	177.70	160.54
8673.000	350.00	.00	.00	1927.40	2183.00	1931.11	.00	1932.29	64.21	8.73	249.94	272.42
* 8754.000	81.00	.00	.00	1927.90	1281.00	1932.92	1932.92	1934.82	24.01	11.04	116.03	261.45
* 8754.000	81.00	.00	.00	1927.90	2183.00	1934.67	1934.67	1937.10	22.51	12.50	174.62	460.12
* 8755.000	1.00	1941.60	1941.80	1927.90	1281.00	1933.11	1933.11	1935.04	34.91	11.16	114.76	216.81
* 8755.000	1.00	1941.60	1941.80	1927.90	2183.00	1934.90	1934.90	1937.35	33.78	12.58	173.55	375.62
* 8860.000	79.00	1942.10	1942.30	1928.40	1281.00	1933.61	1933.61	1935.54	34.91	11.16	114.76	216.81
* 8860.000	79.00	1942.10	1942.30	1928.40	2183.00	1935.40	1935.40	1937.85	33.78	12.58	173.55	375.62
* 8861.000	1.00	.00	.00	1928.40	1281.00	1934.91	1933.43	1935.84	9.00	7.75	165.38	427.01
* 8861.000	1.00	.00	.00	1928.40	2183.00	1937.02	1935.18	1938.23	9.09	8.83	247.13	724.07
* 9120.000	259.00	.00	.00	1930.90	1281.00	1936.25	1936.25	1938.07	24.05	10.82	118.40	261.19
* 9120.000	259.00	.00	.00	1930.90	2183.00	1937.92	1937.92	1940.23	22.48	12.19	179.04	460.40
* 9237.000	117.00	.00	.00	1940.00	1281.00	1941.73	1941.73	1942.27	294.66	5.91	216.89	74.63
* 9237.000	117.00	.00	.00	1940.00	2183.00	1942.23	1942.23	1942.91	273.02	6.63	329.02	132.12
* 9429.000	192.00	.00	.00	1942.10	1281.00	1944.09	.00	1944.19	48.20	2.55	502.17	184.52
* 9429.000	192.00	.00	.00	1942.10	2183.00	1944.58	.00	1944.73	45.52	3.06	712.49	323.57

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
* 10155.000	726.00	.00	.00	1948.70	1281.00	1953.20	1953.20	1953.78	332.31	6.13	209.05	70.27
* 10155.000	726.00	.00	.00	1948.70	2183.00	1953.81	1953.81	1953.91	37.07	2.30	872.11	358.54
* 10962.000	807.00	.00	.00	1956.70	1281.00	1959.30	1959.13	1959.37	21.38	1.58	631.22	277.05
* 10962.000	807.00	.00	.00	1956.70	2183.00	1959.31	1959.31	1959.51	60.64	2.68	637.38	280.33
* 11614.000	652.00	.00	.00	1960.30	1281.00	1964.34	1964.34	1964.90	340.27	6.00	213.56	69.44
* 11614.000	652.00	.00	.00	1960.30	2183.00	1965.26	1964.88	1965.54	156.00	4.22	517.79	174.78

* 12202.000	588.00	.00	.00	1962.70	1281.00	1968.32	.00	1968.56	24.86	3.92	329.54	256.94
* 12202.000	588.00	.00	.00	1962.70	2183.00	1969.14	.00	1969.57	37.71	5.33	436.89	355.47
13094.000	892.00	.00	.00	1964.70	1281.00	1969.98	.00	1970.12	12.86	3.00	426.79	357.16
* 13094.000	892.00	.00	.00	1964.70	2183.00	1971.41	.00	1971.63	15.32	3.73	585.96	557.74
* 14167.000	1073.00	.00	.00	1970.30	1281.00	1972.94	.00	1973.84	193.82	7.60	168.54	92.01
* 14167.000	1073.00	.00	.00	1970.30	2183.00	1974.40	.00	1975.29	106.62	7.56	288.64	211.42
* 14368.000	201.00	.00	.00	1982.60	1281.00	1984.91	1984.91	1985.90	240.49	8.00	160.21	82.60
* 14368.000	201.00	.00	.00	1982.60	2183.00	1985.93	1985.93	1987.14	176.64	8.84	255.39	164.25
* 15114.000	746.00	.00	.00	1980.60	1281.00	1987.30	.00	1987.40	6.35	2.43	527.56	508.53
* 15114.000	746.00	.00	.00	1980.60	2183.00	1988.78	.00	1988.94	8.44	3.17	691.02	751.57
* 15667.000	553.00	.00	.00	1989.60	1281.00	1991.60	1991.60	1992.29	273.08	6.66	192.33	77.52
* 15667.000	553.00	.00	.00	1989.60	2183.00	1992.19	1992.19	1993.14	244.91	7.82	279.21	139.49
* 16546.000	879.00	.00	.00	1993.00	1281.00	1996.99	.00	1997.15	22.73	3.20	399.92	268.71
* 16546.000	879.00	.00	.00	1993.00	2183.00	1998.02	.00	1998.27	25.09	4.02	543.50	435.85
* 17058.000	512.00	.00	.00	2004.60	1281.00	2006.91	2006.91	2007.52	289.84	6.28	203.95	75.24
* 17058.000	512.00	.00	.00	2004.60	2183.00	2007.45	2007.45	2008.27	254.67	7.24	301.50	136.79
* 17612.000	554.00	.00	.00	2009.20	1281.00	2013.44	.00	2013.82	59.81	4.90	261.68	165.64
* 17612.000	554.00	.00	.00	2009.20	2183.00	2014.82	.00	2015.14	72.36	4.51	484.45	256.63
* 18436.000	824.00	.00	.00	2019.10	1281.00	2021.73	.00	2022.36	216.30	6.40	200.19	87.10
18436.000	824.00	.00	.00	2019.10	2183.00	2022.72	.00	2023.21	137.97	5.62	388.43	185.85
18462.000	26.00	.00	.00	2020.00	1281.00	2022.37	.00	2022.81	132.12	5.36	239.03	111.45
18462.000	26.00	.00	.00	2020.00	2183.00	2022.95	.00	2023.66	153.77	6.75	323.60	176.04
18472.000	10.00	.00	.00	2020.00	1281.00	2022.59	.00	2022.93	90.46	4.73	270.82	134.69
18472.000	10.00	.00	.00	2020.00	2183.00	2023.26	.00	2023.80	101.94	5.88	371.44	216.21
18619.000	147.00	.00	.00	2021.60	1281.00	2023.85	.00	2024.05	63.36	3.62	353.95	160.94
18619.000	147.00	.00	.00	2021.60	2183.00	2024.69	.00	2024.92	56.38	3.85	567.23	290.74
* 18710.000	91.00	.00	.00	2015.60	1281.00	2024.09	.00	2024.11	1.57	1.17	1098.17	1023.16
* 18710.000	91.00	.00	.00	2015.60	2183.00	2024.96	.00	2025.01	2.84	1.67	1306.18	1294.82

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
* 19020.000	310.00	.00	.00	2017.60	1281.00	2024.13	.00	2024.14	.45	.68	1875.31	1911.17
* 19020.000	310.00	.00	.00	2017.60	2183.00	2025.04	.00	2025.05	.81	.99	2194.09	2421.64
* 19215.000	195.00	.00	.00	2025.60	1281.00	2029.25	2029.25	2030.34	276.50	8.38	152.91	77.04
* 19215.000	195.00	.00	.00	2025.60	2183.00	2030.26	2030.26	2030.93	245.92	6.59	331.41	139.20
* 19802.000	587.00	.00	.00	2032.00	1281.00	2035.44	.00	2035.62	43.00	3.43	373.65	195.35
* 19802.000	587.00	.00	.00	2032.00	2183.00	2036.18	.00	2036.45	48.77	4.20	520.33	312.60
* 20595.000	793.00	.00	.00	2039.30	1281.00	2042.29	2042.29	2042.85	269.28	6.02	212.76	78.06
* 20595.000	793.00	.00	.00	2039.30	2183.00	2042.88	.00	2043.59	206.62	6.75	323.35	151.87
* 21291.000	696.00	.00	.00	2045.40	1281.00	2049.25	.00	2049.40	46.98	3.04	421.71	186.90
* 21291.000	696.00	.00	.00	2045.40	2183.00	2049.85	.00	2050.06	52.06	3.71	589.14	302.56
* 22138.000	847.00	.00	.00	2052.60	1281.00	2055.97	.00	2056.39	175.36	5.18	247.19	96.73
* 22138.000	847.00	.00	.00	2052.60	2183.00	2056.62	.00	2057.13	149.68	5.72	381.79	178.43
* 23230.000	1092.00	.00	.00	2063.10	1281.00	2066.45	.00	2066.64	58.10	3.45	371.54	168.05
* 23230.000	1092.00	.00	.00	2063.10	2183.00	2067.06	.00	2067.33	63.53	4.17	522.92	273.88
* 24530.000	1300.00	.00	.00	2075.40	1281.00	2078.44	2078.20	2078.79	172.75	4.74	270.27	97.46
* 24530.000	1300.00	.00	.00	2075.40	2183.00	2079.00	.00	2079.43	147.91	5.28	413.26	179.50
* 25616.000	1086.00	.00	.00	2085.10	1281.00	2089.51	.00	2089.76	66.08	3.98	321.96	157.59
25616.000	1086.00	.00	.00	2085.10	2183.00	2090.28	.00	2090.60	75.54	4.59	475.09	251.17
26383.000	767.00	.00	.00	2090.00	1281.00	2094.12	.00	2094.39	55.22	4.15	308.90	172.38
26383.000	767.00	.00	.00	2090.00	2183.00	2095.10	.00	2095.46	53.57	4.82	452.68	298.27
* 27000.000	617.00	.00	.00	2101.50	1281.00	2105.47	2105.47	2107.05	94.98	10.12	126.62	131.44
* 27000.000	617.00	.00	.00	2101.50	2183.00	2106.90	2106.90	2109.00	89.21	11.60	188.14	231.13
* 27303.000	303.00	.00	.00	2104.50	1281.00	2108.45	2108.45	2110.05	96.14	10.16	126.08	130.64
* 27303.000	303.00	.00	.00	2104.50	2183.00	2109.91	2109.91	2112.00	88.79	11.58	188.45	231.67

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LNLV WASH

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 150.000	1025.00	1889.02	.00	.00	.12	34.22	.00
* 150.000	1746.00	1890.31	1.29	.00	.21	34.24	.00
243.600	1025.00	1889.63	.00	.61	.00	34.19	93.60

	243.600	1746.00	1891.05	1.41	.73	.00	34.20	93.60
	244.600	1025.00	1889.80	.00	.17	.00	35.00	1.00
	244.600	1746.00	1891.33	1.53	.28	.00	35.00	1.00
*	450.000	1025.00	1890.03	.00	.23	.00	34.61	205.40
*	450.000	1746.00	1891.32	1.29	-.01	.00	34.86	205.40
*	544.000	1025.00	1891.10	.00	1.06	.00	31.69	94.00
*	544.000	1746.00	1892.55	1.45	1.23	.00	36.05	94.00
*	600.000	1025.00	1891.31	.00	.21	.00	31.55	56.00
*	600.000	1746.00	1892.77	1.46	.22	.00	35.86	56.00
*	700.000	1025.00	1891.60	.00	.29	.00	31.69	100.00
*	700.000	1746.00	1893.05	1.45	.29	.00	36.05	100.00
*	1200.000	1025.00	1893.20	.00	1.60	.00	31.70	500.00
*	1200.000	1746.00	1894.65	1.45	1.60	.00	36.06	500.00
*	1700.000	1025.00	1894.90	.00	1.70	.00	31.70	500.00
*	1700.000	1746.00	1896.35	1.45	1.70	.00	36.06	500.00
*	2000.000	1025.00	1895.90	.00	1.00	.00	31.70	300.00
*	2000.000	1746.00	1897.35	1.45	1.00	.00	36.06	300.00
*	2200.000	1025.00	1896.50	.00	.60	.00	31.70	200.00
*	2200.000	1746.00	1897.95	1.45	.60	.00	36.06	200.00
*	3724.000	1025.00	1901.54	.00	5.04	.00	31.51	1524.00
*	3724.000	1746.00	1903.00	1.46	5.04	.00	35.90	1524.00
*	3823.000	1025.00	1902.55	.00	1.01	.00	34.83	99.00
*	3823.000	1746.00	1904.14	1.60	1.14	.00	37.24	99.00
	4020.000	1025.00	1902.56	.00	.01	.00	33.97	197.00
	4020.000	1746.00	1904.14	1.58	.00	.00	36.34	197.00
	4060.000	1025.00	1902.55	.00	-.01	.00	33.65	40.00
	4060.000	1746.00	1904.12	1.57	-.02	.00	35.99	40.00
*	4115.000	1281.00	1902.86	.00	.31	.00	39.48	55.00
	4115.000	2183.00	1904.17	1.31	.05	.00	39.50	55.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4188.000	1281.00	1903.50	.00	.64	.00	52.75	73.00
*	4188.000	2183.00	1905.41	1.91	1.24	.00	52.78	73.00
	4189.000	1281.00	1903.45	.00	-.05	.00	52.74	1.00
	4189.000	2183.00	1905.35	1.90	-.06	.00	52.76	1.00
	4246.000	1281.00	1903.39	.00	-.06	.00	52.73	57.00
	4246.000	2183.00	1905.30	1.91	-.05	.00	52.75	57.00
	4247.000	1281.00	1903.68	.00	.29	.00	52.75	1.00
	4247.000	2183.00	1905.60	1.92	.30	.00	52.78	1.00
*	4360.000	1281.00	1905.76	.00	2.07	.00	34.43	113.00
*	4360.000	2183.00	1907.40	1.65	1.80	.00	41.01	113.00
*	4831.000	1281.00	1909.66	.00	3.91	.00	34.45	471.00
*	4831.000	2183.00	1911.29	1.63	3.89	.00	40.95	471.00
*	4920.000	1281.00	1910.36	.00	.70	.00	34.44	89.00
*	4920.000	2183.00	1911.99	1.63	.70	.00	40.97	89.00
*	5005.000	1281.00	1911.06	.00	.70	.00	34.44	85.00
*	5005.000	2183.00	1912.69	1.63	.70	.00	40.96	85.00
*	5105.000	1281.00	1911.66	.00	.60	.00	35.00	100.00
*	5105.000	2183.00	1913.13	1.46	.44	.00	35.00	100.00
*	5200.000	1281.00	1912.06	.00	.39	.00	38.20	95.00
	5200.000	2183.00	1913.94	1.88	.81	.00	38.20	95.00
*	5500.000	1281.00	1913.59	.00	1.54	.00	48.20	300.00
*	5500.000	2183.00	1914.78	1.19	.84	.00	48.20	300.00
*	5852.000	1281.00	1915.13	.00	1.54	.00	56.25	352.00
*	5852.000	2183.00	1916.20	1.07	1.42	.00	56.27	352.00
	5853.000	1281.00	1915.14	.00	.01	.00	56.26	1.00
	5853.000	2183.00	1916.21	1.08	.01	.00	56.27	1.00
*	5973.000	1281.00	1915.86	.00	.72	.00	56.26	120.00
*	5973.000	2183.00	1916.99	1.13	.77	.00	56.27	120.00
*	5974.000	1281.00	1916.52	.00	.66	.00	56.27	1.00
*	5974.000	2183.00	1917.93	1.41	.94	.00	56.28	1.00
*	6092.000	1281.00	1916.77	.00	.25	.00	71.32	126.00
*	6092.000	2183.00	1918.44	1.67	.51	.00	78.19	126.00
*	6370.000	1281.00	1918.21	.00	1.44	.00	73.50	278.00

6370.000	2183.00	1919.40	1.19	.96	.00	78.24	278.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	6828.000	1281.00	1919.58	.00	1.37	.00	73.53	458.00
	6828.000	2183.00	1920.81	1.23	1.41	.00	78.44	458.00
*	7265.000	1281.00	1921.22	.00	1.64	.00	70.91	437.00
	7265.000	2183.00	1922.33	1.11	1.52	.00	75.41	437.00
	7730.000	1281.00	1924.21	.00	2.98	.00	70.79	465.00
	7730.000	2183.00	1925.14	.93	2.80	.00	74.55	465.00
	8323.000	1281.00	1927.96	.00	3.76	.00	70.88	593.00
	8323.000	2183.00	1929.01	1.05	3.88	.00	75.03	593.00
	8673.000	1281.00	1930.11	.00	2.15	.00	70.86	350.00
	8673.000	2183.00	1931.11	1.00	2.09	.00	74.83	350.00
*	8754.000	1281.00	1932.92	.00	2.81	.00	30.86	81.00
*	8754.000	2183.00	1934.67	1.75	3.56	.00	36.26	81.00
*	8755.000	1281.00	1933.11	.00	.18	.00	31.43	1.00
*	8755.000	2183.00	1934.90	1.79	.23	.00	36.96	1.00
*	8860.000	1281.00	1933.61	.00	.50	.00	31.43	79.00
*	8860.000	2183.00	1935.40	1.79	.50	.00	36.96	79.00
*	8861.000	1281.00	1934.91	.00	1.31	.00	35.46	1.00
*	8861.000	2183.00	1937.02	2.10	1.62	.00	43.21	1.00
*	9120.000	1281.00	1936.25	.00	1.34	.00	33.15	259.00
*	9120.000	2183.00	1937.92	1.67	.90	.00	39.51	259.00
*	9237.000	1281.00	1941.73	.00	5.48	.00	203.73	117.00
*	9237.000	2183.00	1942.23	.50	4.31	.00	245.11	117.00
*	9429.000	1281.00	1944.09	.00	2.36	.00	427.79	192.00
*	9429.000	2183.00	1944.58	.49	2.35	.00	441.70	192.00
*	10155.000	1281.00	1953.20	.00	9.11	.00	202.06	726.00
*	10155.000	2183.00	1953.81	.61	9.23	.00	792.33	726.00
*	10962.000	1281.00	1959.30	.00	6.11	.00	592.26	807.00
*	10962.000	2183.00	1959.31	.01	5.50	.00	594.65	807.00
*	11614.000	1281.00	1964.34	.00	5.04	.00	218.05	652.00
*	11614.000	2183.00	1965.26	.92	5.95	.00	500.49	652.00
*	12202.000	1281.00	1968.32	.00	3.98	.00	104.68	588.00
*	12202.000	2183.00	1969.14	.82	3.88	.00	156.15	588.00
	13094.000	1281.00	1969.98	.00	1.66	.00	103.90	892.00
*	13094.000	2183.00	1971.41	1.44	2.28	.00	117.38	892.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	14167.000	1281.00	1972.94	.00	2.96	.00	78.50	1073.00
*	14167.000	2183.00	1974.40	1.46	2.99	.00	86.03	1073.00
*	14368.000	1281.00	1984.91	.00	11.97	.00	81.56	201.00
*	14368.000	2183.00	1985.93	1.02	11.53	.00	145.75	201.00
*	15114.000	1281.00	1987.30	.00	2.39	.00	103.54	746.00
*	15114.000	2183.00	1988.78	1.47	2.85	.00	129.51	746.00
*	15667.000	1281.00	1991.60	.00	4.29	.00	142.44	553.00
*	15667.000	2183.00	1992.19	.59	3.41	.00	149.77	553.00
*	16546.000	1281.00	1996.99	.00	5.40	.00	136.70	879.00
*	16546.000	2183.00	1998.02	1.03	5.83	.00	142.10	879.00
*	17058.000	1281.00	2006.91	.00	9.92	.00	171.89	512.00
*	17058.000	2183.00	2007.45	.54	9.43	.00	186.13	512.00
*	17612.000	1281.00	2013.44	.00	6.53	.00	96.80	554.00
*	17612.000	2183.00	2014.82	1.38	7.37	.00	235.84	554.00
*	18436.000	1281.00	2021.73	.00	8.28	.00	132.25	824.00
	18436.000	2183.00	2022.72	1.00	7.90	.00	222.55	824.00
	18462.000	1281.00	2022.37	.00	.64	.00	142.00	26.00
	18462.000	2183.00	2022.95	.58	.23	.00	152.31	26.00
	18472.000	1281.00	2022.59	.00	.22	.00	145.96	10.00
	18472.000	2183.00	2023.26	.68	.31	.00	157.85	10.00
	18619.000	1281.00	2023.85	.00	1.26	.00	218.41	147.00
	18619.000	2183.00	2024.69	.84	1.43	.00	292.55	147.00
*	18710.000	1281.00	2024.09	.00	.24	.00	228.97	91.00

*	18710.000	2183.00	2024.96	.87	.27	.00	247.88	91.00
*	19020.000	1281.00	2024.13	.00	.04	.00	345.09	310.00
*	19020.000	2183.00	2025.04	.91	.07	.00	358.13	310.00
*	19215.000	1281.00	2029.25	.00	5.12	.00	80.47	195.00
*	19215.000	2183.00	2030.26	1.01	5.22	.00	230.20	195.00
*	19802.000	1281.00	2035.44	.00	6.19	.00	187.36	587.00
*	19802.000	2183.00	2036.18	.74	5.92	.00	211.78	587.00
*	20595.000	1281.00	2042.29	.00	6.85	.00	180.85	793.00
*	20595.000	2183.00	2042.88	.60	6.70	.00	189.72	793.00
*	21291.000	1281.00	2049.25	.00	6.97	.00	269.77	696.00
*	21291.000	2183.00	2049.85	.60	6.97	.00	302.23	696.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	22138.000	1281.00	2055.97	.00	6.72	.00	190.89	847.00
*	22138.000	2183.00	2056.62	.65	6.77	.00	225.99	847.00
*	23230.000	1281.00	2066.45	.00	10.48	.00	231.21	1092.00
*	23230.000	2183.00	2067.06	.61	10.44	.00	261.09	1092.00
*	24530.000	1281.00	2078.44	.00	11.99	.00	235.71	1300.00
*	24530.000	2183.00	2079.00	.56	11.94	.00	272.63	1300.00
*	25616.000	1281.00	2089.51	.00	11.07	.00	177.42	1086.00
	25616.000	2183.00	2090.28	.76	11.28	.00	233.47	1086.00
	26383.000	1281.00	2094.12	.00	4.61	.00	139.43	767.00
	26383.000	2183.00	2095.10	.98	4.82	.00	159.26	767.00
*	27000.000	1281.00	2105.47	.00	11.34	.00	39.86	617.00
*	27000.000	2183.00	2106.90	1.44	11.81	.00	45.62	617.00
*	27303.000	1281.00	2108.45	.00	2.99	.00	39.81	303.00
*	27303.000	2183.00	2109.91	1.46	3.01	.00	45.65	303.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 150.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 2 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 450.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 450.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 450.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 450.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 450.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 544.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 544.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 544.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 544.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 544.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 544.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 600.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 600.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 700.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 700.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 700.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1200.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1200.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 1200.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1200.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1200.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 1700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1700.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1700.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 1700.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1700.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1700.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 2000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2000.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2000.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 2000.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2000.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2000.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

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 CAUTION SECNO=   2200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   2200.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2200.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=   2200.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   3724.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3724.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   3724.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3724.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   3724.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   3823.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   3823.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   4115.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   4188.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   4188.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4360.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4360.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4360.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   4360.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4360.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4360.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4831.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4831.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4831.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   4831.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4831.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4831.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4920.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4920.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4920.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   4920.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4920.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4920.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5005.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5005.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5005.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5005.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5005.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5005.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5105.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5105.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5105.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5105.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5105.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5105.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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 CAUTION SECNO=   5500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5500.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5500.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5500.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5500.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5500.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5852.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5852.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5852.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5852.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5852.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5852.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5973.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5973.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5973.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5973.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5973.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5973.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   5974.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   5974.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=   6370.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   7265.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   8754.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   8754.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=   8754.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   8754.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   8754.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   8755.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   8755.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   8860.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   8860.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   8860.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   8860.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   8861.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   8861.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=   8861.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   8861.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   9120.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   9120.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9120.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9120.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9120.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9120.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   9237.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9237.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9237.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   9237.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   9237.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   9237.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   9429.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   9429.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  10155.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10155.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  10155.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10155.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  10155.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  10962.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=  10962.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  10962.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  10962.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=  11614.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  11614.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  11614.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=  11614.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  12202.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12202.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  13094.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  14167.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  14167.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  14368.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  14368.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  15114.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  15114.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  15667.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  15667.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  15667.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=  15667.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  16546.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  16546.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=  17058.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  17058.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  17058.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  17058.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  17058.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  17612.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  17612.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=  18436.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18710.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  18710.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  19020.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  19020.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  19215.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  19215.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  19215.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  19215.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  19802.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  19802.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  20595.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  20595.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 WARNING SECNO=  20595.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  21291.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  21291.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  22138.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  22138.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  23230.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  23230.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  24530.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  24530.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  25616.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  27000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
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    15APR98       13:28:01                                                                    PAGE   75


 CAUTION SECNO=  27000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  27000.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27000.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27000.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  27303.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  27303.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  27303.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
```

Paper Copy E

Craig Road to North Las Vegas
Diversion Dike
100- and 500-year flood event

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    15APR98    TIME   13:58:20 *
 *****************************************
```

```
**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X         X     X           X     X
X     X  X         X                       X
XXXXXXX  XXXX      X          XXXXX    XXXXX
X     X  X         X                  X
X     X  X         X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

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1
    15APR98      13:58:20                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 15APR98    13:58:20
 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************



 SPLIT FLOW BEING PERFORMED

 SF


 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      3    6092    6397      -1       3
 WC      0  1924.6     133  1925.6     287  1926.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6397    6842      -1       3
 WC      0  1926.6     149  1927.6     297  1928.6     446  1929.6

 TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD
 WS      4    6842    7287      -1       3
 WC      0  1929.6     149  1930.6     297  1931.6     447  1932.6


 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18472   18619      -1       3
 WC      0  2027.6      40  2026.6     147  2026.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      3   18619   18710      -1       3
 WC      0  2026.6      71  2026.6      91  2028.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      5   18710   19020      -1       3
 WC      0  2028.6      20  2029.6     175  2031.6     265  2033.6     405  2035.6

 TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
 WS      4   19020   19215      -1       3
 WC      0  2035.6      55  2037.6     200  2039.6     270  2040.3
1
    15APR98      13:58:20                                                                    PAGE    2


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1      FEMA 100-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      LNLV WASH W/O DIVERSION

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2                                                                  1925.6

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                  -1

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150
```

```
   ********************************************************************************
   12/31   rubble at section 18436
   ********************************************************************************

   ********************************************************************************
   1/5   Inserted BSI channel improvements d/s of Lone Mountain Road
   ********************************************************************************

   ********************************************************************************
   1/20  Added section 187+00 and 3 points to 18436
   ********************************************************************************

   ********************************************************************************
   1/30  Removed flow upstream of 187+00 simulating breakout across Azure
   ********************************************************************************

   ********************************************************************************
   1/30 Removed Sunrise Development Park and replaced with Kenny dropped section
   ********************************************************************************

   ********************************************************************************
   2/10 ADDED SPECIAL CULVERT AT CRAIG
   ********************************************************************************

   ********************************************************************************
   Debris pile at 184+36 lowered to EL. 2020 to account for erosion and CNLV wash
   debris removal plan.  Weir flow leaving the wash is represented by the
   split flow cards from 184+72 to 190+20
   ********************************************************************************

   ********************************************************************************
   3/4 Revised Lone Mountain Road Crossing
   ********************************************************************************
1
    15APR98      13:58:20                                                  PAGE    3


   ********************************************************************************
   Model bypasses the NLVDB and extends to the upstream teminus at the Div Weir
   ********************************************************************************


QT         2       8536      17855
NC       .03        .03        .03         .3         .5

    CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)
  Bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1      5852         18       1609    1665.10
X3        10
GR    1924.6        420     1924.6        421     1923.6        635     1923.6        768     1924.6        990
GR    1925.6       1247     1925.6       1355     1924.6       1562     1924.6       1609     1913.2     1609.1
GR    1913.2       1665     1924.6     1665.1     1924.6       1706     1925.6       1944     1926.3       2048
GR    1927.4       2427     1927.6       2490     1927.6       2927


X1      5973         18       1609     1665.1        120        120        120
X3        10
X5         2     1925.6     1926.2
BT       -18        420     1924.6                   421     1924.6                   635     1923.6
BT                  768     1923.6                   990     1924.6                  1247     1925.6
BT                 1355     1925.6                  1562     1924.6                  1609     1924.6
BT               1609.1     1924.6                  1665     1924.6                1665.1     1924.6
BT                 1706     1924.6                  1944     1925.6                  2048     1926.3
BT                 2427     1927.4                  2490     1927.6                  2927     1927.6
GR    1924.6        420     1924.6        421     1923.6        635     1923.6        768     1924.6        990
GR    1925.6       1247     1925.6       1355     1924.6       1562     1924.6       1609     1913.2     1609.1
GR    1913.2       1665     1924.6     1665.1     1924.6       1706     1925.6       1944     1926.3       2048
GR    1927.4       2427     1927.6       2490     1927.6       2927


NC       .03        .03        .03         .1         .3
   ***************************************************************
   BSI Channel Plans
   ***************************************************************

    11+27
X1      6092         13       1727     1823.2        127        127        127                  -2.4
GR      1927       1000       1926       1363       1925       1644       1925       1718       1925       1727
GR    1916.4       1745     1916.4       1805     1925.5     1823.2       1926       1984       1927       2233
GR      1928       2483       1929       2740       1930       2990

    14+05

X1      6370         11       1732       1834        278        278        278                  -2.4
GR      1929       1000       1928       1328       1927       1607     1927.8       1730     1927.8       1732
GR    1917.2       1753     1917.2       1813     1927.8       1834       1928       2025       1929       2250
GR      1930       2495

    18+63
1
    15APR98      13:58:20                                                  PAGE    4


X1      6828         11       1775       1880        458        458        458                  -2.4
GR      1932       1000       1931       1310       1930       1573     1929.3       1773     1929.3       1775
GR    1918.6       1797     1918.6       1857     1930.4       1880       1931       2009       1932       2216
GR      1933       2430
```

```
   23+00

X1      7265         11       1762       1870        437        437        437                 -2.4
GR      1935       1000       1934       1313       1933       1575     1932.4       1760     1932.4       1762
GR    1920.9       1785     1920.9       1845     1933.3       1870       1934       2025       1935       2324
GR      1936       2523


NC       .03        .03        .03         .1         .3

  Right bank limit of effective area for 500 yr event
   27+65
X1      7730          9       1830     1939.4        465        465        465                 -2.4
GR      1938       1000       1937       1264       1936       1506       1936       1574     1935.9       1653
GR    1935.9       1830     1923.9       1854     1923.9       1914     1936.6     1939.4

   33+58

X1      8323         14       2257       2369        593        593        593                 -2.4
GR      1948       1000       1946       1160       1944       1300       1942       1375       1941       1400
GR      1941       1415       1940       1455       1940       1510       1940       1555     1940.3       1577
GR    1940.3       2257     1927.6       2282     1927.6       2342     1941.3       2369

  ********************************************************************************
  Lone Mountain Road profile from BSI grading plans
  Assumes Lone mountain bridge is blocked
  ********************************************************************************
  ********************************************************************************
  STATION EQUATION USED IN MAPPING STA 8834.5 BACK = STA 8860 FORWARD
  ********************************************************************************

   38+28

X1      8794         12       1070       1735        470        470        470                 -2.4
GR      1950       1000       1948       1070       1946       1195       1944       1260     1945.3       1408
GR      1945       1444     1945.2       1501     1945.5       1599     1945.9       1698       1946       1735
GR      1947       1764       1948       1790


NC       .035       .035       .035         .1         .3

NH          3       .035    1804.76       .015    1954.26       .035    2930.0
X1       9120         45    1660.36    2136.88        301        301        301
X3         10                     0    1661.33          0     2712.5          0          0          0
GR    1938.9       1000     1938.4    1022.44     1939.4    1050.83     1939.8    1109.61     1940.4    1185.31
GR    1941.1    1255.73     1941.4    1329.84     1941.9    1406.09     1942.3    1476.83     1942.7    1527.08
GR    1943.1    1593.17     1944.1    1622.98     1945.2    1660.36     1944.3    1668.77     1944.1    1695.47
GR    1943.4    1751.09     1943.4    1804.76     1942.6    1841.55     1941.1    1849.31     1941.2    1871.11
1
   15APR98       13:58:20                                                                                PAGE     5

GR    1931.6    1888.31     1930.9    1902.34       1941    1922.71     1940.5    1934.27     1942.7    1954.26
GR    1943.1    1985.88       1944    2016.07     1944.6    2058.89     1945.1    2091.74     1945.5    2136.88
GR    1945.7    2189.84     1945.5    2239.5      1945.5    2313.35     1948.7    2328.55     1948.9    2355.38
GR    1946.9    2377.76     1948.5    2413.91     1947.4    2476.49     1948.2     2508.5     1948.8    2533.66
GR    1949.2    2564.44       1949    2623.1      1949.6    2704.24     1949.3    2783.03     1948.3      2930

NC       .045       .045       .045         0.1        0.3
   CROSS SECTION CUT FROM TOPO 9-16-97
X1      9237         19       1900       2580        117        117        117
X3        10          0          0                     0                     0          0          0
GR      1944       1000     1940.9       1220     1941.9       1250       1941       1270       1944       1560
GR      1948       1900       1944       2123       1940       2140       1940       2155     1940.5       2240
GR      1944       2515       1948       2570       1950       2580       1948       2623       1948       2630
GR    1948.6       2760     1950.8       3055       1948       3195       1952       3275
   CROSS SECTION CUT FROM TOPO 9-16-97

X1      9429         24       1775       2330        192        192        192
X3        10          0          0       1573          0          0          0          0          0
GR      1948        850       1944        920       1944       1000       1948       1058     1948.4       1100
GR      1948       1200     1947.8       1270       1948       1330     1949.9       1510     1950.5       1560
GR      1948       1695       1948       1775       1944       1855     1942.1       1900     1942.3       2000
GR      1944       2280       1948       2315     1949.1       2330       1948       2350       1948       2382
GR      1949       2470     1949.9       2565     1950.3       2664       1952       2815


X1     10155         39    2117.61       2420        726        726        726
X3        10          0          0    1567.24          0          0          0          0          0
GR    1950.2       1000     1950.5     1089.5     1951.3    1173.63       1952    1264.68     1952.6    1341.06
GR      1953    1418.64       1953    1482.79     1953.7     1509.3     1954.2    1533.43     1954.2    1567.24
GR    1953.7    1645.43     1953.4     1728.2     1951.4    1742.62     1950.6    1774.96     1951.3    1799.01
GR    1953.2    1821.33     1953.3     1893.3     1952.9    1957.65     1952.3    2022.96     1952.3    2050.45
GR    1953.3    2062.52       1953    2082.16     1952.7    2105.51     1953.7    2117.61       1953    2162.78
GR    1953.1    2184.83     1952.6    2209.21     1951.7    2274.07     1948.7    2286.68     1952.9    2302.13
GR    1950.9    2322.64     1953.3    2334.66     1953.5    2396.66     1951.7    2407.52     1953.8      2420
GR    1955.1    2455.16     1955.7    2508.22     1955.8    2563.46     1956.7    2685.29

X1     10962         51    1440.93    1695.93        807        807        807
X3        10          0          0                     0                     0          0          0
GR    1963.6       1000     1963.2     1026.45     1961.4     1061.7     1958.3    1120.54     1958.3    1142.66
GR    1959.8    1170.46     1961.9    1193.68       1962    1224.14     1960.1    1235.84     1959.8    1256.52
GR    1957.3    1274.17     1956.1    1322.35     1955.8    1365.42     1959.1    1375.51     1959.1    1386.44
GR    1957.3    1392.19     1959.6    1414.44     1959.9    1440.93     1957.6     1456.6       1958    1488.58
GR    1956.9    1523.04     1958.3    1535.33     1956.7    1550.46     1958.6    1560.22     1957.9    1569.99
GR      1959    1583.95     1959.2    1604.04     1957.9    1630.23       1959    1643.16     1958.7    1682.16
GR    1959.3    1695.93     1958.8    1743.65     1958.2    1795.77     1957.4    1813.41     1955.9    1824.29
GR    1955.3    1842.84     1957.2    1851.64     1958.8    1891.67     1955.5    1902.15     1959.2    1911.85
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GR   1959.3   1942.31    1954.9   1955.14    1958.7   1962.51    1959.2   2014.23    1959.5   2081.38
GR     1960   2149.42    1960.7   2223.54    1961.5   2269.13    1961.8   2309.63    1962.4   2347.97
GR   1963.2   2447.12
1
    15APR98      13:58:20                                                                  PAGE    6


X1   11614        31   1060.74   1621.25       652       652       652
X3      10         0         0                   0                   0         0         0
GR  1968.5      1000    1968.5   1016.77    1965.9   1031.5    1965.5   1037.26    1966.9   1060.74
GR  1966.5   1082.27    1964.7   1108.37    1964.2   1144.42    1963.6   1165.29    1964.2   1204.22
GR    1964   1257.43    1960.3   1277.59    1961.9   1298.65    1963.6   1327.11    1963.6   1344.72
GR  1964.6   1354.9     1964.5   1388.25    1964.7   1426.54    1965.2    1464.8      1965   1516.16
GR  1965.3   1552.81      1965   1601.59    1965.5   1621.25    1964.9   1637.89    1964.6   1659.07
GR    1965      1682      1965   1710.33    1966.1      1767    1966.5   1831.92    1966.5   1883.35
GR    1968      1980

X1   12202        39   1416.33   1531.53       588       588       588
X3
GR  1973.5      1000    1973.9    1041.1    1972.6   1049.1    1972.3   1055.57    1973.5   1078.41
GR  1973.2   1102.18    1971.8   1117.54      1971   1136.36    1972.7   1151.28    1972.1    1159.6
GR  1972.4   1180.73    1973.1   1194.37    1972.7   1209.54    1972.8   1239.18    1972.2   1280.99
GR  1971.6   1315.18    1971.4    1359.1    1971.4   1416.33    1962.7   1437.46    1963.5   1446.89
GR  1964.3   1491.07    1967.2   1507.08    1974.3   1531.53    1971.7   1550.54    1972.2   1562.12
GR  1969.8   1576.39    1969.9   1600.21    1969.6   1662.22    1969.7   1729.13    1968.1   1735.53
GR  1969.8    1750.2    1968.1   1791.98    1969.1   1799.86    1967.7   1808.69    1969.9   1822.11
GR  1969.8   1885.59      1974   1909.53    1974.1    1930.2    1972.2   1957.33

X1   13094        34   1507.22   1754.18       892       892       892
X3      10         0         0         0         0         0         0         0         0
GR  1980.1      1000    1980.2   1028.38    1979.8   1031.96      1981   1052.72    1980.7   1076.61
GR  1979.6   1099.46    1978.5   1123.34      1980   1128.65      1980   1136.28    1977.8   1145.37
GR  1980.6   1153.56    1979.4   1161.62    1978.9    1198.7    1978.6   1271.71    1978.1    1318.1
GR  1978.4   1368.29    1978.3   1434.68      1978   1507.22    1964.9    1530.8    1964.7   1554.39
GR  1965.3   1602.79      1968   1610.61    1974.3   1658.31    1975.2   1678.04    1976.4   1711.3
GR  1977.6   1754.18    1976.8   1790.55    1977.8   1826.85    1978.5   1884.66    1978.4   1937.24
GR  1978.7   2013.58    1978.2   2063.28      1978   2130.51      1980      2400

X1   14167        45   1672.71   2003.74      1073      1073      1073
X3      10
GR  1989.9      1000    1990.5   1040.67    1990.3   1060.84    1989.9   1069.03    1990.6   1091.31
GR  1990.4   1118.27    1988.9   1140.74    1988.5   1163.72    1988.7   1187.86    1988.4   1236.13
GR  1988.8   1269.36    1987.5   1275.64    1990.8   1283.64    1989.5   1291.56    1988.8   1321.74
GR  1988.4   1390.82    1988.6   1465.28    1988.4   1531.6     1987.8   1590.63    1987.5      1656
GR  1987.8   1672.71    1970.3   1708.36    1970.6   1765.73      1973   1781.86    1979.9   1802.41
GR  1979.9   1820.98    1983.2   1834.21    1983.4   1869.28    1983.8   1911.87    1983.5   1953.67
GR  1984.2   2003.74      1984   2066.64    1983.5   2081.1       1984   2122.85    1985.2   2166.7
GR  1985.7   2206.72    1986.2   2266.33    1985.9   2315.3     1985.9   2372.26    1984.4   2391.21
GR    1989   2407.95      1989   2413.66    1990.6   2419.39      1989   2424.37    1989.4   2456.46

    SECTION 14368 CUT FROM CNLV TOPO

X1   14368        15      1540      1625       201       201       201                 -2.4
GR    1994      1000      1994      1100      1992      1300      1990      1520      1988      1540
GR    1986      1545      1985      1560      1985      1600      1986      1620      1988      1625
GR    1990      1975      1990      2025      1990      2125      1992      2290      1994      2307

1
    15APR98      13:58:20                                                                  PAGE    7


X1   15114        41   1574.57   1764.17       746       746       746
X3      10         0         0         0         0         0         0         0         0
GR  1995.8      1000    1995.7   1016.07    1994.6   1024.33    1998.4   1031.82    1997.1   1038.62
GR  1997.5   1045.61    1997.1   1066.88    1997.7   1100.17    1997.1   1105.06    1995.7   1143.88
GR  1999.3   1154.57    1997.8   1161.14    1997.2   1212.87    1995.8   1279.05    1994.5    1342.8
GR  1993.5   1403.18    1992.7   1471.87    1992.4   1512.27    1991.9   1574.57    1990.6   1628.15
GR  1989.7   1649.09    1980.6    1683.4    1981.4   1710.99    1980.9   1747.36    1988.4   1764.17
GR  1989.7   1825.53    1989.9   1910.87    1990.3   1988.92    1990.3   2014.51    1989.6   2113.37
GR  1991.8   2134.73    1991.8   2175.51    1991.5   2213.67      1992   2272.76    1993.1   2287.01
GR  1993.1   2302.85    1991.5   2319.43    1991.7   2362.97    1991.1   2406.64    1993.4   2420.8
GR  1993.5   2469.97
    SECTION 15667 CUT FROM CNLV TOPO

X1   15667        19      1505      1672       553       553       553                 -2.4
X3      10
GR    2006      1000      2004      1010      2002      1030      2002      1040      2002      1150
GR    2000      1170      1998      1240      1996      1505      1992      1530      1992      1580
GR    1994      1660      1996      1672      1997      1950      1997      2180      1998      2315
GR    2000      2385    2000.5      2500      2002      2750      2004      2830

X1   16546        51   1033.85   2193.69       879       879       879
X3      10
GR  2006.9      1000    2006.8   1010.78    2006.1   1016.3     2006.7   1024.48    2006.8   1033.85
GR  2005.8   1039.27    2006.4   1045.74    2005.4   1105.06    2005.9   1124.21    2004.8    1165.3
GR  2004.5   1207.41    2003.2    1248.7    2002.7   1303.12    2003.2   1323.23    2003.7   1363.28
GR    2003   1384.95    2002.4   1422.56    2002.9   1449.26    2002.1   1478.94    2001.6   1523.77
GR  1999.6    1542.4    1994.6   1560.28    1994.9   1595.91      1993   1611.38    1993.5   1666.94
GR  1994.8   1684.76    2001.8   1696.43    2002.6   1732.45    2002.1   1766.78    2003.9   1784.85
GR  2006.1   1817.89      2007   1842.65    2007.4   1867.41    2006.7   1892.85    2009.1   1918.63
GR  2008.6   1957.57    2008.3   2006.72    2008.7   2052.44    2009.6   2074.93    2009.6   2122.66
GR  2013.1   2156.53    2013.9   2193.69    2010.8   2246.21    2011.1    2266.5    2009.9   2285.66
GR  2011.5   2296.24    2014.4   2329.51    2009.4   2361.01    2013.7   2373.12    2009.6   2383.61
GR  2008.7   2409.39

NC     .045      .045      .045       0.1       0.3
X1   17058        43   1359.48   1938.16       512       512       512
```

```
X3      10          0          0          0          0          0          0          0          0
GR    2013       1000       2013    1073.16     2013.6    1143.99     2013.8    1197.07     2013.8    1251.55
GR  2013.8    1308.43     2013.8    1359.48     2013.3     1403.3     2012.6    1443.16     2010.6    1475.15
GR  2011.5    1499.88     2007.2    1508.86     2006.6    1524.38     2011.1    1542.91     2004.9    1561.98
GR  2006.2    1588.21     2004.6    1623.75     2006.7    1633.73     2005.4     1671.7     2005.6    1712.49
GR  2010.9    1735.99       2013     1760.7     2014.1    1799.91     2016.4    1839.49       2018    1893.93
GR    2019    1938.16     2018.8    1979.65     2017.8    2023.12     2016.8    2052.36     2016.9    2076.96
GR  2019.5    2097.45     2019.4    2117.17     2016.7    2144.75     2015.5     2171.7     2016.4    2196.52
GR  2018.6    2219.04     2017.6    2235.65     2015.1    2278.14     2016.4    2314.03       2014    2356.58
GR  2012.9    2417.09     2009.4    2453.61     2008.7     2504.6

1
    15APR98      13:58:20                                                                    PAGE     8


X1    17612         47    1599.17    2107.09        554        554        554
X3       10
GR  2017.5       1000     2017.9    1014.14     2019.1    1061.46     2018.6    1107.82     2018.6    1146.75
GR  2019.4    1149.73       2018    1156.88     2018.9    1169.22     2019.4     1218.1     2019.3    1281.77
GR  2019.5    1337.02     2019.2    1373.49     2020.2    1403.28     2019.5    1447.41     2020.7    1473.98
GR  2020.2    1530.55     2018.8     1547.3     2018.2    1568.04     2019.6    1578.58     2020.2    1599.17
GR  2019.8    1621.27     2015.4    1638.14     2013.6    1657.35     2014.7    1708.33     2011.3    1714.43
GR  2014.2    1726.74     2014.4    1742.41     2013.8    1761.75     2014.8     1779.7       2011    1804.57
GR  2009.2    1843.45     2009.5    1862.85     2013.9    1873.55     2016.8    1894.29     2017.7     1912.3
GR  2017.3    1950.29     2019.1    1985.62     2019.6    2028.19     2020.6    2041.68       2022    2084.98
GR  2023.6    2107.09     2022.4    2120.89     2022.4    2158.33       2024    2187.61       2025    2213.62
GR  2025.4    2259.48     2025.1       2309

     ADDED 3 POINTS TO LEFT BANK FROM KENNY TOPO 1/20

X1    18436         44    1374.66    2012.84        824        824        824
X3       10
GR    2024        780       2024        880       2024        965     2025.8       1000     2025.9    1060.03
GR  2025.5    1101.54     2025.5    1161.04     2025.7    1213.91     2026.5    1261.85     2026.7    1291.71
GR  2027.2    1333.82     2028.2    1374.86     2027.8    1416.23     2027.8    1469.12     2027.2    1499.51
GR  2025.6    1535.68     2023.2    1577.09     2021.5    1611.73     2019.6     1648.4     2019.1    1670.38
GR  2019.3    1692.62     2021.2    1722.68     2021.8    1742.03     2022.1    1774.31     2022.2    1800.18
GR    2024    1831.25     2025.3    1850.91     2025.3    1882.76     2025.1    1914.54     2026.7    1942.83
GR  2027.8    1971.11     2028.2    2012.84     2027.5    2047.72       2028    2090.73     2028.8    2121.56
GR    2029    2161.18     2028.7    2214.59     2029.6    2257.8      2031.1    2294.58       2033     2320.6
GR  2034.6    2346.17     2034.6    2360.41     2033.6    2385.33     2030.5    2447.19

   DEBRIS REPRESENTED BY CROSS SECTIONS 18462 AND 18472
   SECTION 18462 CUT FROM CNLV TOPO

X1    18462         14         32        429         26         26         26                 -2.4
GR    2032          0       2032         32       2030         42       2028         57       2026         70
GR  2022.4        131     2022.4        194       2024        209       2024        232       2026        234
GR    2028        336       2030        341       2032        429       2034        479

   SECTION 18462 DUPLICATED 10' U/S

X1    18472         14         32        429         10         10         10                 -2.4
GR    2032          0       2032         32       2030         42       2028         57       2026         70
GR  2022.4        131     2022.4        194       2024        209       2024        232       2026        234
GR    2028        336       2030        341       2032        429       2034        479

    SECTION 18619 CUT FROM CNLV TOPO

X1    18619         25          0        397        147        147        147                 -2.4
GR    2029          0       2028         50       2026         80       2024        102       2024        128
GR    2026        180       2027        215       2027        227       2026        248       2024        264
GR    2024        342       2026        347       2028        364       2030        370       2032        397
GR    2032        418       2030        430       2028        465       2028        491       2030        555
GR    2031        590       2032        709       2034        789       2034        797       2034        894

    SECTION 18710 CUT FROM CNLV TOPO
1
    15APR98      13:58:20                                                                    PAGE     9


X1    18710         23       1000       1700         91         91         91                 -2.4
GR    2031       1000       2030       1070       2030       1125       2028       1160       2026       1180
GR    2026       1210       2030       1220       2030       1240       2018       1260       2018       1310
GR    2020       1345       2022       1380       2024       1410       2026       1435       2028       1450
GR    2030       1535       2032       1580       2032       1700       2038       1735       2038       1745
GR    2034       1770       2034       1865       2036       2095

    SECTION 19020 CUT FROM CNLV TOPO

X1    19020         13       1000       1470        310        310        310                 -2.4
GR    2032       1000       2030       1050       2028       1090       2026       1110       2024       1130
GR    2022       1155       2020       1180       2020       1370       2022       1430       2030       1465
GR    2032       1470       2034       1575       2036       1610

    SECTION 19215 CUT FROM CNLV TOPO

X1    19215         13       1000       1330        195        195        195                 -2.4
GR    2036       1000       2034       1025       2032       1038       2032       1070       2030       1089
GR    2028       1098       2028       1119       2030       1125       2032       1160       2032       1260
GR    2034       1272       2038       1300       2040       1330


X1    19802         46     1510.5    2179.13        587        587        587
X3       10
GR  2041.6       1000     2041.5    1046.48     2039.3    1081.39     2038.7    1110.52     2039.7    1154.42
GR  2040.5    1184.19     2038.7    1210.92     2034.8    1249.33     2032.9    1287.07     2031.9    1300.58
```

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GR     2032    1315.86     2034.6    1346.74     2036.8     1373.6     2039.7    1416.99     2042.4    1448.51
GR   2044.4    1482.22     2044.4     1510.5     2043.7    1540.75     2043.7    1569.59     2040.9    1599.88
GR   2039.5    1643.73     2038.4    1703.43     2038.9    1715.29     2037.5    1725.92     2034.5     1762.3
GR   2034.3     1780.5     2032.5    1794.35       2032    1814.83     2032.2    1837.85     2032.7     1857.1
GR   2033.5    1881.06     2034.3    1914.07     2036.2    1954.17     2036.5    1979.88     2038.2    2000.14
GR   2039.5    2048.44     2040.8    2101.47     2041.2    2137.26     2041.3    2179.13     2040.3    2206.98
GR   2040.1    2282.34     2040.5    2296.63       2041    2352.88     2041.4    2379.33     2041.7    2393.79
GR   2046.5    2440.08

X1     20595         30    1175.03    1780.94        793         793        793
X3        10
GR    2053.4       1000     2050.3     1053.9     2049.5    1072.42     2048.6    1147.63     2048.5    1175.03
GR    2047.3     1213.4     2042.3    1233.31     2041.5    1252.21     2041.7    1278.91     2040.3    1292.04
GR    2040.8    1307.82     2040.3    1315.35     2041.5    1329.05     2041.5     1367.1     2039.4    1374.77
GR    2039.3    1391.01     2042.2    1402.49     2042.1    1412.56     2043.6    1428.19     2043.8    1441.31
GR    2045.9    1463.28     2045.7     1509.8       2046    1549.61     2046.9    1571.99     2046.6    1606.16
GR    2046.3    1620.17     2046.5    1666.78     2047.3    1701.91       2047     1730.5     2048.2    1780.94

X1     21291         40    1082.37    1603.93        696         696        696
X3        10
GR    2057.5       1000     2055.7    1041.47     2054.1    1052.27     2054.9    1065.72     2056.1    1082.37
GR    2055.6    1096.57     2049.8    1121.39     2050.1    1157.01     2050.9    1186.54     2050.7    1226.18
GR    2049.7    1271.29     2048.6    1312.57     2046.2    1326.33     2045.8    1342.04     2048.1    1357.87
GR    2048.9    1388.15       2049    1432.26     2045.4    1440.93     2045.4    1453.12     2046.2    1460.09
GR    2047.4    1479.88     2046.7    1508.66     2048.6    1525.56     2047.4    1541.05     2049.2    1557.32
GR    2054.2    1580.56     2055.5    1603.93     2055.3    1614.05     2050.1    1634.03     2051.5    1646.85
GR    2050.2    1662.75     2053.2    1691.04     2054.7    1703.17     2054.1    1717.68     2054.8    1740.29
1
     15APR98      13:58:20                                                                                PAGE   10


GR    2054.2    1755.38     2055.3    1779.76     2056.9    1804.58     2059.6    1840.52     2058.5    1875.28

X1     22138         45    1153.02     1845.3        847         847        847
X3        10
GR     2065       1000     2064.2    1028.21     2064.2    1044.93     2064.8    1062.86       2065    1122.17
GR   2065.1    1153.02     2063.6    1171.24       2057    1198.51     2056.9    1209.25     2055.3    1220.44
GR   2055.9       1233       2055    1254.99     2055.5    1267.43     2054.9    1288.54     2052.6    1299.22
GR     2054    1331.64     2053.4    1343.77     2054.8    1353.31     2053.5    1364.18     2055.4    1376.62
GR   2055.7    1393.52     2056.7    1440.89     2057.5    1492.61     2057.6    1551.85     2057.4    1558.95
GR   2057.5    1574.03     2059.6    1587.92     2057.9    1602.87     2058.3    1624.73     2058.9      1664
GR     2059    1681.88     2061.6     1696.4       2061    1715.37     2064.1      1752       2066    1780.08
GR   2066.5    1808.11     2066.7     1845.3     2065.3    1884.82     2064.3    1915.48     2063.9    1951.16
GR   2062.8    1987.23     2061.8    2019.52     2060.2    2043.65     2059.3    2078.64     2058.5    2091.44

X1     23230         27    1139.83    1531.88       1092        1092       1092
X3        10
GR    2076.7       1000     2076.1    1016.84     2074.9    1061.89     2068.1    1081.86     2075.4    1111.27
GR    2075.5    1139.83     2074.2    1166.71     2066.5    1193.41     2065.6    1213.71     2066.8    1235.89
GR    2064.9    1255.54     2065.5    1264.15     2064.8    1280.17     2065.2    1292.98     2065.1     1311.7
GR    2063.6    1322.89     2063.2    1333.84     2064.3    1352.07     2063.1    1361.54     2064.2    1397.04
GR    2065.5    1403.83     2065.5    1425.63     2066.5    1435.79     2066.6    1449.87     2072.1    1482.47
GR      2082    1514.37     2082.3    1531.88

X1     24530         24    1057.36    1506.91       1300        1300       1300
X3        10
GR    2089.3       1000     2089.1    1057.36     2088.1      1097     2087.5    1131.87     2079.2    1157.95
GR    2079.2    1170.13     2077.3    1177.86     2078.6    1189.17       2079    1212.67     2077.7    1231.33
GR    2076.5    1287.94     2077.2     1303.9     2078.3    1319.85     2078.3    1331.35     2077.1    1340.46
GR    2076.8    1364.53     2077.8    1380.92     2077.8    1409.89     2075.6    1424.15     2075.4    1434.07
GR    2085.4    1460.45     2105.9    1487.26     2106.5    1506.91     2104.8    1528.79

X1     25616         35    1184.78    1836.38       1086        1086       1086
X3        10
GR    2101.4       1000      2101    1045.55     2099.9    1064.96     2098.8    1097.76     2100.6     1140.3
GR    2100.5    1184.78     2100.1    1232.97     2098.8    1266.02     2095.4    1298.04     2093.6    1320.41
GR    2090.3    1337.94     2088.6     1351.7     2085.1      1366.4    2085.5    1380.16       2088    1389.21
GR      2088    1401.52     2086.9    1411.19     2086.2    1423.94     2087.8    1440.11     2088.3    1475.16
GR    2089.9    1536.61     2090.5    1565.47     2089.9    1577.62     2091.1    1606.85     2095.5     1630.6
GR    2096.8     1656.2     2092.3     1681.9       2092    1698.26     2094.5    1711.86     2095.2    1722.18
GR      2098    1749.32       2098    1767.19     2099.3      1795     2100.6    1836.38     2099.8    1884.62

X1     26383         35    1170.09    1701.35        767         767        767
X3        10
GR    2113.1       1000     2111.6    1036.82     2109.6    1062.2      2108.4    1109.45     2106.8    1118.94
GR    2109.3    1139.73     2109.8    1170.09     2108.5    1193.39     2105.4    1226.56     2095.8    1254.34
GR    2096.8    1269.86     2095.3    1278.59     2094.3    1298.05     2092.4     1307.9     2091.9    1327.03
GR    2090.2    1338.57       2090    1360.32     2092.4    1367.29     2093.1    1381.56     2092.1    1414.58
GR    2091.1    1427.75     2096.3    1445.95     2101.5    1471.22     2102.6    1501.08     2101.3      1515
GR    2100.7    1570.49     2102.6    1604.17     2103.1    1638.74     2103.7    1673.36     2105.6    1701.35
GR      2106    1729.64     2104.9    1761.13     2107.4    1791.33     2107.1    1828.72     2106.3    1856.7


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X1     26845         20    1043.87    1353.27        462         462        462
X3        10
GR    2122.6       1000     2113.7    1043.87     2098.3    1105.81     2097.6    1132.08     2096.7    1171.4
GR    2097.4    1206.41     2097.5    1234.01       2099    1254.7      2099.4    1282.95     2098.8    1307.72
GR    2101.5    1353.27     2100.7    1407.61     2097.4    1421.74     2097.1    1438.85     2093.6    1451.45
GR    2097.1    1460.19     2097.3    1466.66     2103.6    1500.25     2106.8    1516.18     2103.9    1548.24


X1     28095         45    1592.11    2194.29       1250        1250       1250
X3        10          0          0          0                                    0          0
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GR   2138.4      1000     2138.2   1029.86   2137.8   1041.72   2137.5   1079.24   2136.6   1085.22
GR   2136.9   1106.65     2136.1   1121.97   2135.9   1143.76   2137.6   1185.29   2138.4   1224.73
GR   2138.2   1259.68     2116.7   1305.35   2117.2   1323.24   2116.7   1338.21   2133.5   1373.16
GR   2131.8   1393.74     2142.8    1433.5   2143.2   1458.81   2142.5   1466.24   2143.4   1488.98
GR   2143.2   1504.74     2143.6   1560.99   2142.6   1592.11   2130.9   1652.86     2124   1688.71
GR   2124.1   1717.38     2125.2   1766.27   2115.1   1801.58   2115.6   1822.89   2114.6   1874.78
GR     2114   1926.49       2113   1974.97   2110.5   1990.52   2110.5   2002.38     2112   2017.28
GR   2111.7   2045.77     2110.5   2056.12   2112.1   2071.74   2110.8   2089.09   2110.3    2102.8
GR   2110.4   2113.93     2110.5   2130.99   2132.1   2178.79     2134   2194.29     2134   2226.66

X1    29413        36    1187.41   1497.39     1318     1318     1318
X3       10         0          0         0        0        0        0         0         0
GR   2141.9      1000     2141.2   1038.06   2138.8   1051.71   2126.8    1080.2   2126.3    1093.3
GR   2126.5   1109.82     2140.3   1144.77     2140   1159.82   2143.3   1187.41   2142.3   1229.96
GR   2127.5   1305.13     2126.4   1322.24   2125.6   1373.77   2125.1   1426.86   2131.3   1454.75
GR   2131.7   1476.36     2133.7   1497.39   2133.1   1533.21   2132.3   1544.82   2133.1   1549.13
GR   2133.1   1565.76     2131.5   1579.53   2130.7   1613.22     2131   1631.42   2123.7   1655.79
GR   2123.6   1674.82       2122   1684.19     2119   1693.95     2119   1700.59   2122.6   1711.72
GR   2122.7   1719.51     2119.8   1734.23   2122.4   1747.27   2122.4   1754.62   2133.5   1782.94
GR     2134   1814.13

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 1
0

 CCHV=      .300 CEHV=      .500
 *SECNO 5852.000

 3265 DIVIDED FLOW

 3280 CROSS SECTION    5852.00 EXTENDED       1.00 FEET

   5852.000      12.40    1925.60       .00    1925.60    1926.15        .55        .00        .00    1924.60
     7717.2     2495.7     5025.2      196.3     1200.0      694.5      159.9         .0         .0    1924.60
        .00       2.08       7.24       1.23       .030       .030       .030       .000    1913.20     420.00
    .001170         0.         0.         0.          0          0          0        .00    1416.00    1944.00


 *SECNO 5973.000
  WATER EL=XS CARD=    1925.600

 3265 DIVIDED FLOW

 3280 CROSS SECTION    5973.00 EXTENDED       1.00 FEET

   5973.000      12.40    1925.60       .00        .00    1926.15        .55        .14        .00    1924.60
     7717.2     2495.7     5025.2      196.3     1200.0      694.5      159.9        5.7        3.9    1924.60
        .01       2.08       7.24       1.23       .030       .030       .030       .000    1913.20     420.00
    .001170       120.       120.       120.          0          0          0        .00    1416.00    1944.00


 CCHV=      .100 CEHV=      .300
 *SECNO 6092.000
 3280 CROSS SECTION    6092.00 EXTENDED       1.55 FEET


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.29

   6092.000      12.15    1926.15       .00        .00    1926.25        .10        .06        .05    1922.60
     7717.2     2739.0     3486.2     1491.9     1898.6     1009.0     1265.1       14.7        8.3    1923.10
        .02       1.44       3.46       1.18       .030       .030       .030       .000    1914.00    1000.00
    .000224       127.       127.       127.          2          0          0        .00    1625.33    2625.33


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *SECNO 6370.000

 3301 HV CHANGED MORE THAN HVINS

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .36

   6370.000      10.83    1925.63    1922.15        .00    1926.67       1.04        .13        .28    1925.40
     7717.2     322.3      7380.5       14.3      229.1      882.8       26.4       31.7       15.8    1925.40
        .03       1.41       8.36        .54       .030       .030       .030       .000    1914.80    1315.71
    .001709       278.       278.       278.          6         14          0        .00     717.72    2033.43


 *SECNO 6828.000
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3301 HV CHANGED MORE THAN HVINS

  6828.000     10.03   1926.23      .00      .00   1927.82     1.58      .98      .16   1926.90
    8109.2        .0    8109.2       .0       .0    803.7        .0     41.9     20.1   1928.00
       .04       .00     10.09      .00     .000     .030     .000     .000  1916.20   1776.37
   .002747      458.      458.      458.        3        0        0      .00   100.19   1876.56


*SECNO 7265.000

3301 HV CHANGED MORE THAN HVINS

  7265.000      8.81   1927.31      .00      .00   1929.49     2.18     1.49      .18   1930.00
    8109.2        .0    8109.2       .0       .0    684.5        .0     49.4     21.1   1930.90
       .05       .00     11.85      .00     .000     .030     .000     .000  1918.50   1767.38
   .004372      437.      437.      437.        3        0        0      .00    95.39   1862.76


CCHV=      .100 CEHV=      .300
*SECNO 7730.000

3301 HV CHANGED MORE THAN HVINS

  7730.000      7.77   1929.27      .00      .00   1932.23     2.96     2.51      .23   1933.50
    8109.2        .0    8109.2       .0       .0    587.2        .0     56.1     22.1   1934.20
       .06       .00     13.81      .00     .000     .030     .000     .000  1921.50   1838.45
   .006828      465.      465.      465.        3        0        0      .00    91.09   1929.55


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 8323.000
  8323.000      8.13   1933.33      .00      .00   1936.01     2.67     3.74      .03   1937.90
    8109.2        .0    8109.2       .0       .0    617.9        .0     64.4     23.3   1938.90
       .08       .00     13.12      .00     .000     .030     .000     .000  1925.20   2266.00
   .005856      593.      593.      593.        2        0        0      .00    92.02   2358.02


*SECNO 8794.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  8794.000      3.09   1944.69   1944.69      .00   1945.57      .88     3.67      .18   1945.60
    8109.2        .0    8046.7      62.5       .0   1068.1     17.2     73.5     27.3   1943.60
       .09       .00      7.53      3.62     .000     .030     .030     .000  1941.60   1126.83
   .010918      470.      470.      470.       20       22        0      .00    639.53   1766.36


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 9120.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.70


3470 ENCROACHMENT STATIONS=     1661.3    2712.5  TYPE=       1  TARGET=     1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1945.50

  9120.000     15.36   1946.26   1944.41      .00   1946.58      .32      .96      .06 100000.00
    8109.2        .0    7947.9     161.3       .0   1733.0     124.9     83.7     31.8   1945.50
       .11       .00      4.59      1.29     .000     .029     .035     .000  1930.90   1661.33
   .001492      301.      301.      301.       17       21        0      .00    655.62   2316.95


CCHV=      .100 CEHV=      .300
*SECNO 9237.000
1
   15APR98      13:58:20                                                                PAGE   15

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3280 CROSS SECTION   9237.00 EXTENDED      2.58 FEET


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

  9237.000      6.58   1946.58      .00      .00   1946.80      .22      .21      .01   1948.00
    8109.2        .0    8109.2       .0       .0   2137.4        .0     89.1     33.4   1950.00
       .12       .00      3.79      .00     .000     .045     .000     .000  1940.00   1979.09
```

.002276	117.	117.	117.	3	0	0	.00	571.40	2550.49

*SECNO 9429.000

3470 ENCROACHMENT STATIONS= 1573.0 2815.0 TYPE= 1 TARGET= -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1948.00 ELREA= 1949.10

9429.000	4.93	1947.03	.00	.00	1947.32	.29	.50	.02	1948.00
8109.2	.0	8109.2	.0	.0	1882.5	.0	97.9	35.8	1949.10
.13	.00	4.31	.00	.000	.045	.000	.000	1942.10	1794.32
.003002	192.	192.	192.	3	0	0	.00	512.23	2306.55

*SECNO 10155.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1567.2 2685.3 TYPE= 1 TARGET= -1567.240

10155.000	5.51	1954.21	1954.21	.00	1954.92	.71	4.59	.13	1953.70
8109.2	4857.3	3248.1	3.7	705.0	492.0	2.2	123.6	47.3	1953.80
.16	6.89	6.60	1.65	.045	.045	.045	.000	1948.70	1567.24
.021033	726.	726.	726.	20	12	0	.00	863.75	2430.99

*SECNO 10962.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.42

10962.000	5.65	1960.55	.00	.00	1960.77	.22	5.80	.05	1959.90
8109.2	2896.7	1991.3	3221.2	703.4	582.0	913.5	155.1	65.2	1959.30
.22	4.12	3.42	3.53	.045	.045	.045	.000	1954.90	1077.82
.003585	807.	807.	807.	4	0	0	.00	1075.64	2207.76

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 11614.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1966.90 ELREA= 1965.50

11614.000	5.76	1966.06	1966.06	.00	1966.98	.93	5.03	.21	1966.90
8109.2	.0	7405.6	703.6	.0	935.6	129.4	179.5	78.3	1965.50
.25	.00	7.92	5.44	.000	.045	.045	.000	1960.30	1088.70
.027142	652.	652.	652.	3	8	0	.00	676.07	1764.77

*SECNO 12202.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.42

12202.000	9.14	1971.84	.00	.00	1972.48	.64	5.47	.03	1971.40
8109.2	65.0	5036.0	3008.2	53.3	669.1	753.4	196.7	86.8	1974.30
.27	1.22	7.53	3.99	.045	.045	.045	.000	1962.70	1117.09
.004645	588.	588.	588.	4	0	0	.00	585.54	1897.22

*SECNO 13094.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	10.77	1975.47	.00	.00	1976.25	.77	3.73	.04	1978.00
8109.2	.0	8109.2	.0	.0	1149.8	.0	223.5	94.6	1977.60
.31	.00	7.05	.00	.000	.045	.000	.000	1964.70	1511.77
.003776	892.	892.	892.	3	0	0	.00	173.85	1685.61

*SECNO 14167.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	9.99	1980.29	.00	.00	1981.58	1.29	5.18	.16	1987.80
8109.2	.0	8109.2	.0	.0	888.7	.0	248.7	98.4	1984.20
.34	.00	9.12	.00	.000	.045	.000	.000	1970.30	1688.02
.006382	1073.	1073.	1073.	2	0	0	.00	134.50	1822.52

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14368.000	5.87	1988.47	1988.47	.00	1989.35	.88	1.50	.04	1985.60
8109.2	247.5	4378.3	3483.4	78.5	461.1	813.8	253.8	100.5	1985.60
.35	3.15	9.50	4.28	.045	.045	.045	.000	1982.60	1424.77
.008787	201.	201.	201.	20	14	0	.00	771.65	2196.42

*SECNO 15114.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.98

15114.000	11.44	1992.04	.00	.00	1992.36	.32	2.96	.06	1991.90
8109.2	.3	5867.1	2241.7	1.2	1143.0	898.3	282.9	114.1	1988.40
.40	.26	5.13	2.50	.045	.045	.045	.000	1980.60	1557.26
.002246	746.	746.	746.	5	0	0	.00	814.58	2412.42

*SECNO 15667.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15667.000	5.61	1995.21	1995.21	.00	1996.06	.85	2.14	.16	1993.60
8109.2	440.2	6357.6	1311.4	170.7	770.1	471.2	304.8	125.4	1993.60
.42	2.58	8.26	2.78	.045	.045	.045	.000	1989.60	1292.31
.008176	553.	553.	553.	20	8	0	.00	969.40	2261.71

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 16546.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	8.02	2001.02	.00	.00	2002.04	1.03	5.93	.05	2006.80
8109.2	.0	8109.2	.0	.0	997.3	.0	329.1	136.9	2013.90
.45	.00	8.13	.00	.000	.045	.000	.000	1993.00	1529.25
.005663	879.	879.	879.	3	0	0	.00	165.87	1695.12

CCHV= .100 CEHV= .300
*SECNO 17058.000

3265 DIVIDED FLOW

3280 *CROSS SECTION 17058.00 EXTENDED* 1.02 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 *PROBABLE MINIMUM SPECIFIC ENERGY*
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	5.12	2009.72	2009.72	.00	2011.49	1.78	4.95	.23	2013.80
8109.2	.0	8109.2	.0	.0	758.0	.0	339.5	139.1	2019.00
.46	.00	10.70	.00	.000	.045	.000	.000	2004.60	1503.60
.020125	512.	512.	512.	20	14	0	.00	217.18	1730.74

*SECNO 17612.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.61

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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2020.20 ELREA=      2023.60

 17612.000      8.08   2017.28       .00       .00   2018.11       .83      6.53       .09   2020.20
    8109.2        .0    8109.2        .0        .0    1106.9        .0     351.3     142.2   2023.60
       .48        .00      7.33      .00       .000     .045      .000      .000   2009.20   1630.94
   .007722       554.      554.      554.         4         0         0       .00    272.93   1903.86


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 18436.000
3280 CROSS SECTION  18436.00 EXTENDED      1.05 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2028.20 ELREA=      2028.20

 18436.000      5.95   2025.05       .00       .00   2026.07      1.02      7.90       .06   2028.20
    8109.2        .0    8109.2        .0        .0    1000.3        .0     371.2     147.7   2028.20
       .51        .00      8.11      .00       .000     .045      .000      .000   2019.10   1545.18
   .012220       824.      824.      824.         6         0         0       .00    301.94   1847.12


*SECNO 18462.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 18462.000      5.41   2025.41   2025.41       .00   2026.94      1.53       .41       .15   2029.60
    8109.2        .0    8109.2        .0        .0     816.5        .0     371.8     147.8   2029.60
       .51        .00      9.93      .00       .000     .045      .000      .000   2020.00     58.26
   .020584        26.       26.       26.        20        11         0       .00    267.83    326.09


*SECNO 18472.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

 18472.000      6.18   2026.18       .00       .00   2027.14       .96       .14       .06   2029.60
    8109.2        .0    8109.2        .0        .0    1031.8        .0     372.0     147.9   2029.60
       .51        .00      7.86      .00       .000     .045      .000      .000   2020.00     52.68
   .010241        10.       10.       10.         6         0         0       .00    284.75    337.44


*SECNO 18619.000

3265 DIVIDED FLOW

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3280 CROSS SECTION  18619.00 EXTENDED      1.02 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

 18619.000      6.02   2027.62       .00       .00   2028.00       .38       .81       .06   2026.60
    8238.3        .0    7876.4     361.9        .0    1560.7     153.6     376.6     149.2   2029.60
       .52        .00      5.05      2.36      .000     .045      .045      .000   2021.60       .00
   .003457       147.      147.      147.         2         0         0       .00    496.14    555.73


*SECNO 18710.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.51

 18710.000      12.42  2028.02       .00       .00   2028.23       .21       .21       .02   2028.60
    8536.0        .0    8536.0        .0        .0    2322.4        .0     380.9     150.3   2029.60
       .53        .00      3.68      .00       .000     .045      .000      .000   2015.60   1040.74
   .001634        91.       91.       91.         4         0         0       .00    503.66   1544.40


*SECNO 19020.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.19
```

19020.000	10.75	2028.35	.00	.00	2028.44	.09	.20	.01	2029.60
8536.0	.0	8536.0	.0	.0	3497.8	.0	401.6	153.6	2029.60
.56	.00	2.44	.00	.000	.045	.000	.000	2017.60	1031.32
.000341	310.	310.	310.	2	0	0	.00	435.55	1466.87

*SECNO 19215.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

19215.000	6.70	2032.30	2032.30	.00	2033.94	1.64	.21	.47	2033.60
8536.0	.0	8536.0	.0	.0	829.6	.0	411.2	155.2	2037.60
.57	.00	10.29	.00	.000	.045	.000	.000	2025.60	1016.26
.020854	195.	195.	195.	20	14	0	.00	260.64	1276.90

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 19802.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.89

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2044.40 ELREA= 2041.30

19802.000	7.37	2039.37	.00	.00	2039.93	.55	5.87	.11	2044.40
8536.0	.0	8536.0	.0	.0	1429.5	.0	426.5	159.6	2041.30
.59	.00	5.97	.00	.000	.045	.000	.000	2032.00	1650.67
.005856	587.	587.	587.	3	0	0	.00	393.02	2043.69

*SECNO 20595.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2048.50 ELREA= 2048.20

20595.000	6.64	2045.94	.00	.00	2047.06	1.12	6.97	.17	2048.50
8536.0	.0	8536.0	.0	.0	1004.9	.0	448.6	166.1	2048.20
.62	.00	8.49	.00	.000	.045	.000	.000	2039.30	1218.83
.014617	793.	793.	793.	2	0	0	.00	322.39	1541.22

*SECNO 21291.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.70

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2056.10 ELREA= 2055.50

21291.000	6.86	2052.26	.00	.00	2052.71	.44	5.58	.07	2056.10
8536.0	.0	8536.0	.0	.0	1594.7	.0	469.4	172.3	2055.50
.66	.00	5.35	.00	.000	.045	.000	.000	2045.40	1110.88
.005048	696.	696.	696.	3	0	0	.00	460.65	1571.53

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 22138.000

3265 DIVIDED FLOW

3280 CROSS SECTION 22138.00 EXTENDED .32 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2065.10 ELREA= 2066.70

22138.000	6.22	2058.82	.00	.00	2059.68	.86	6.85	.13	2065.10
8536.0	.0	8536.0	.0	.0	1143.9	.0	496.0	181.3	2066.70
.69	.00	7.46	.00	.000	.045	.000	.000	2052.60	1191.01
.015005	847.	847.	847.	2	0	0	.00	455.41	1658.50

*SECNO 23230.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.48

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	6.45	2069.55	.00	.00	2070.33	.79	10.64	.01	2075.50
8536.0	.0	8536.0	.0	.0	1200.5	.0	525.4	190.5	2082.30
.73	.00	7.11	.00	.000	.045	.000	.000	2063.10	1182.87
.006837	1092.	1092.	1092.	3	0	0	.00	284.43	1467.30

*SECNO 24530.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2089.10 ELREA= 2106.50

24530.000	5.70	2081.10	.00	.00	2082.18	1.09	11.76	.09	2089.10
8536.0	.0	8536.0	.0	.0	1019.7	.0	558.5	199.2	2106.50
.77	.00	8.37	.00	.000	.045	.000	.000	2075.40	1152.00
.012524	1300.	1300.	1300.	4	0	0	.00	297.09	1449.09

*SECNO 25616.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2100.50 ELREA= 2100.60

25616.000	7.61	2092.72	.00	.00	2093.56	.85	11.36	.02	2100.50
8536.0	.0	8536.0	.0	.0	1154.1	.0	585.6	206.8	2100.60
.81	.00	7.40	.00	.000	.045	.000	.000	2085.10	1325.11
.008863	1086.	1086.	1086.	5	0	0	.00	313.07	1702.15

*SECNO 26383.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2109.80 ELREA= 2105.60

26383.000	8.43	2098.43	.00	.00	2099.39	.97	5.79	.04	2109.80
8536.0	.0	8536.0	.0	.0	1080.7	.0	605.3	211.4	2105.60
.84	.00	7.90	.00	.000	.045	.000	.000	2090.00	1246.75
.006516	767.	767.	767.	3	0	0	.00	209.52	1456.27

*SECNO 26845.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2113.70 ELREA= 2101.50

26845.000	5.19	2101.89	.00	.00	2102.57	.68	3.14	.03	2113.70
8536.0	.0	5779.4	2756.6	.0	907.4	388.5	617.9	214.6	2101.50
.86	.00	6.37	7.10	.000	.045	.045	.000	2096.70	1091.37
.007118	462.	462.	462.	2	0	0	.00	399.76	1491.13

*SECNO 28095.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2142.60 ELREA= 2134.00

28095.000	5.31	2115.61	2115.58	.00	2116.93	1.32	14.17	.19	2142.60
8536.0	.0	8536.0	.0	.0	926.2	.0	649.8	225.3	2134.00
.90	.00	9.22	.00	.000	.045	.000	.000	2110.30	1799.80
.020805	1250.	1250.	1250.	7	5	0	.00	342.50	2142.30

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 29413.000

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 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2143.30 ELREA=      2133.70

  29413.000       5.77   2130.87   2130.87       .00   2133.08       2.21      25.91       .27   2143.30
     8536.0         .0    8536.0        .0         .0     715.3         .0      674.6     233.0    2133.70
        .93        .00     11.93        .00       .000     .045       .000       .000   2125.10   1288.00
    .018601     1318.     1318.     1318.         20          8          0        .00    164.83    1452.83


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  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
     391.97    391.99        .01     391.97    391.99        .01         5  1926.153  1925.665  6092.000  6397.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
        .00       .00        .00     391.97    391.99        .01         5  1925.665  1926.269  6397.000  6842.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
        .00       .00        .00     391.97    391.99        .01         5  1926.269  1927.403  6842.000  7287.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
     129.11    128.67        .34     521.08    520.66        .08         5  2026.176  2027.621 18472.000 18619.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
     297.72    297.87        .05     818.81    818.53        .03         5  2027.621  2028.018 18619.000 18710.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
        .00       .00        .00     818.81    818.53        .03         5  2028.018  2028.346 18710.000 19020.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS      USWS      DSSNO     USSNO
        .00       .00        .00     818.81    818.53        .03         5  2028.346  2032.300 19020.000 19215.000

 T1       FEMA 500-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLV WASH W/O DIVERSION

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0         3                                                                          1926.2

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2                    -1

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      SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
      Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
      TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
      SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  *PROF 2
0

  CCHV=      .300 CEHV=      .500
  *SECNO 5852.000
  3280 CROSS SECTION    5852.00 EXTENDED       1.60 FEET

    5852.000      13.00   1926.20        .00   1926.20   1926.92        .72        .00        .00   1924.60
     13343.2     5904.3     6650.5     788.4     1913.4     728.2      354.0         .0         .0   1924.60
         .00       3.09       9.13       2.23       .030       .030       .030       .000   1913.20     420.00
     .001750         0.         0.         0.          0          0          0        .00   1613.13    2033.13


  *SECNO 5973.000
   WATER EL=X5 CARD=    1926.200
  3280 CROSS SECTION    5973.00 EXTENDED       1.60 FEET

    5973.000      13.00   1926.20        .00        .00   1926.92        .72        .21        .00   1924.60
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  13343.2    5904.3    6650.5     788.4    1913.4     728.2     354.0       8.3       4.4   1924.60
      .01       3.09      9.13      2.23      .030      .030      .030      .000   1913.20    420.00
  .001750     120.      120.      120.         0         0         0       .00   1613.13   2033.13


CCHV=     .100 CEHV=     .300
*SECNO 6092.000
3280 CROSS SECTION   6092.00 EXTENDED      2.30 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.24
         .
  6092.000     12.90   1926.90       .00       .00   1927.06       .15       .08       .06   1922.60
  13343.2    5152.6    4886.7    3303.9    2443.1    1081.0    1937.6      20.6       9.4   1923.10
      .02       2.11      4.52      1.71      .030      .030      .030      .000   1914.00   1000.00
  .000350     127.      127.      127.         2         0         0       .00   1815.68   2815.68


*SECNO 6370.000
3280 CROSS SECTION   6370.00 EXTENDED       .30 FEET

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  6370.000     12.10   1926.90   1926.90       .00   1927.91      1.00       .19       .26   1925.40
  13343.2    2807.3    9495.0    1040.9    1004.5    1012.0     460.5      45.9      19.5   1925.40
      .03       2.79      9.38      2.26      .030      .030      .030      .000   1914.80   1000.00
  .001794     278.      278.      278.        20        10         0       .00   1324.56   2324.56


*SECNO 6828.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  6828.000     13.32   1929.52   1929.52       .00   1930.75      1.23       .82       .07   1926.90
  14763.7    2821.5   11456.0     486.2     962.7    1145.0     244.5      71.3      32.6   1928.00
      .04       2.93     10.00      1.99      .030      .030      .030      .000   1916.20   1025.28
  .001802     458.      458.      458.        20        11         0       .00   1173.84   2199.12


*SECNO 7265.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  7265.000     13.90   1932.40   1932.40       .00   1933.68      1.29       .77       .02   1930.00
  14933.8    2276.4   12148.6     508.9     832.6    1213.7     273.1      94.7      44.5   1930.90
      .06       2.73     10.01      1.86      .030      .030      .030      .000   1918.50   1063.27
  .001735     437.      437.      437.        20         8         0       .00   1200.29   2263.56


CCHV=     .100 CEHV=     .300
*SECNO 7730.000
3280 CROSS SECTION   7730.00 EXTENDED       .87 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  7730.000     13.57   1935.07   1935.07       .00   1936.67      1.60       .90       .09   1933.50
  14933.9    2100.5   12833.4         .0     762.4    1179.4         .0     117.5      55.2   1934.20
      .07       2.76     10.88       .00      .030      .030      .000      .000   1921.50   1139.70
  .002193     465.      465.      465.        20         5         0       .00    799.70   1939.40


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 8323.000
3280 CROSS SECTION   8323.00 EXTENDED       .12 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  8323.000     13.82   1939.02   1939.02       .00   1940.45      1.43      1.24       .02   1937.90
  14933.9    2389.0   12545.0         .0     979.1    1204.4         .0     145.6      67.3   1938.90
      .09       2.44     10.42       .00      .030      .030      .000      .000   1925.20   1389.43
  .002007     593.      593.      593.        20         8         0       .00    979.57   2369.00
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*SECNO 8794.000
3280 CROSS SECTION    8794.00 EXTENDED        .02 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  8794.000      4.02   1945.62   1945.62       .00   1946.81      1.19      1.76       .02   1945.60
   14933.9        .0   14614.5     319.4        .0    1657.3      57.4     166.6      76.5   1943.60
       .10        .05      8.82      5.57      .030      .030      .030      .000   1941.60   1069.46
   .009381      470.      470.      470.        20        14         0       .00    720.54   1790.00


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 9120.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.23


3470 ENCROACHMENT STATIONS=     1661.3    2712.5  TYPE=      1  TARGET=     1051.170

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1945.50

  9120.000     16.49   1947.39   1945.73       .00   1947.96       .56      1.08       .06 100000.00
   14933.9        .0   14021.2     912.7        .0    2271.8     336.0     181.5      81.3   1945.50
       .12        .00      6.17      2.72      .000      .029      .035      .000   1930.90   1661.33
   .001891      301.      301.      301.        17        20         0       .00    677.59   2388.85


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   15APR98      13:58:20                                                                        PAGE   29

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

CCHV=     .100 CEHV=     .300
*SECNO 9237.000
3280 CROSS SECTION    9237.00 EXTENDED       4.04 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.87


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1950.00

  9237.000      8.04   1948.04       .00       .00   1948.11       .07       .11       .05   1948.00
   14933.9   8537.0     6396.9        .0    3859.7    3043.8        .0     194.3      84.3   1950.00
       .13      2.21      2.10       .00       .045      .045      .000      .000   1940.00   1000.00
   .000539      117.      117.      117.         3         0         0       .00   1570.19   2570.19


*SECNO 9429.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .32


3470 ENCROACHMENT STATIONS=     1573.0    2815.0  TYPE=      1  TARGET=    -1573.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1948.00 ELREA=      1949.10

  9429.000      5.78   1947.88       .00       .00   1948.52       .64       .24       .17   1948.00
   14933.9        .0   14933.9        .0        .0    2328.6        .0     214.6      89.0   1949.10
       .14        .00      6.41       .00       .000      .045      .000      .000   1942.10   1777.31
   .005334      192.      192.      192.         3         0         0       .00    536.68   2313.99


*SECNO 10155.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1567.2    2685.3  TYPE=      1  TARGET=    -1567.240
 10155.000      6.16   1954.86   1954.86       .00   1955.97      1.11      7.00       .14   1953.70
   14933.9   8982.8     5901.5      49.6    1066.8     690.8      15.3     248.8     100.8   1953.80
       .16      8.42      8.54      3.24      .045      .045      .045      .000   1948.70   1567.24
   .022399      726.      726.      726.         2         8         0       .00    881.53   2448.77


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   15APR98      13:58:20                                                                        PAGE   30

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST
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*SECNO 10962.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 *WARNING:* *CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,* KRATIO = 2.51

10962.000	6.71	1961.61	.00	.00	1961.91	.30	5.86	.08	1959.90
14933.9	4937.7	3736.6	6259.5	1050.6	852.0	1494.9	296.7	120.0	1959.30
.22	4.70	4.39	4.19	.045	.045	.045	.000	1954.90	1057.60
.003545	807.	807.	807.	5	0	0	.00	1190.23	2283.91

*SECNO 11614.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11614.000	6.69	1966.99	1966.99	.00	1968.09	1.10	4.57	.24	1966.90
14933.9	126.2	12668.4	2139.3	29.5	1445.9	344.4	335.8	135.5	1965.50
.24	4.28	8.76	6.21	.045	.045	.045	.000	1960.30	1025.30
.019924	652.	652.	652.	4	5	0	.00	889.90	1915.20

*SECNO 12202.000

3265 DIVIDED FLOW

3280 CROSS SECTION 12202.00 EXTENDED .81 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.85

12202.000	10.31	1973.01	.00	.00	1973.89	.88	5.78	.02	1971.40
14933.9	911.1	7351.4	6671.4	316.2	796.1	1171.2	363.5	147.0	1974.30
.26	2.88	9.23	5.70	.045	.045	.045	.000	1962.70	1046.58
.005830	588.	588.	588.	3	0	0	.00	814.52	1957.33

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 13094.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1978.00 ELREA= 1977.60

13094.000	13.23	1977.93	.00	.00	1979.15	1.21	5.16	.10	1978.00
14933.9	.0	14836.6	97.3	.0	1674.6	50.5	404.5	158.8	1977.60
.29	.00	8.86	1.93	.000	.045	.045	.000	1964.70	1507.34
.005735	892.	892.	892.	4	*0*	*0*	*.00*	*330.64*	*1837.98*

*SECNO 14167.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1987.80 ELREA= 1984.20

14167.000	14.52	1984.82	.00	.00	1985.87	1.06	6.71	.02	1987.80
14933.9	.0	14645.2	288.7	.0	1757.0	118.4	448.8	168.8	1984.20
.32	.00	8.34	2.44	.000	.045	.045	.000	1970.30	1678.79
.006853	1073.	1073.	1073.	5	0	0	.00	480.61	2392.72

*SECNO 14368.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14368.000	6.82	1989.42	1989.42	.00	1990.46	1.04	1.61	.00	1985.60
14933.9	913.9	5953.8	8066.2	239.6	542.6	1399.7	458.2	172.1	1985.60
.33	3.81	10.97	5.76	.045	.045	.045	.000	1982.60	1319.28
.009444	201.	201.	201.	20	15	0	.00	956.26	2275.54

*SECNO 15114.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.93

15114.000	12.77	1993.37	.00	.00	1993.80	.43	3.28	.06	1991.90
14933.9	209.1	8687.4	6037.4	129.1	1396.1	1739.3	504.8	188.9	1988.40
.37	1.62	6.22	3.47	.045	.045	.045	.000	1980.60	1414.00
.002528	746.	746.	746.	6	0	0	.00	1006.64	2420.64

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 15667.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15667.000	6.55	1996.15	1996.15	.00	1997.05	.90	2.31	.14	1993.60
14933.9	1647.4	8675.2	4611.3	415.6	927.6	1072.3	540.9	202.3	1993.60
.39	3.96	9.35	4.30	.045	.045	.045	.000	1989.60	1220.81
.008187	553.	553.	553.	20	8	0	.00	1113.38	2334.19

*SECNO 16546.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2006.80 ELREA= 2013.90

16546.000	10.98	2003.98	.00	.00	2004.85	.87	7.80	.00	2006.80
14933.9	.0	14933.9	.0	.0	1989.6	.0	585.3	219.2	2013.90
.43	.00	7.51	.00	.000	.045	.000	.000	1993.00	1223.94
.009646	879.	879.	879.	5	0	0	.00	562.11	1786.05

CCHV= .100 CEHV= .300
*SECNO 17058.000
3280 CROSS SECTION 17058.00 EXTENDED 3.03 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2013.80 ELREA= 2019.00

17058.000	7.13	2011.73	2011.73	.00	2013.94	2.21	6.70	.40	2013.80
14933.9	.0	14933.9	.0	.0	1252.3	.0	604.4	224.2	2019.00
.44	.00	11.93	.00	.000	.045	.000	.000	2004.60	1457.02
.018739	512.	512.	512.	4	14	0	.00	288.78	1745.80

*SECNO 17612.000
3280 CROSS SECTION 17612.00 EXTENDED 1.91 FEET

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2020.20 ELREA= 2023.60

17612.000	10.21	2019.41	.00	.00	2020.44	1.03	6.38	.12	2020.20
14933.9	.0	14933.9	.0	.0	1834.0	.0	624.0	228.6	2023.60
.46	.00	8.14	.00	.000	.045	.000	.000	2009.20	1622.76
.007792	554.	554.	554.	4	0	0	.00	389.49	2012.25

*SECNO 18436.000
3280 CROSS SECTION 18436.00 EXTENDED 2.90 FEET

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2028.20 ELREA= 2028.20

18436.000	7.80	2026.90	.00	.00	2028.05	1.15	7.57	.04	2028.20
14933.9	.0	14933.9	.0	.0	1733.6	.0	657.8	236.4	2028.20
.48	.00	8.61	.00	.000	.045	.000	.000	2019.10	1506.28
.011005	824.	824.	824.	4	0	0	.00	441.69	1947.98

*SECNO 18462.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

18462.000	6.98	2026.98	2026.98	.00	2029.15	2.17	.36	.30	2029.60
14933.9	.0	14933.9	.0	.0	1264.0	.0	658.7	236.6	2029.60
.48	.00	11.81	.00	.000	.045	.000	.000	2020.00	46.65
.018338	26.	26.	26.	20	16	0	.00	292.80	339.45

*SECNO 18472.000
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

18472.000	7.87	2027.87	2026.95	.00	2029.35	1.48	.14	.07	2029.60
14933.9	.0	14933.9	.0	.0	1530.1	.0	659.0	236.7	2029.60
.48	.00	9.76	.00	.000	.045	.000	.000	2020.00	40.65
.010571	10.	10.	10.	13	5	0	.00	312.23	352.88

*SECNO 18619.000
3280 CROSS SECTION 18619.00 EXTENDED 3.09 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.98

18619.000	8.08	2029.68	.00	.00	2030.21	.53	.76	.10	2026.60
16289.1	.0	14313.5	1975.6	.0	2353.9	551.8	666.5	238.4	2029.60
.49	.00	6.08	3.58	.000	.045	.045	.000	2021.60	.00
.003205	147.	147.	147.	2	0	0	.00	712.42	712.42

*SECNO 18710.000
3280 CROSS SECTION 18710.00 EXTENDED 1.50 FEET

18710.000	14.50	2030.10	.00	.00	2030.49	.39	.26	.01	2028.60
17770.8	.0	17770.3	.5	.0	3550.3	.7	673.2	239.9	2029.60
.50	.00	5.01	.67	.000	.045	.045	.000	2015.60	1000.00
.002667	91.	91.	91.	4	0	0	.00	702.92	1702.92

*SECNO 19020.000
3280 CROSS SECTION 19020.00 EXTENDED 1.04 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.98

19020.000	13.04	2030.64	.00	.00	2030.88	.24	.37	.02	2029.60
17855.0	.0	17839.2	15.8	.0	4553.1	28.3	702.1	244.3	2029.60
.52	.00	3.92	.56	.000	.045	.045	.000	2017.60	1000.00
.000687	310.	310.	310.	2	0	0	.00	524.52	1524.52

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 19215.000
3280 CROSS SECTION 19215.00 EXTENDED .77 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

19215.000	8.77	2034.37	2034.37	.00	2036.87	2.50	.38	.68	2033.60
17855.0	.0	17855.0	.0	.0	1407.0	.0	715.5	246.1	2037.60
.52	.00	12.69	.00	.000	.045	.000	.000	2025.60	1000.00
.018265	195.	195.	195.	20	19	0	.00	291.38	1291.38

*SECNO 19802.000
3280 CROSS SECTION 19802.00 EXTENDED .17 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.82

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2044.40 ELREA= 2041.30

19802.000	9.78	2041.78	.00	.00	2042.43	.65	5.37	.18	2044.40
17855.0	.0	17165.7	689.3	.0	2605.4	241.3	744.2	253.5	2041.30
.55	.00	6.59	2.86	.000	.045	.045	.000	2032.00	1590.50
.005484	587.	587.	587.	2	0	0	.00	803.93	2394.43

*SECNO 20595.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2048.50 ELREA= 2048.20

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
20595.000	8.74	2048.04	.00	.00	2049.30	1.26	6.69	.18	2048.50
17855.0	.0	17855.0	.0	.0	1984.3	.0	788.2	266.1	2048.20
.57	.00	9.00	.00	.000	.045	.000	.000	2039.30	1189.69
.014609	793.	793.	793.	3	0	0	.00	584.59	1774.28

*SECNO 21291.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2056.10 ELREA= 2055.50

21291.000	8.80	2054.20	.00	.00	2054.99	.79	5.64	.05	2056.10
17855.0	.0	17855.0	.0	.0	2506.6	.0	824.1	274.6	2055.50
.60	.00	7.12	.00	.000	.045	.000	.000	2045.40	1102.56
.005143	696.	696.	696.	2	0	0	.00	478.00	1580.56

*SECNO 22138.000
3280 CROSS SECTION 22138.00 EXTENDED 1.92 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2065.10 ELREA= 2066.70

22138.000	7.81	2060.41	.00	.00	2061.74	1.33	6.59	.16	2065.10
17855.0	.0	17855.0	.0	.0	1932.6	.0	867.2	284.2	2066.70
.63	.00	9.24	.00	.000	.045	.000	.000	2052.60	1184.40
.013143	847.	847.	847.	3	0	0	.00	505.39	1689.78

*SECNO 23230.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2075.50 ELREA= 2082.30

23230.000	8.50	2071.60	.00	.00	2073.12	1.52	11.32	.06	2075.50
17855.0	.0	17855.0	.0	.0	1806.1	.0	914.1	294.3	2082.30
.66	.00	9.89	.00	.000	.045	.000	.000	2063.10	1175.73
.008384	1092.	1092.	1092.	4	0	0	.00	303.78	1479.50

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 24530.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2089.10 ELREA= 2106.50

24530.000	8.02	2083.42	.00	.00	2085.08	1.66	11.92	.04	2089.10
17855.0	.0	17855.0	.0	.0	1727.0	.0	966.8	303.5	2106.50
.69	.00	10.34	.00	.000	.045	.000	.000	2075.40	1144.68
.010068	1300.	1300.	1300.	3	0	0	.00	310.55	1455.23

*SECNO 25616.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 2100.50 ELREA= 2100.60

25616.000	9.61	2094.71	.00	.00	2096.19	1.48	11.10	.02	2100.50
17855.0	.0	17855.0	.0	.0	1827.0	.0	1011.1	311.9	2100.60
.72	.00	9.77	.00	.000	.045	.000	.000	2085.10	1306.62
.010369	1086.	1086.	1086.	4	0	0	.00	366.54	1714.96

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*SECNO 26383.000

3265 DIVIDED FLOW


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2109.80 ELREA=      2105.60

 26383.000      11.74   2101.74       .00       .00   2103.16      1.41      6.96       .01   2109.80
  17855.0         .0    17855.0         .0         .0   1872.5         .0    1043.7     318.0   2105.60
       .74        .00      9.54        .00       .000      .045      .000      .000   2090.00   1237.13
   .008001      767.      767.      767.         3         0         0        .00    319.59   1589.04


*SECNO 26845.000

3265 DIVIDED FLOW

3280 CROSS SECTION  26845.00 EXTENDED      1.06 FEET

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    15APR98      13:58:20                                                                                PAGE   38

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2113.70 ELREA=      2101.50

 26845.000       8.26   2104.96       .00       .00   2105.71       .75      2.49       .07   2113.70
  17855.0         .0    12095.4    5759.6         .0   1729.6     842.3    1067.2     322.0   2101.50
       .76        .00      6.99      6.84       .000      .045      .045      .000   2096.70   1079.03
   .003866      462.      462.      462.         2         0         0        .00    439.66   1548.24


*SECNO 28095.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2142.60 ELREA=      2134.00

 28095.000       6.97   2117.27   2117.27       .00   2119.46      2.20      9.17       .43   2142.60
  17855.0         .0    17855.0         .0         .0   1501.3         .0    1125.7     333.3   2134.00
       .79        .00     11.89        .00       .000      .045      .000      .000   2110.30   1794.01
   .018912     1250.     1250.     1250.        20        15         0        .00    351.96   2145.96


*SECNO 29413.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      2143.30 ELREA=      2133.70

 29413.000       8.72   2133.82   2133.82       .00   2134.39       .58      6.21       .16   2143.30
  17855.0         .0     6321.7   11533.3         .0   1301.7    1730.0    1194.3     346.7   2133.70
       .85        .00      4.86      6.67       .000      .045      .045      .000   2125.10   1273.04
   .002092     1318.     1318.     1318.        13        14         0        .00    529.76   1802.80

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  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER     DSWS      USWS      DSSNO     USSNO
   1420.54   1420.95        .03   1420.54   1420.95        .03        13  1926.902  1927.058  6092.000  6397.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER     DSWS      USWS      DSSNO     USSNO
    170.11    170.32        .12   1590.65   1591.27        .04        13  1927.058  1929.611  6397.000  6842.000


  TW      LEFT BANK WEIR FLOW TOWARD FREHNER ROAD

     ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER     DSWS      USWS      DSSNO     USSNO
       .08       .07       4.55   1590.72   1591.34        .04        13  1929.611  1932.524  6842.000  7287.000


  TW      LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE
```

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
1355.18	1355.23	.00	2945.90	2946.57	.02	13	2027.873	2029.683	18472.000	18619.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
1481.72	1481.57	.01	4427.62	4428.15	.01	13	2029.683	2030.101	18619.000	18710.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
84.19	84.15	.04	4511.81	4512.30	.01	13	2030.101	2030.642	18710.000	19020.000

TW LEFT BANK WEIR FLOW ACROSS LOSEE/AZURE

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	4511.81	4512.30	.01	13	2030.642	2034.369	19020.000	19215.000

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THIS RUN EXECUTED 15APR98 13:58:28

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5852.000	.00	.00	.00	1913.20	7717.19	1925.60	.00	1926.15	11.70	7.24	2054.40	2256.17
	5852.000	.00	.00	.00	1913.20	13343.19	1926.20	.00	1926.92	17.50	9.13	2995.50	3189.54
*	5973.000	120.00	100000.00	100000.00	1913.20	7717.19	1925.60	.00	1926.15	11.70	7.24	2054.40	2256.17
*	5973.000	120.00	100000.00	100000.00	1913.20	13343.19	1926.20	.00	1926.92	17.50	9.13	2995.50	3189.54
*	6092.000	127.00	.00	.00	1914.00	7717.19	1926.15	.00	1926.25	2.24	3.46	4172.76	5156.06
*	6092.000	127.00	.00	.00	1914.00	13343.19	1926.90	.00	1927.06	3.50	4.52	5461.72	7134.77
*	6370.000	278.00	.00	.00	1914.80	7717.19	1925.63	1922.15	1926.67	17.09	8.36	1138.30	1866.56
*	6370.000	278.00	.00	.00	1914.80	13343.19	1926.90	1926.90	1927.91	17.94	9.38	2477.04	3150.00
	6828.000	458.00	.00	.00	1916.20	8109.17	1926.23	.00	1927.82	27.47	10.09	803.72	1547.09
*	6828.000	458.00	.00	.00	1916.20	14763.73	1929.52	1929.52	1930.75	18.02	10.00	2352.26	3478.35
	7265.000	437.00	.00	.00	1918.50	8109.17	1927.31	.00	1929.49	43.72	11.85	684.55	1226.38
*	7265.000	437.00	.00	.00	1918.50	14933.84	1932.40	1932.40	1933.68	17.35	10.01	2319.35	3584.82
	7730.000	465.00	.00	.00	1921.50	8109.17	1929.27	.00	1932.23	68.28	13.81	587.23	981.39
*	7730.000	465.00	.00	.00	1921.50	14933.91	1935.07	1935.07	1936.67	21.93	10.88	1941.75	3188.69
	8323.000	593.00	.00	.00	1925.20	8109.17	1933.33	.00	1936.01	58.56	13.12	617.86	1059.66
*	8323.000	593.00	.00	.00	1925.20	14933.91	1939.02	1939.02	1940.45	20.07	10.42	2183.51	3333.80
*	8794.000	470.00	.00	.00	1941.60	8109.17	1944.69	1944.69	1945.57	109.18	7.53	1085.34	776.09
*	8794.000	470.00	.00	.00	1941.60	14933.91	1945.62	1945.62	1946.81	93.81	8.82	1714.61	1541.86
*	9120.000	301.00	.00	.00	1930.90	8109.17	1946.26	1944.41	1946.58	14.92	4.59	1857.92	2099.19
*	9120.000	301.00	.00	.00	1930.90	14933.91	1947.39	1945.73	1947.96	18.91	6.17	2607.82	3433.78
	9237.000	117.00	.00	.00	1940.00	8109.17	1946.58	.00	1946.80	22.76	3.79	2137.41	1699.70
*	9237.000	117.00	.00	.00	1940.00	14933.91	1948.04	.00	1948.11	5.39	2.10	6903.56	6431.51

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	9429.000	192.00	.00	.00	1942.10	8109.17	1947.03	.00	1947.32	30.02	4.31	1882.48	1479.91
*	9429.000	192.00	.00	.00	1942.10	14933.91	1947.88	.00	1948.52	53.34	6.41	2328.64	2044.83
*	10155.000	726.00	.00	.00	1948.70	8109.17	1954.21	1954.21	1954.92	210.33	6.60	1199.19	559.15
*	10155.000	726.00	.00	.00	1948.70	14933.91	1954.86	1954.86	1955.97	223.99	8.54	1772.93	997.84
*	10962.000	807.00	.00	.00	1954.90	8109.17	1960.55	.00	1960.77	35.85	3.42	2198.93	1354.31
*	10962.000	807.00	.00	.00	1954.90	14933.91	1961.61	.00	1961.91	35.45	4.39	3397.46	2508.35
*	11614.000	652.00	.00	.00	1960.30	8109.17	1966.06	1966.06	1966.98	271.42	7.92	1065.03	492.21
*	11614.000	652.00	.00	.00	1960.30	14933.91	1966.99	1966.99	1968.09	199.24	8.76	1819.88	1058.00
*	12202.000	588.00	.00	.00	1962.70	8109.17	1971.84	.00	1972.48	46.45	7.53	1475.80	1189.86
*	12202.000	588.00	.00	.00	1962.70	14933.91	1973.01	.00	1973.89	58.30	9.23	2283.50	1955.80

	13094.000	892.00	.00	.00	1964.70	8109.17	1975.47	.00	1976.25	37.76	7.05	1149.82	1319.61
	13094.000	892.00	.00	.00	1964.70	14933.91	1977.93	.00	1979.15	57.35	8.86	1725.14	1972.01
	14167.000	1073.00	.00	.00	1970.30	8109.17	1980.29	.00	1981.58	63.82	9.12	888.71	1015.07
	14167.000	1073.00	.00	.00	1970.30	14933.91	1984.82	.00	1985.87	68.53	8.34	1875.43	1803.93
*	14368.000	201.00	.00	.00	1982.60	8109.17	1988.47	1988.47	1989.35	87.87	9.50	1353.40	865.07
*	14368.000	201.00	.00	.00	1982.60	14933.91	1989.42	1989.42	1990.46	94.44	10.97	2181.92	1536.71
*	15114.000	746.00	.00	.00	1980.60	8109.17	1992.04	.00	1992.36	22.46	5.13	2042.51	1711.06
*	15114.000	746.00	.00	.00	1980.60	14933.91	1993.37	.00	1993.80	25.28	6.22	3264.51	2970.31
*	15667.000	553.00	.00	.00	1989.60	8109.17	1995.21	1995.21	1996.06	81.76	8.26	1411.96	896.82
*	15667.000	553.00	.00	.00	1989.60	14933.91	1996.15	1996.15	1997.05	81.87	9.35	2415.49	1650.50
	16546.000	879.00	.00	.00	1993.00	8109.17	2001.02	.00	2002.04	56.63	8.13	997.33	1077.62
	16546.000	879.00	.00	.00	1993.00	14933.91	2003.98	.00	2004.85	96.46	7.51	1989.62	1520.51
*	17058.000	512.00	.00	.00	2004.60	8109.17	2009.72	2009.72	2011.49	201.25	10.70	758.02	571.62
*	17058.000	512.00	.00	.00	2004.60	14933.91	2011.73	2011.73	2013.94	187.39	11.93	1252.29	1090.95
*	17612.000	554.00	.00	.00	2009.20	8109.17	2017.28	.00	2018.11	77.22	7.33	1106.85	922.79
*	17612.000	554.00	.00	.00	2009.20	14933.91	2019.41	.00	2020.44	77.92	8.14	1833.99	1691.79
	18436.000	824.00	.00	.00	2019.10	8109.17	2025.05	.00	2026.07	122.20	8.11	1000.25	733.55
	18436.000	824.00	.00	.00	2019.10	14933.91	2026.90	.00	2028.05	110.05	8.61	1733.56	1423.56
*	18462.000	26.00	.00	.00	2020.00	8109.17	2025.41	2025.41	2026.94	205.84	9.93	816.46	565.22
*	18462.000	26.00	.00	.00	2020.00	14933.91	2026.98	2026.98	2029.15	183.38	11.81	1264.00	1102.81
*	18472.000	10.00	.00	.00	2020.00	8109.17	2026.18	.00	2027.14	102.41	7.86	1031.80	801.33
	18472.000	10.00	.00	.00	2020.00	14933.91	2027.87	2026.95	2029.35	105.71	9.76	1530.12	1452.49
*	18619.000	147.00	.00	.00	2021.60	8238.28	2027.62	.00	2028.00	34.57	5.05	1714.34	1401.09
*	18619.000	147.00	.00	.00	2021.60	16289.09	2029.68	.00	2030.21	32.05	6.08	2905.73	2877.07

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	18710.000	91.00	.00	.00	2015.60	8536.00	2028.02	.00	2028.23	16.34	3.68	2322.44	2111.69
	18710.000	91.00	.00	.00	2015.60	17770.81	2030.10	.00	2030.49	26.67	5.01	3551.07	3440.85
*	19020.000	310.00	.00	.00	2017.60	8536.00	2028.35	.00	2028.44	3.41	2.44	3497.81	4621.75
*	19020.000	310.00	.00	.00	2017.60	17855.00	2030.64	.00	2030.88	6.87	3.92	4581.38	6812.00
*	19215.000	195.00	.00	.00	2025.60	8536.00	2032.30	2032.30	2033.94	208.54	10.29	829.57	591.10
*	19215.000	195.00	.00	.00	2025.60	17855.00	2034.37	2034.37	2036.87	182.65	12.69	1406.98	1321.15
*	19802.000	587.00	.00	.00	2032.00	8536.00	2039.37	.00	2039.93	58.56	5.97	1429.50	1115.49
*	19802.000	587.00	.00	.00	2032.00	17855.00	2041.78	.00	2042.43	54.84	6.59	2846.70	2410.99
*	20595.000	793.00	.00	.00	2039.30	8536.00	2045.94	.00	2047.06	146.17	8.49	1004.91	706.03
*	20595.000	793.00	.00	.00	2039.30	17855.00	2048.04	.00	2049.30	146.09	9.00	1984.30	1477.23
*	21291.000	696.00	.00	.00	2045.40	8536.00	2052.26	.00	2052.71	50.48	5.35	1594.66	1201.46
*	21291.000	696.00	.00	.00	2045.40	17855.00	2054.20	.00	2054.99	51.43	7.12	2506.62	2489.81
*	22138.000	847.00	.00	.00	2052.60	8536.00	2058.82	.00	2059.68	150.05	7.46	1143.92	696.84
*	22138.000	847.00	.00	.00	2052.60	17855.00	2060.41	.00	2061.74	131.43	9.24	1932.65	1557.46
*	23230.000	1092.00	.00	.00	2063.10	8536.00	2069.55	.00	2070.33	68.37	7.11	1200.49	1032.33
	23230.000	1092.00	.00	.00	2063.10	17855.00	2071.60	.00	2073.12	83.84	9.89	1806.08	1950.04
	24530.000	1300.00	.00	.00	2075.40	8536.00	2081.10	.00	2082.18	125.24	8.37	1019.70	762.74
	24530.000	1300.00	.00	.00	2075.40	17855.00	2083.42	.00	2085.08	100.68	10.34	1727.03	1779.47
	25616.000	1086.00	.00	.00	2085.10	8536.00	2092.72	.00	2093.56	88.63	7.40	1154.26	906.69
	25616.000	1086.00	.00	.00	2085.10	17855.00	2094.71	.00	2096.19	103.69	9.77	1826.98	1753.43
	26383.000	767.00	.00	.00	2090.00	8536.00	2098.43	.00	2099.39	65.16	7.90	1080.66	1057.44
	26383.000	767.00	.00	.00	2090.00	17855.00	2101.74	.00	2103.16	80.01	9.54	1872.52	1996.11
	26845.000	462.00	.00	.00	2096.70	8536.00	2101.89	.00	2102.57	71.18	6.37	1295.84	1011.75
*	26845.000	462.00	.00	.00	2096.70	17855.00	2104.96	.00	2105.71	38.66	6.99	2571.91	2871.49
*	28095.000	1250.00	.00	.00	2110.30	8536.00	2115.61	2115.58	2116.93	208.05	9.22	926.25	591.79
*	28095.000	1250.00	.00	.00	2110.30	17855.00	2117.27	2117.27	2119.46	189.12	11.89	1501.26	1298.36
*	29413.000	1318.00	.00	.00	2125.10	8536.00	2130.87	2130.87	2133.08	186.01	11.93	715.26	625.86
*	29413.000	1318.00	.00	.00	2125.10	17855.00	2133.82	2133.82	2134.39	20.92	4.86	3031.71	3903.51

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LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	5852.000	7717.19	1925.60	.00	.00	.00	1416.00	.00
	5852.000	13343.19	1926.20	.60	.00	.00	1613.13	.00
*	5973.000	7717.19	1925.60	.00	.00	.00	1416.00	120.00

*	5973.000	13343.19	1926.20	.60	.00	.00	1613.13	120.00
*	6092.000	7717.19	1926.15	.00	.55	.00	1625.33	127.00
*	6092.000	13343.19	1926.90	.75	.70	.00	1815.68	127.00
*	6370.000	7717.19	1925.63	.00	-.52	.00	717.72	278.00
*	6370.000	13343.19	1926.90	1.28	.00	.00	1324.56	278.00
	6828.000	8109.17	1926.23	.00	.61	.00	100.19	458.00
*	6828.000	14763.73	1929.52	3.28	2.61	.00	1173.84	458.00
	7265.000	8109.17	1927.31	.00	1.08	.00	95.39	437.00
*	7265.000	14933.84	1932.40	5.09	2.88	.00	1200.29	437.00
	7730.000	8109.17	1929.27	.00	1.96	.00	91.09	465.00
*	7730.000	14933.91	1935.07	5.80	2.67	.00	799.70	465.00
	8323.000	8109.17	1933.33	.00	4.06	.00	92.02	593.00
*	8323.000	14933.91	1939.02	5.69	3.95	.00	979.57	593.00
*	8794.000	8109.17	1944.69	.00	11.36	.00	639.53	470.00
*	8794.000	14933.91	1945.62	.92	6.59	.00	720.54	470.00
*	9120.000	8109.17	1946.26	.00	1.57	.00	655.62	301.00
*	9120.000	14933.91	1947.39	1.13	1.78	.00	677.59	301.00
	9237.000	8109.17	1946.58	.00	.32	.00	571.40	117.00
*	9237.000	14933.91	1948.04	1.46	.65	.00	1570.19	117.00
	9429.000	8109.17	1947.03	.00	.45	.00	512.23	192.00
*	9429.000	14933.91	1947.88	.85	-.16	.00	536.68	192.00
*	10155.000	8109.17	1954.21	.00	7.17	.00	863.75	726.00
*	10155.000	14933.91	1954.86	.66	6.98	.00	881.53	726.00
*	10962.000	8109.17	1960.55	.00	6.34	.00	1075.64	807.00
*	10962.000	14933.91	1961.61	1.06	6.75	.00	1190.23	807.00
*	11614.000	8109.17	1966.06	.00	5.51	.00	676.07	652.00
*	11614.000	14933.91	1966.99	.94	5.39	.00	889.90	652.00
*	12202.000	8109.17	1971.84	.00	5.79	.00	585.54	588.00
*	12202.000	14933.91	1973.01	1.16	6.01	.00	814.52	588.00

1

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	13094.000	8109.17	1975.47	.00	3.63	.00	173.85	892.00
	13094.000	14933.91	1977.93	2.46	4.93	.00	330.64	892.00
	14167.000	8109.17	1980.29	.00	4.81	.00	134.50	1073.00
	14167.000	14933.91	1984.82	4.53	6.88	.00	480.61	1073.00
*	14368.000	8109.17	1988.47	.00	8.18	.00	771.65	201.00
*	14368.000	14933.91	1989.42	.96	4.61	.00	956.26	201.00
*	15114.000	8109.17	1992.04	.00	3.57	.00	814.58	746.00
*	15114.000	14933.91	1993.37	1.34	3.95	.00	1006.64	746.00
*	15667.000	8109.17	1995.21	.00	3.17	.00	969.40	553.00
*	15667.000	14933.91	1996.15	.94	2.77	.00	1113.38	553.00
	16546.000	8109.17	2001.02	.00	5.81	.00	165.87	879.00
	16546.000	14933.91	2003.98	2.96	7.83	.00	562.11	879.00
*	17058.000	8109.17	2009.72	.00	8.70	.00	217.18	512.00
*	17058.000	14933.91	2011.73	2.02	7.75	.00	288.78	512.00
*	17612.000	8109.17	2017.28	.00	7.56	.00	272.93	554.00
*	17612.000	14933.91	2019.41	2.13	7.68	.00	389.49	554.00
	18436.000	8109.17	2025.05	.00	7.77	.00	301.94	824.00
	18436.000	14933.91	2026.90	1.85	7.49	.00	441.69	824.00
*	18462.000	8109.17	2025.41	.00	.36	.00	267.83	26.00
*	18462.000	14933.91	2026.98	1.57	.08	.00	292.80	26.00
*	18472.000	8109.17	2026.18	.00	.77	.00	284.75	10.00
	18472.000	14933.91	2027.87	1.70	.89	.00	312.23	10.00
*	18619.000	8238.28	2027.62	.00	1.44	.00	496.14	147.00
*	18619.000	16289.09	2029.68	2.06	1.81	.00	712.42	147.00
*	18710.000	8536.00	2028.02	.00	.40	.00	503.66	91.00
	18710.000	17770.81	2030.10	2.08	.42	.00	702.92	91.00
*	19020.000	8536.00	2028.35	.00	.33	.00	435.55	310.00
*	19020.000	17855.00	2030.64	2.30	.54	.00	524.52	310.00
*	19215.000	8536.00	2032.30	.00	3.95	.00	260.64	195.00
*	19215.000	17855.00	2034.37	2.07	3.73	.00	291.38	195.00
*	19802.000	8536.00	2039.37	.00	7.07	.00	393.02	587.00
*	19802.000	17855.00	2041.78	2.40	7.41	.00	803.93	587.00
*	20595.000	8536.00	2045.94	.00	6.57	.00	322.39	793.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	20595.000	17855.00	2048.04	2.10	6.27	.00	584.59	793.00

1

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	21291.000	8536.00	2052.26	.00	6.32	.00	460.65	696.00
*	21291.000	17855.00	2054.20	1.94	6.16	.00	478.00	696.00
*	22138.000	8536.00	2058.82	.00	6.56	.00	455.41	847.00
*	22138.000	17855.00	2060.41	1.60	6.22	.00	505.39	847.00
*	23230.000	8536.00	2069.55	.00	10.73	.00	284.43	1092.00
	23230.000	17855.00	2071.60	2.05	11.18	.00	303.78	1092.00
	24530.000	8536.00	2081.10	.00	11.55	.00	297.09	1300.00
	24530.000	17855.00	2083.42	2.32	11.82	.00	310.55	1300.00
	25616.000	8536.00	2092.72	.00	11.62	.00	313.07	1086.00
	25616.000	17855.00	2094.71	1.99	11.29	.00	366.54	1086.00
	26383.000	8536.00	2098.43	.00	5.71	.00	209.52	767.00
	26383.000	17855.00	2101.74	3.32	7.04	.00	319.59	767.00
	26845.000	8536.00	2101.89	.00	3.46	.00	399.76	462.00
*	26845.000	17855.00	2104.96	3.07	3.22	.00	439.66	462.00
*	28095.000	8536.00	2115.61	.00	13.72	.00	342.50	1250.00
*	28095.000	17855.00	2117.27	1.66	12.31	.00	351.96	1250.00
*	29413.000	8536.00	2130.87	.00	15.26	.00	164.83	1318.00
*	29413.000	17855.00	2133.82	2.95	16.55	.00	529.76	1318.00

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

NOTE SECNO= 5973.000 PROFILE= 1 WSEL BASED ON X5 CARD
NOTE SECNO= 5973.000 PROFILE= 2 WSEL BASED ON X5 CARD

WARNING SECNO= 6092.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 6092.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 6370.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 6370.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6370.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 6370.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 6828.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6828.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 6828.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 7265.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 7265.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 7265.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 7730.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 7730.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 7730.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 8323.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8323.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 8323.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 8794.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8794.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 8794.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 8794.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 8794.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 8794.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 9120.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 9120.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 9237.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 9429.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 10155.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10155.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 10155.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 10155.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10155.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 10962.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 10962.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 11614.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

1

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 CAUTION SECNO=  11614.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  11614.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  11614.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  12202.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  12202.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  14368.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  14368.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  14368.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  14368.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  15114.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  15114.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  15667.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  15667.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  15667.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  15667.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  15667.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  17058.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  17058.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  17058.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  17058.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  17058.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=  17612.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  17612.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  18462.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  18462.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  18462.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  18462.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  18462.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  18462.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  18472.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18619.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  18619.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  18710.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  19020.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  19020.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=  19215.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  19215.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  19215.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
1
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 CAUTION SECNO=  19215.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  19215.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=  19802.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  19802.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  20595.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  20595.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  21291.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  21291.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  22138.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=  22138.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  23230.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  26845.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=  28095.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=  28095.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  28095.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=  28095.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=  29413.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  29413.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=  29413.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=  29413.000  PROFILE=  2  MINIMUM SPECIFIC ENERGY
```

Paper Copy F

Interstate 15 to Craig Road subcritical
100- and 500-year flood event

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1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    15APR98    TIME   13:28:43  *
 *******************************************
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
****************************************
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```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                 X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

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1
   15APR98      13:28:43                                                                    PAGE    1


                                                                THIS RUN EXECUTED 15APR98    13:28:43

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC
T1      FEMA 100-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      LNLV WASH W/O DIVERSION

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0         2                             .0033                              1894.2

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      0                   -1


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150


QT        2       4623       5833

NC      .03        .03       .014         .1          .3

  Add xsec 1+50 from as-built plans (rectangular):
X1      150         12       1000     1035.1
X3       10
GR     1900        900       1897        910       1896       1000       1886     1000.01       1886       1017.1
GR     1896    1017.11       1896     1017.9       1886    1017.91       1886       1035       1896       1035.1
GR     1896       1060       1908       1120


X1    243.6          8       1000    1035.01       93.6       93.6       93.6
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1896.2    1017.11     1896.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01


X1    244.6          8       1000    1035.01          1          1          1
GR   1896.2       1000     1886.2    1000.01     1886.2     1017.1     1886.2    1017.11     1886.2     1017.9
GR   1886.2    1017.91     1886.2       1035     1896.2    1035.01

  Duplicate 1+50 to 4+50 (beginning of transition):
1
   15APR98      13:28:43                                                                    PAGE    2


X1      450          8       1000       1036      205.4      205.4      205.4                  1.0
X3       10
GR     1900        900       1897        910       1896       1000       1886       1001       1886       1035
GR     1896       1036       1896       1060       1908       1120

   Begin Transition XS 5+50 from As-Built Plans

X1      544          4       1000       1050         94         94         94
GR   1897.2       1000     1887.2       1015     1887.2       1035     1897.2       1050


X1      600          4       1000       1050         56         56         56
GR   1897.4       1000     1887.4       1015     1887.4       1035     1897.7       1050
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```
X1      700         4       1000       1050        100        100        100
GR   1897.7      1000     1887.7       1015     1887.7       1035     1897.7      1050


X1     1200         4       1000       1050        500        500        500
GR   1899.3      1000     1889.3       1015     1889.3       1035     1899.3      1050


X1     1700         4       1000       1050        500        500        500
GR     1901      1000       1891       1015       1891       1035       1901      1050


NC    0.030       0.030     0.014        0.1         0.3
.
X1     2000         4       1000       1050        300        300        300
GR     1902      1000       1892       1015       1892       1035       1902      1050


NC     .014        .014      .014
X1     2200         4       1000       1050        200        200        200
GR   1902.6      1000     1892.6       1015     1892.6       1035     1902.6      1050

  Duplicate 22+20 (beginning of transition):

NH        3        .035    1296.8       .014     1346.5       .035       1460
X1     3724          13    1296.8     1346.5       1524       1524       1524
X3       10           0         0    1220.1          0          0          0         0         0
GR   1904.6         700    1904.6        745       1904        755       1904       785      1908      1190
GR     1908        1222    1907.6     1296.8     1897.6     1311.8     1897.6    1331.5    1907.6    1346.5
GR     1908        1430      1912       1450     1912.3       1460


NC      .03         .03      .014         .1          .3

1
   15APR98      13:28:43                                                                                PAGE     3


X1     3823         4       1000     1043.8         99         99         99
GR   1908.5      1000       1898    1000.01       1898       1028     1908.5    1043.8

  'N'-CHANNEL DIVERSION
     SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY

X1     4020        28    1603.14    1646.95        197        197        197
X3       10         0          0    1602.66     1914.9    1730.86          0         0         0
GR   1908.2       840       1908        900       1908        980       1904      1170    1907.2    1528.6
GR   1907.5    1550.5     1907.5     1570.6       1907    1595.27     1909.2    1603.14    1898.6    1603.2
GR   1898.6    1631.2     1909.1     1646.95      1909    1686.54     1912.3    1705.34      1913   1719.59
GR     1913   1740.66     1911.7     1747.43    1911.7    1757.13     1907.1    1771.7      1907   1781.99
GR   1910.6   1793.57     1910.7     1799.62    1910.3    1803.01     1910.1    1820.73      1912      2200
GR   1912.4      2480     1912.4        2510      1916       2900

  CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020

X1     4060        29       1604     1647.8         40         40         40
X3       10         0          0     1604.1          0    1720.21          0         0         0
GR   1908.2       840       1908        900       1908        980       1904      1170    1907.2    1528.6
GR   1907.5    1550.5     1907.5     1570.6       1907    1595.27     1909.3      1604   1898.76    1604.1
GR   1898.7      1632     1909.3     1647.8     1909.3    1657.51       1909    1686.54    1912.3    1705.34
GR     1913   1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13    1907.1    1771.7
GR     1907   1781.99     1910.6     1793.57    1910.7    1799.62     1910.3    1803.01    1910.1    1820.73
GR     1912      2200     1912.4        2480     1912.4       2510       1916      2900


NC                                       .3          .5
QT        2       5779       7081

NH        3        .035        840       .014    1657.51       .035       2900
   CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115        29       1604     1643.6         55         55         55
X3       10         0          0    1603.92          0    1721.64          0         0         0
GR   1908.2       840       1908        900       1908        980       1904      1170    1907.2    1528.6
GR   1907.5    1550.5     1907.5     1570.6       1907    1595.27     1909.3      1604    1898.8    1604.1
GR   1898.8    1643.5     1909.3     1643.6     1909.3    1657.51       1909    1686.54    1912.3    1705.34
GR     1913   1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13    1907.1    1771.7
GR     1907   1781.99     1910.6     1793.57    1910.7    1799.62     1910.3    1803.01    1910.1    1820.73
GR     1912      2200     1912.4        2480     1912.4       2510       1916      2900


NC     .035        .035      .014         .3          .5

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)
X1     4188        17          0       52.9         73         73         73
X3        0         0          0          0          0       56.3          0         0         0
GR     1915         0     1899.4        0.1     1899.4       12.3     1899.4      13.5    1899.4      25.8
GR   1899.4        27     1899.4       39.3     1899.4       40.5     1899.4      52.8    1914.8      52.9
GR     1912        65       1912         85     1909.8        140       1912       300    1912.8       685
GR   1912.8       710       1916       1125

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL

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  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125
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X1     4189        18         0       52.9          1          1          1
X3       10
BT      -18         0     1914.8     1909.7        .01     1914.7     1909.7         .1     1914.8     1909.7
BT               12.3     1914.7     1909.7       12.31     1914.7     1899.4       13.5     1914.7     1899.4
BT              13.51     1914.7     1909.7        25.8     1914.7     1909.7      25.81     1914.7     1899.4
BT                 27     1914.7     1899.4       27.01     1914.6     1909.7       39.3     1914.6     1909.7
BT              39.31     1914.6     1899.4        40.5     1914.6     1899.4      40.51     1914.6     1909.7
BT               52.8     1914.6     1909.7       52.81     1914.6     1909.7       52.9     1914.6     1909.7
GR   1914.8         0     1909.7        .01     1899.4         0.1    1899.4       12.3     1899.4      12.31
GR   1899.4      13.5     1899.4       13.51     1899.4        25.8    1899.4      25.81     1899.4         27
GR   1899.4     27.01     1899.4        39.3     1899.4       39.31    1899.4       40.5     1899.4      40.51
GR   1899.4      52.8     1909.7       52.81     1914.6        52.9

X1     4246        18         0       52.9         57         57         57
X3       10
BT      -18         0      1915     1910.2        .01       1915     1910.2         .1      1915     1910.2
BT               12.3     1914.9     1910.2       12.31     1914.9     1899.9       13.5     1914.9     1899.9
BT              13.51     1914.9     1910.2        25.8     1914.9     1910.2      25.81     1914.9     1899.9
BT                 27     1914.9     1899.9       27.01     1914.8     1910.2       39.3     1914.8     1910.2
BT              39.31     1914.8     1899.9        40.5     1914.8     1899.9      40.51     1914.8     1910.2
BT               52.8     1914.8     1910.2       52.81     1914.8     1910.2       52.9     1914.8     1910.2
GR   1915           0     1910.2        .01     1899.9         0.1    1899.9       12.3     1899.9      12.31
GR   1899.9      13.5     1899.9       13.51     1899.9        25.8    1899.9      25.81     1899.9         27
GR   1899.9     27.01     1899.9        39.3     1899.9       39.31    1899.9       40.5     1899.9      40.51
GR   1899.9      52.8     1910.2       52.81     1914.8        52.9

QT       2        6307       6638

X1     4247        10         0       52.9          1          1          1
GR     1915         0     1899.9         0.1    1899.9       12.3     1899.9       13.5     1899.9        25.8
GR   1899.9        27     1899.9        39.3     1899.9       40.5     1899.9       52.8     1914.8        52.9

NC       .03        .03        .014       .1         .3
  Left overbank topo from RR through Lone Mtn. should be extended/refined
   when additional mapping available:
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1     4360         4       1000       1057        113        113        113
GR   1911.4      1000     1900.9       1021     1900.9       1036     1911.4       1057

X1     4831         4       1000       1057        471        471        471
GR   1915.3      1000     1904.8       1021     1904.8       1036     1915.3       1057

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X1     4920         4       1000       1057         89         89         89
GR     1916      1000     1905.5       1021     1905.5       1036       1916       1057

   ADDED TRAPEZOIDAL SECTION

X1     5005         4       1000       1057         85         85         85
GR   1916.7      1000     1906.2       1021     1906.2       1036     1916.7       1057

X1     5105         4       1000    1035.01        100        100        100
GR   1919.2      1000     1908.2    1000.01     1908.2       1035     1919.2    1035.01

X1     5200         4       1000    1038.21         95         95         95
GR   1919.8      1000     1908.8    1000.01     1908.8     1038.2     1919.8    1038.21

X1     5500         4       1000    1048.21        300        300        300
GR   1921.8      1000     1910.8    1000.01     1910.8     1048.2     1921.8    1048.21

X1     5852         4       1000    1060.01        352        352        352
GR   1924.1      1000     1913.1    1000.01     1913.1       1060     1924.1    1060.01

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      OLOSS   L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB          ACH        AROB       VOL     TWA     R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL           XNCH       XNR        WTN     ELMIN   SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL        IDC        ICONT      CORAR   TOPWID  ENDST

 *PROP 1

 CCHV=      .100 CEHV=      .300
 *SECNO 150.000

 3265 DIVIDED FLOW

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

    150.000      8.43    1894.43    1894.27    1894.20    1898.41       3.98        .00        .00    1896.00
     4623.0         .0     4623.0         .0         .0      288.6         .0         .0         .0    1896.00
        .00        .00      16.02        .00       .000       .014       .000       .000    1886.00    1000.00
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   .003307        0.        0.        0.         0         5         0       .00     34.29   1035.08

*SECNO 243.600

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

   243.600      9.22   1895.42       .00       .00   1898.75      3.33       .27       .06   1896.20
    4623.0        .0    4623.0        .0        .0     315.5        .0        .6        .1   1896.20
       .00       .00     14.65       .00      .000      .014      .000      .000   1886.20   1000.00
   .002613       94.       94.       94.         5         0         0       .00     34.22   1035.01

*SECNO 244.600
   244.600      9.75   1895.95       .00       .00   1898.80      2.85       .00       .05   1896.20
    4623.0        .0    4623.0        .0        .0     341.1        .0        .7        .1   1896.20
       .00       .00     13.55       .00      .000      .014      .000      .000   1886.20   1000.00
   .001413        1.        1.        1.         3         0         0       .00     35.01   1035.01

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

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    SECNO       DEPTH       CWSEL       CRIWS       WSELK          EG          HV          HL       OLOSS   L-BANK ELEV
    Q           QLOB        QCH         QROB        ALOB           ACH         AROB        VOL         TWA   R-BANK ELEV
    TIME        VLOB        VCH         VROB        XNL            XNCH        XNR         WTN       ELMIN   SSTA
    SLOPE       XLOBL       XLCH        XLOBR       ITRIAL         IDC         ICONT       CORAR     TOPWID  ENDST

   450.000      8.83   1895.83       .00       .00   1899.33      3.50       .33       .19   1897.00
    4623.0        .0    4623.0        .0        .0     308.1        .0       2.2        .2   1897.00
       .01       .00     15.00       .00      .000      .014      .000      .000   1887.00   1000.12
   .001852       205.      205.      205.         3         0         0       .00     35.77   1035.88

*SECNO 544.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   544.000      9.29   1896.49   1896.49       .00   1899.83      3.34       .17       .02   1897.20
    4623.0        .0    4623.0        .0        .0     315.3        .0       2.9        .3   1897.20
       .01       .00     14.66       .00      .000      .014      .000      .000   1887.20   1001.06
   .001792       94.       94.       94.        20         8         0       .00     47.87   1048.94

*SECNO 600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   600.000      9.33   1896.73   1896.73       .00   1900.07      3.34       .10       .00   1897.40
    4623.0        .0    4623.0        .0        .0     315.2        .0       3.3        .4   1897.70
       .01       .00     14.67       .00      .000      .014      .000      .000   1887.40   1001.01
   .001785       56.       56.       56.         3         5         0       .00     47.58   1048.59

*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   700.000      9.29   1896.99   1896.99       .00   1900.33      3.33       .18       .00   1897.70
    4623.0        .0    4623.0        .0        .0     315.5        .0       4.0        .5   1897.70
       .01       .00     14.65       .00      .000      .014      .000      .000   1887.70   1001.06
   .001789       100.      100.      100.         2         5         0       .00     47.88   1048.94

*SECNO 1200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1200.000      9.30   1898.60   1898.60       .00   1901.93      3.33       .89       .00   1899.30
    4623.0        .0    4623.0        .0        .0     315.7        .0       7.6       1.1   1899.30
       .02       .00     14.64       .00      .000      .014      .000      .000   1889.30   1001.05
   .001786       500.      500.      500.        20         5         0       .00     47.90   1048.95

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    SECNO       DEPTH       CWSEL       CRIWS       WSELK          EG          HV          HL       OLOSS   L-BANK ELEV
    Q           QLOB        QCH         QROB        ALOB           ACH         AROB        VOL         TWA   R-BANK ELEV
    TIME        VLOB        VCH         VROB        XNL            XNCH        XNR         WTN       ELMIN   SSTA
    SLOPE       XLOBL       XLCH        XLOBR       ITRIAL         IDC         ICONT       CORAR     TOPWID  ENDST

 *SECNO 1700.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  1700.000      9.30   1900.30   1900.30       .00   1903.63      3.33       .89       .00   1901.00
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   4623.0        .0    4623.0        .0        .0     315.7        .0      11.2       1.6   1901.00
      .03        .00     14.64       .00       .000     .014       .000     .000   1891.00   1001.05
    .001786     500.     500.      500.       20        5          0        .00    47.90     1048.95


CCHV=      .100 CEHV=      .300
*SECNO 2000.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2000.000      9.30   1901.30   1901.30       .00   1904.63      3.33       .54       .00   1902.00
   4623.0        .0    4623.0        .0        .0     315.7        .0      13.4       1.9   1902.00
      .03        .00     14.64       .00       .000     .014       .000     .000   1892.00   1001.05
    .001786     300.     300.      300.       20        5          0        .00    47.90     1048.95
      .

*SECNO 2200.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000      9.30   1901.90   1901.90       .00   1905.23      3.33       .36       .00   1902.60
   4623.0        .0    4623.0        .0        .0     315.7        .0      14.9       2.2   1902.60
      .04        .00     14.64       .00       .000     .014       .000     .000   1892.60   1001.05
    .001786     200.     200.      200.       20        5          0        .00    47.90     1048.95


1490 NH CARD USED
*SECNO 3724.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=       1  TARGET=    -1220.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      9.35   1906.95   1906.95       .00   1910.29      3.34       2.73      .00   1907.60
   4623.0        .0    4623.0        .0        .0     315.1        .0      25.9       3.8   1907.60
      .07        .00     14.67       .00       .000     .014       .000     .000   1897.60   1297.78
    .001791    1524.    1524.     1524.       20        5          0        .00    47.74     1345.52


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .100 CEHV=      .300
*SECNO 3823.000
  3823.000      9.54   1907.54       .00       .00   1910.49      2.95       .16       .04   1908.50
   4623.0        .0    4623.0        .0        .0     335.3        .0      26.6       3.9   1908.50
      .07        .00     13.79       .00       .000     .014       .000     .000   1898.00   1000.00
    .001505      99.      99.       99.        4         0          0        .00    42.35     1042.35


*SECNO 4020.000

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     1602.7    1730.9  TYPE=       1  TARGET=      128.200
 ELENCL=    1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      8.91   1907.51       .00       .00   1910.97      3.46       .33       .15   1909.20
   4623.0        .0    4623.0        .0        .0     309.7        .0      28.1       4.1   1909.10
      .07        .00     14.93       .00       .000     .014       .000     .000   1898.60   1603.15
    .001879     197.     197.      197.        2         0          0        .00    41.43     1644.58


*SECNO 4060.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1604.1    1720.2  TYPE=       1  TARGET=      116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=    100000.00 ELREA=      1909.30

  4060.000      8.74   1907.44   1907.44       .00   1911.13      3.69       .08       .07 100000.00
   4623.0        .0    4623.0        .0        .0     300.0        .0      28.4       4.2   1909.30
      .07        .00     15.41       .00       .000     .014       .000     .000   1898.70   1604.10
    .002052      40.      40.       40.        2         8          0        .00    40.93     1645.03


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
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    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1603.9    1721.6  TYPE=      1  TARGET=      117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      8.71   1907.51   1907.51       .00   1911.90      4.39       .12       .35   1909.30
    5779.0        .0     5779.0       .0        .0     343.7        .0      28.8       4.2   1909.30
       .07       .00      16.81      .00      .000      .014      .000      .000   1898.80   1604.02
   .002276       55.        55.       55.         3         5         0       .00     39.57   1643.58


CCHV=     .300 CEHV=     .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.34

3470 ENCROACHMENT STATIONS=          .0      56.3  TYPE=      1  TARGET=       56.299
  4188.000      12.26   1911.66       .00       .00   1912.90      1.24       .06       .95   1915.00
    5779.0        .0     5779.0       .0        .0     647.2        .0      29.6       4.3   1914.80
       .08       .00       8.93      .00      .000      .014      .000      .000   1899.40       .02
   .000416       73.        73.       73.         5         0         0       .00     52.86     52.88


*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .50

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.60 MAX ELLC=  1909.70

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000      11.87   1911.27       .00       .00   1913.29      2.02       .00       .39   1914.80
    5779.0        .0     5779.0       .0        .0     506.6        .0      29.6       4.3   1914.60
       .08       .00      11.41      .00      .000      .014      .000      .000   1899.40       .01
   .001672         1.         1.        1.         2         0         0   -119.72     52.83     52.84


*SECNO 4246.000

3370 NORMAL BRIDGE, NRD=  18 MIN ELTRD=  1914.80 MAX ELLC=  1910.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1915.00 ELREA=      1914.80

  4246.000      11.47   1911.37       .00       .00   1913.39      2.02       .10       .00   1915.00
    5779.0        .0     5779.0       .0        .0     506.6        .0      30.3       4.4   1914.80
       .08       .00      11.41      .00      .000      .014      .000      .000   1899.90       .01
   .001672       57.        57.       57.         2         0         0    -98.36     52.83     52.83


*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.98

  4247.000      12.14   1912.04       .00       .00   1913.54      1.51       .00       .15   1915.00
    6307.0        .0     6307.0       .0        .0     640.6        .0      30.3       4.4   1914.80
       .08       .00       9.85      .00      .000      .014      .000      .000   1899.90       .02
   .000510         1.         1.        1.         3         0         0       .00     52.86     52.88


CCHV=     .100 CEHV=     .300
*SECNO 4360.000
3280 CROSS SECTION    4360.00 EXTENDED        .56 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	*XLOBL*	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4360.000	11.06	1911.96	1911.96	.00	1915.64	3.68	.10	.65	1911.40
6307.0	.0	6307.0	.0	.0	409.7	.0	31.7	4.5	1911.40
.08	.00	15.39	.00	.000	.014	.000	.000	1900.90	1000.00
.001735	113.	113.	113.	20	11	0	.00	57.00	1057.00

*SECNO 4831.000
3280 CROSS SECTION 4831.00 EXTENDED .57 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4831.000	11.07	1915.87	1915.87	.00	1919.54	3.66	.81	.00	1915.30
6307.0	.0	6307.0	.0	.0	410.6	.0	36.1	5.1	1915.30
.09	.00	15.36	.00	.000	.014	.000	.000	1904.80	1000.00
.001723	471.	471.	471.	20	5	0	.00	57.00	1057.00

*SECNO 4920.000
3280 CROSS SECTION 4920.00 EXTENDED .57 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4920.000	11.07	1916.57	1916.57	.00	1920.24	3.67	.15	.00	1916.00
6307.0	.0	6307.0	.0	.0	410.4	.0	36.9	5.2	1916.00
.09	.00	15.37	.00	.000	.014	.000	.000	1905.50	1000.00
.001727	89.	89.	89.	20	5	0	.00	57.00	1057.00

*SECNO 5005.000
3280 CROSS SECTION 5005.00 EXTENDED .57 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5005.000	11.07	1917.27	1917.27	.00	1920.94	3.67	.15	.00	1916.70
6307.0	.0	6307.0	.0	.0	410.4	.0	37.7	5.3	1916.70
.09	.00	15.37	.00	.000	.014	.000	.000	1906.20	1000.00
.001726	85.	85.	85.	20	5	0	.00	57.00	1057.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5105.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	9.99	1918.19	1918.19	.00	1923.24	5.05	.20	.42	1919.20
6307.0	.0	6307.0	.0	.0	349.7	.0	38.6	5.4	1919.20
.09	.00	18.04	.00	.000	.014	.000	.000	1908.20	1000.00
.002449	100.	100.	100.	20	11	0	.00	35.01	1035.01

*SECNO 5200.000
3280 CROSS SECTION 5200.00 EXTENDED .72 FEET

3301 HV CHANGED MORE THAN HVINS

5200.000	11.72	1920.52	.00	.00	1923.60	3.08	.16	.20	1919.80
6307.0	.0	6307.0	.0	.0	447.6	.0	39.5	5.5	1919.80
.10	.00	14.09	.00	.000	.014	.000	.000	1908.80	1000.00
.001253	95.	95.	95.	6	0	0	.00	38.21	1038.21

*SECNO 5500.000

3301 HV CHANGED MORE THAN HVINS

5500.000	11.00	1921.80	.00	.00	1924.00	2.20	.31	.09	1921.80
6307.0	.0	6307.0	.0	.0	530.0	.0	42.8	5.8	1921.80
.10	.00	11.90	.00	.000	.014	.000	.000	1910.80	1000.00
.000848	300.	300.	300.	3	0	0	.00	48.21	1048.21

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*SECNO 5852.000
  5852.000      9.18   1922.28       .00       .00   1924.31      2.04       .30       .02   1924.10
  6307.0         .0    6307.0        .0        .0     550.6        .0      47.2       6.3   1924.10
     .11        .00     11.45       .00       .000     .014      .000      .000   1913.10   1000.00
 .000865       352.      352.      352.         2         0         0       .00     60.01   1060.01


T1      FEMA 500-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      LNLV WASH W/O DIVERSION

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J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        3                           .0033                                  1895.8

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      2


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 150.000
   150.000     10.08   1896.08   1895.67   1895.80   1900.51      4.43       .00       .00   1896.00
    5833.0        .1    5831.9       1.0        .3     345.2       2.0        .0        .0   1896.00
       .00        .33     16.89       .52       .030      .014      .030      .000   1886.00    992.94
  .003307         0.        0.        0.         0         8         0       .00     67.46   1060.39


*SECNO 243.600
3280 CROSS SECTION    243.60 EXTENDED       .72 FEET


3301 HV CHANGED MORE THAN HVINS

   243.600     10.73   1896.93       .00       .00   1900.84      3.92       .28       .05   1896.20
    5833.0        .0    5833.0        .0        .0     367.2        .0        .8        .1   1896.20
       .00        .00     15.88       .00       .000      .014      .000      .000   1886.20   1000.00
  .002760        94.       94.       94.         4         0         0       .00     35.01   1035.01


*SECNO 244.600
3280 CROSS SECTION    244.60 EXTENDED      1.34 FEET


3301 HV CHANGED MORE THAN HVINS

   244.600     11.35   1897.55       .00       .00   1900.90      3.35       .00       .06   1896.20
    5833.0        .0    5833.0        .0        .0     397.0        .0        .8        .1   1896.20
       .00        .00     14.69       .00       .000      .014      .000      .000   1886.20   1000.00
  .001464         1.        1.        1.         3         0         0       .00     35.01   1035.01


*SECNO 450.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   450.000     11.42   1898.42   1898.42       .00   1901.35      2.94       .27       .04   1897.00
    5833.0     134.2    5618.2      80.6      82.9     401.0      39.0       2.9        .6   1897.00
       .01      1.62     14.01      2.06       .030      .014      .030      .000   1887.00    908.61
  .001205       205.      205.      205.         2         5         0       .00    158.48   1067.09


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 544.000
3280 CROSS SECTION    544.00 EXTENDED      1.19 FEET

   544.000     11.19   1898.39       .00       .00   1901.54      3.15       .12       .06   1897.20
    5833.0        .0    5833.0        .0        .0     409.4        .0       4.0        .8   1897.20
       .01        .00     14.25       .00       .000      .014      .000      .000   1887.20   1000.00
  .001344        94.       94.       94.         2         0         0       .00     50.00   1050.00


*SECNO 600.000
3280 CROSS SECTION    600.00 EXTENDED       .85 FEET
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   600.000     10.84   1898.24        .00       .00   1901.71      3.47       .08       .10   1897.40
    5833.0        .0    5833.0         .0        .0     390.2        .0       4.5        .9   1897.70
       .01        .00     14.95        .00      .000      .014      .000      .000   1887.40   1000.00
   .001548        56.      56.         56.         2         0         0       .00     50.00   1050.00


*SECNO 700.000
3280 CROSS SECTION    700.00 EXTENDED       .53 FEET

   700.000     10.53   1898.23   1898.20       .00   1901.95      3.73       .16       .08   1897.70
    5833.0        .0    5833.0         .0        .0     376.5        .0       5.3       1.0   1897.70
       .01        .00     15.49        .00      .000      .014      .000      .000   1887.70   1000.00
   .001723        100.     100.        100.        4         8         0       .00     50.00   1050.00


*SECNO 1200.000
3280 CROSS SECTION   1200.00 EXTENDED       .45 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1200.000     10.45   1899.75   1899.75       .00   1903.56      3.81       .88       .03   1899.30
    5833.0        .0    5833.0         .0        .0     372.4        .0       9.6       1.5   1899.30
       .02        .00     15.66        .00      .000      .014      .000      .000   1889.30   1000.00
   .001781        500.     500.        500.       20         5         0       .00     50.00   1050.00


*SECNO 1700.000
3280 CROSS SECTION   1700.00 EXTENDED       .47 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1700.000     10.47   1901.47   1901.47       .00   1905.26      3.79       .89       .00   1901.00
    5833.0        .0    5833.0         .0        .0     373.5        .0      13.9       2.1   1901.00
       .03        .00     15.62        .00      .000      .014      .000      .000   1891.00   1000.00
   .001765        500.     500.        500.       20         5         0       .00     50.00   1050.00


CCHV=      .100 CEHV=      .300
*SECNO 2000.000
3280 CROSS SECTION   2000.00 EXTENDED       .47 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2000.000     10.47   1902.47   1902.47       .00   1906.26      3.79       .53       .00   1902.00
    5833.0        .0    5833.0         .0        .0     373.3        .0      16.5       2.5   1902.00
       .03        .00     15.63        .00      .000      .014      .000      .000   1892.00   1000.00
   .001768        300.     300.        300.       20         5         0       .00     50.00   1050.00


*SECNO 2200.000
3280 CROSS SECTION   2200.00 EXTENDED       .47 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2200.000     10.47   1903.07   1903.07       .00   1906.86      3.79       .35       .00   1902.60
    5833.0        .0    5833.0         .0        .0     373.3        .0      18.2       2.7   1902.60
       .04        .00     15.63        .00      .000      .014      .000      .000   1892.60   1000.00
   .001768        200.     200.        200.       20         5         0       .00     50.00   1050.00


1490 NH CARD USED
*SECNO 3724.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1220.1    1460.0  TYPE=      1  TARGET=    -1220.100
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  3724.000     11.55   1909.15   1909.15       .00   1911.59      2.43      1.97       .14   1907.60
    5833.0      167.6    5477.9      187.5      103.4     424.2      116.3      36.0       7.3   1907.60
       .07       1.62     12.91       1.61       .035      .014       .035      .000   1897.60   1220.10
   .000989       1524.    1524.       1524.       20         8         0       .00     215.66   1435.76
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CCHV=      .100 CEHV=      .300
*SECNO 3823.000

3301 HV CHANGED MORE THAN HVINS

  3823.000      10.20    1908.20    1908.03        .00    1912.18       3.98        .13        .46    1908.50
     5833.0         .0     5833.0         .0         .0     364.4          .0       37.1        7.6    1908.50
       .07        .00      16.01        .00       .000       .014       .000       .000    1898.00    1000.00
   .001901        99.        99.        99.          6         11          0        .00      43.37    1043.37


*SECNO 4020.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1602.7    1730.9  TYPE=       1  TARGET=       128.200
 ELENCL=    1914.90  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.20 ELREA=       1909.10

  4020.000       9.97    1908.57    1908.57        .00    1912.79       4.22        .39        .07    1909.20
     5833.0         .0     5833.0         .0         .0     354.0          .0       38.8        7.8    1909.10
       .08        .00      16.48        .00       .000       .014       .000       .000    1898.60    1603.14
   .002059       197.       197.       197.          3          6          0        .00      43.01    1646.16


*SECNO 4060.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1604.1    1720.2  TYPE=       1  TARGET=       116.110

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     100000.00 ELREA=       1909.30

  4060.000       9.91    1908.61    1908.61        .00    1912.95       4.34        .08        .04 100000.00
     5833.0         .0     5833.0         .0         .0     348.9          .0       39.1        7.9    1909.30
       .08        .00      16.72        .00       .000       .014       .000       .000    1898.70    1604.10
   .002139        40.        40.        40.          2          5          0        .00      42.67    1646.77


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1603.9    1721.6  TYPE=       1  TARGET=       117.720

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1909.30 ELREA=       1909.30

  4115.000       9.83    1908.63    1908.63        .00    1913.80       5.17        .13        .41    1909.30
     7081.0         .0     7081.0         .0         .0     388.2          .0       39.6        7.9    1909.30
       .08        .00      18.24        .00       .000       .014       .000       .000    1898.80    1604.01
   .002399        55.        55.        55.          3          8          0        .00      39.59    1643.59


CCHV=      .300 CEHV=      .500
*SECNO 4188.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.43

3470 ENCROACHMENT STATIONS=          .0      56.3  TYPE=       1  TARGET=        56.299
  4188.000      14.21    1913.61        .00        .00    1914.99       1.38        .06       1.13    1915.00
     7081.0         .0     7081.0         .0         .0     750.0          .0       40.5        8.0    1914.80
       .08        .00       9.44        .00       .000       .014       .000       .000    1899.40        .01
   .000408        73.        73.        73.          5          0          0        .00      52.88      52.89


*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .40

1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
```

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.60 MAX ELLC= 1909.70

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	13.38	1912.78	.00	.00	1915.82	3.03	.00	.82	1914.80
7081.0	.0	7081.0	.0	.0	506.7	.0	40.5	8.0	1914.60
.08	.00	13.98	.00	.000	.014	.000	.000	1899.40	.00
.002509	1.	1.	1.	2	0	0	-199.52	52.86	52.87

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 18 MIN ELTRD= 1914.80 MAX ELLC= 1910.20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	13.03	1912.93	.00	.00	1915.96	3.03	.14	.00	1915.00
7081.0	.0	7081.0	.0	.0	506.7	.0	41.2	8.1	1914.80
.08	.00	13.98	.00	.000	.014	.000	.000	1899.90	.00
.002509	57.	57.	57.	2	0	0	-180.67	52.86	52.86

*SECNO 4247.000
3280 CROSS SECTION 4247.00 EXTENDED .77 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.85

4247.000	15.67	1915.57	.00	.00	1916.57	1.00	.00	.61	1915.00
6638.0	.0	6638.0	.0	.0	827.2	.0	41.2	8.1	1914.80
.08	.00	8.02	.00	.000	.014	.000	.000	1899.90	.00
.000271	1.	1.	1.	3	0	0	.00	52.90	52.90

CCHV= .100 CEHV= .300
*SECNO 4360.000
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 4360.00 EXTENDED 3.47 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

4360.000	13.97	1914.87	.00	.00	1916.93	2.06	.05	.32	1911.40
6638.0	.0	6638.0	.0	.0	575.8	.0	43.0	8.2	1911.40
.08	.00	11.53	.00	.000	.014	.000	.000	1900.90	1000.00
.000649	113.	113.	113.	3	0	0	.00	57.00	1057.00

*SECNO 4831.000
3280 CROSS SECTION 4831.00 EXTENDED .80 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4831.000	11.30	1916.10	1916.10	.00	1919.91	3.82	.47	.53	1915.30
6638.0	.0	6638.0	.0	.0	423.5	.0	48.4	8.8	1915.30
.09	.00	15.68	.00	.000	.014	.000	.000	1904.80	1000.00
.001739	471.	471.	471.	20	15	0	.00	57.00	1057.00

*SECNO 4920.000
3280 CROSS SECTION 4920.00 EXTENDED .83 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4920.000	11.33	1916.83	1916.83	.00	1920.61	3.79	.15	.00	1916.00
6638.0	.0	6638.0	.0	.0	425.1	.0	49.3	8.9	1916.00
.09	.00	15.62	.00	.000	.014	.000	.000	1905.50	1000.00
.001719	89.	89.	89.	20	5	0	.00	57.00	1057.00

*SECNO 5005.000
1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3280 CROSS SECTION 5005.00 EXTENDED .82 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5005.000	11.32	1917.52	1917.52	.00	1921.31	3.80	.15	.00	1916.70
6638.0	.0	6638.0	.0	.0	424.6	.0	50.1	9.1	1916.70
.10	.00	15.63	.00	.000	.014	.000	.000	1906.20	1000.00
.001726	85.	85.	85.	20	5	0	.00	57.00	1057.00

*SECNO 5105.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5105.000	10.34	1918.54	1918.54	.00	1923.76	5.22	.20	.43	1919.20
6638.0	.0	6638.0	.0	.0	361.9	.0	51.0	9.2	1919.20
.10	.00	18.34	.00	.000	.014	.000	.000	1908.20	1000.00
.002462	100.	100.	100.	20	11	0	.00	35.01	1035.01

*SECNO 5200.000
3280 CROSS SECTION 5200.00 EXTENDED 1.16 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.40

5200.000	12.16	1920.96	.00	.00	1924.13	3.17	.16	.21	1919.80
6638.0	.0	6638.0	.0	.0	464.5	.0	51.9	9.2	1919.80
.10	.00	14.29	.00	.000	.014	.000	.000	1908.80	1000.00
.001250	95.	95.	95.	6	0	0	.00	38.21	1038.21

*SECNO 5500.000
3280 CROSS SECTION 5500.00 EXTENDED .50 FEET

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

5500.000	11.50	1922.30	.00	.00	1924.53	2.23	.30	.09	1921.80
6638.0	.0	6638.0	.0	.0	554.2	.0	55.4	9.5	1921.80
.11	.00	11.98	.00	.000	.014	.000	.000	1910.80	1000.00
.000825	300.	300.	300.	3	0	0	.00	48.21	1048.21

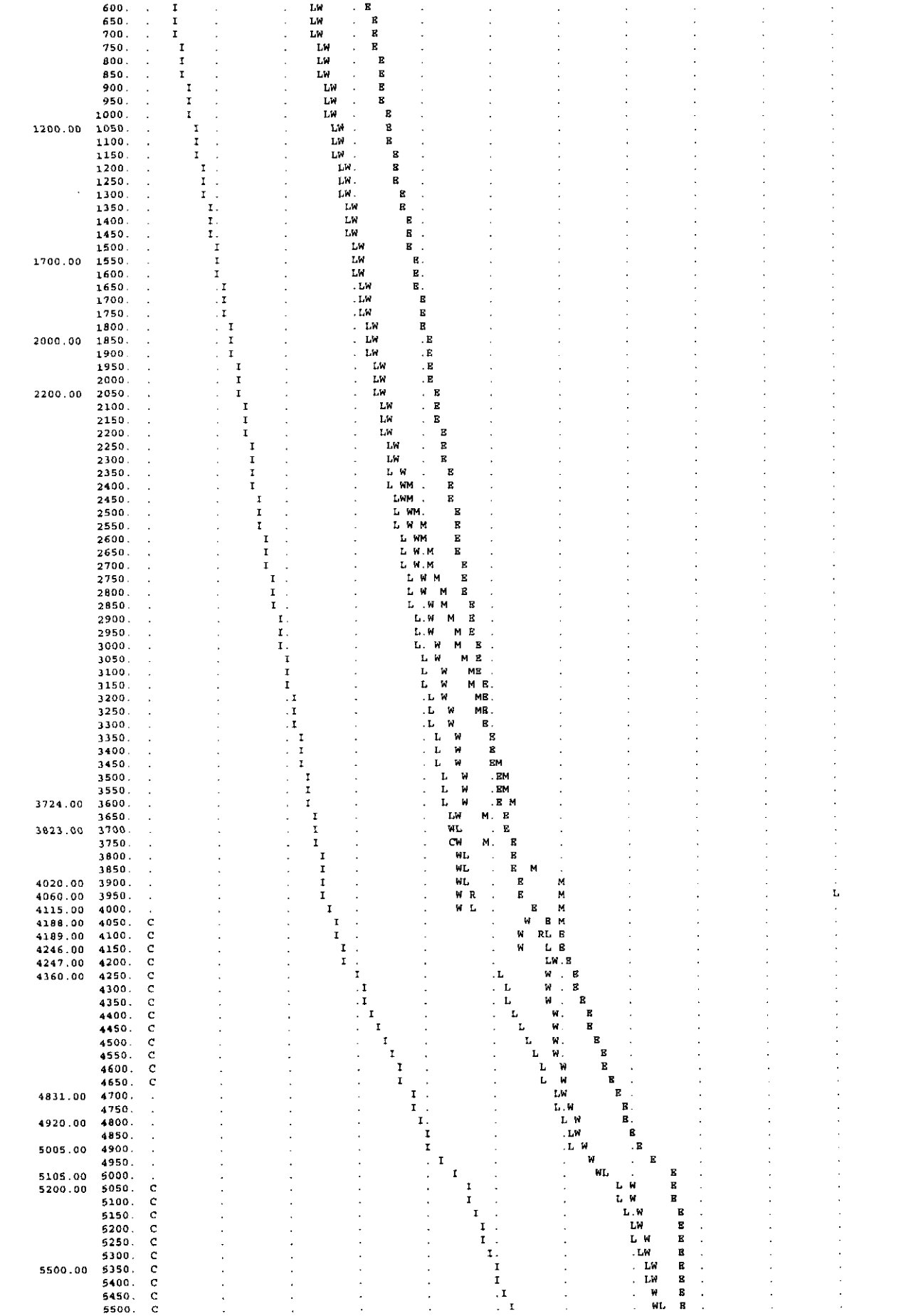
*SECNO 5852.000

5852.000	9.73	1922.83	.00	.00	1924.84	2.01	.29	.02	1924.10
6638.0	.0	6638.0	.0	.0	583.7	.0	60.0	10.0	1924.10
.11	.00	11.37	.00	.000	.014	.000	.000	1913.10	1000.00
.000803	352.	352.	352.	2	0	0	.00	60.01	1060.01

1
PROFILE FOR STREAM LNLV WASH W/O DIVERSION

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION	1886.	1891.	1896.	1901.	1906.	1911.	1916.	1921.	1926.	1931.
SECNO	CUMDIS									
150.00	0. I	.	CW	MB.	.	.	.	.	.	.
	50. I	.	LW M	B.	.	.	.	.	.	.
243.60	100. I	.	L W	E	.	.	.	.	.	.
244.60	150. I	.	L W	E	.	.	.	.	.	.
	200. CI	.	.L MW	E	.	.	.	.	.	.
	250. CI	.	.L WM	E	.	.	.	.	.	.
450.00	300. . I	.	. L W	ME	.	.	.	.	.	.
	350. C I	.	. L WM	.E	.	.	.	.	.	.
544.00	400. C I	.	. L W	.E	.	.	.	.	.	.
600.00	450. C I	.	. L W	.E	.	.	.	.	.	.
	500. C I	.	. LW	. E	.	.	.	.	.	.
700.00	550. . I	.	. LW	. E	.	.	.	.	.	.



```
          5550.  C          .         .         .         .         . I       .         . WL  E .         .         .
          5600.  C          .         .         .         .         .  I      .         . W L  E .         .         .
          5650.  C          .         .         .         .         .   I     .         .  W L E .         .         .
          5700.  C          .         .         .         .         .   I     .         .  W L E .         .         .
   5852.00 5750.  C          .         .         .         .         .   I     .         .  W L E .         .         .
1
    15APR98       13:28:43                                                                                    PAGE   24


                                                                                    THIS RUN EXECUTED 15APR98     13:28:44

 ****************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ****************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST


LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE  150

      SECNO      XLCH      ELTRD     ELLC      ELMIN      Q         CWSEL     CRIWS     EG        10*KS     VCH       AREA      .01K
     150.000       .00       .00       .00   1886.00   4623.00   1894.43   1894.27   1898.41     33.07     16.02     288.63    803.93
     150.000       .00       .00       .00   1886.00   5833.00   1896.08   1895.67   1900.51     33.07     16.89     347.45   1014.37

     243.600     93.60       .00       .00   1886.20   4623.00   1895.42       .00   1898.75     26.13     14.65     315.47    904.37
     243.600     93.60       .00       .00   1886.20   5833.00   1896.93       .00   1900.84     27.60     15.88     367.25   1110.21

     244.600      1.00       .00       .00   1886.20   4623.00   1895.95       .00   1898.80     14.13     13.55     341.10   1229.94
     244.600      1.00       .00       .00   1886.20   5833.00   1897.55       .00   1900.90     14.64     14.69     396.95   1524.67

     450.000    205.40       .00       .00   1887.00   4623.00   1895.83       .00   1899.33     18.52     15.00     308.11   1074.31
*    450.000    205.40       .00       .00   1887.00   5833.00   1898.42   1898.42   1901.35     12.05     14.01     522.92   1680.23

*    544.000     94.00       .00       .00   1887.20   4623.00   1896.49   1896.49   1899.83     17.92     14.66     315.32   1092.09
     544.000     94.00       .00       .00   1887.20   5833.00   1898.39       .00   1901.54     13.44     14.25     409.39   1591.20

*    600.000     56.00       .00       .00   1887.40   4623.00   1896.73   1896.73   1900.07     17.85     14.67     315.24   1094.36
     600.000     56.00       .00       .00   1887.40   5833.00   1898.24       .00   1901.71     15.48     14.95     390.16   1482.34

*    700.000    100.00       .00       .00   1887.70   4623.00   1896.99   1896.99   1900.33     17.89     14.65     315.48   1092.87
     700.000    100.00       .00       .00   1887.70   5833.00   1898.23   1898.20   1901.95     17.23     15.49     376.54   1405.26

*   1200.000    500.00       .00       .00   1889.30   4623.00   1898.60   1898.60   1901.93     17.86     14.64     315.71   1093.98
*   1200.000    500.00       .00       .00   1889.30   5833.00   1899.75   1899.75   1903.56     17.81     15.66     372.39   1382.25

*   1700.000    500.00       .00       .00   1891.00   4623.00   1900.30   1900.30   1903.63     17.86     14.64     315.73   1094.06
*   1700.000    500.00       .00       .00   1891.00   5833.00   1901.47   1901.47   1905.26     17.65     15.62     373.50   1388.41

*   2000.000    300.00       .00       .00   1892.00   4623.00   1901.30   1901.30   1904.63     17.86     14.64     315.69   1093.86
*   2000.000    300.00       .00       .00   1892.00   5833.00   1902.47   1902.47   1906.26     17.68     15.63     373.26   1387.05

*   2200.000    200.00       .00       .00   1892.60   4623.00   1901.90   1901.90   1905.23     17.86     14.64     315.69   1093.86
*   2200.000    200.00       .00       .00   1892.60   5833.00   1903.07   1903.07   1906.86     17.68     15.63     373.28   1387.15

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      SECNO      XLCH      ELTRD     ELLC      ELMIN      Q         CWSEL     CRIWS     EG        10*KS     VCH       AREA      .01K
*   3724.000   1524.00       .00       .00   1897.60   4623.00   1906.95   1906.95   1910.29     17.91     14.67     315.11   1092.30
*   3724.000   1524.00       .00       .00   1897.60   5833.00   1909.15   1909.15   1911.59      9.89     12.91     643.82   1854.57

     3823.000     99.00       .00       .00   1898.00   4623.00   1907.54       .00   1910.49     15.05     13.79     335.34   1191.59
     3823.000     99.00       .00       .00   1898.00   5833.00   1908.20   1908.03   1912.18     19.01     16.01     364.44   1337.97

     4020.000    197.00       .00       .00   1898.60   4623.00   1907.51       .00   1910.97     18.79     14.93     309.71   1066.50
*    4020.000    197.00       .00       .00   1898.60   5833.00   1908.57   1908.57   1912.79     20.59     16.48     354.00   1285.54

*    4060.000     40.00       .00       .00   1898.70   4623.00   1907.44   1907.44   1911.13     20.52     15.41     299.97   1020.64
*    4060.000     40.00       .00       .00   1898.70   5833.00   1908.61   1908.61   1912.95     21.39     16.72     348.94   1261.08

*    4115.000     55.00       .00       .00   1898.80   5779.00   1907.51   1907.51   1911.90     22.76     16.81     343.73   1211.46
*    4115.000     55.00       .00       .00   1898.80   7081.00   1908.63   1908.63   1913.80     23.99     18.24     388.17   1445.79

*    4188.000     73.00       .00       .00   1899.40   5779.00   1911.66       .00   1912.90      4.16      8.93     647.17   2834.32
*    4188.000     73.00       .00       .00   1899.40   7081.00   1913.61       .00   1914.99      4.08      9.44     749.99   3507.11

*    4189.000      1.00   1914.60   1909.70   1899.40   5779.00   1911.27       .00   1913.29     16.72     11.41     506.59   1413.34
*    4189.000      1.00   1914.60   1909.70   1899.40   7081.00   1912.78       .00   1915.82     25.09     13.98     506.68   1413.76

     4246.000     57.00   1914.80   1910.20   1899.90   5779.00   1911.37       .00   1913.39     16.72     11.41     506.57   1413.23
     4246.000     57.00   1914.80   1910.20   1899.90   7081.00   1912.93       .00   1915.96     25.09     13.98     506.66   1413.66

*    4247.000      1.00       .00       .00   1899.90   6307.00   1912.04       .00   1913.54      5.10      9.85     640.62   2792.68
*    4247.000      1.00       .00       .00   1899.90   6638.00   1915.57       .00   1916.57      2.71      8.02     827.20   4033.17

*    4360.000    113.00       .00       .00   1900.90   6307.00   1911.96   1911.96   1915.64     17.35     15.39     409.69   1514.04
*    4360.000    113.00       .00       .00   1900.90   6638.00   1914.87       .00   1916.93      6.49     11.53     575.83   2605.57

*    4831.000    471.00       .00       .00   1904.80   6307.00   1915.87   1915.87   1919.54     17.23     15.36     410.62   1519.22
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*	4831.000	471.00	.00	.00	1904.80	6638.00	1916.10	1916.10	1919.91	17.39	15.68	423.46	1591.64
*	4920.000	89.00	.00	.00	1905.50	6307.00	1916.57	1916.57	1920.24	17.27	15.37	410.36	1517.78
*	4920.000	89.00	.00	.00	1905.50	6638.00	1916.83	1916.83	1920.61	17.19	15.62	425.10	1600.97
*	5005.000	85.00	.00	.00	1906.20	6307.00	1917.27	1917.27	1920.94	17.26	15.37	410.44	1518.21
*	5005.000	85.00	.00	.00	1906.20	6638.00	1917.52	1917.52	1921.31	17.26	15.63	424.58	1598.01
*	5105.000	100.00	.00	.00	1908.20	6307.00	1918.19	1918.19	1923.24	24.49	18.04	349.69	1274.34
*	5105.000	100.00	.00	.00	1908.20	6638.00	1918.54	1918.54	1923.76	24.62	18.34	361.87	1337.93
	5200.000	95.00	.00	.00	1908.80	6307.00	1920.52	.00	1923.60	12.53	14.09	447.62	1702.07
*	5200.000	95.00	.00	.00	1908.80	6638.00	1920.96	.00	1924.13	12.50	14.29	464.51	1877.65
	5500.000	300.00	.00	.00	1910.80	6307.00	1921.80	.00	1924.00	8.48	11.90	529.96	2165.32
	5500.000	300.00	.00	.00	1910.80	6638.00	1922.30	.00	1924.53	8.25	11.98	554.21	2310.90
	5852.000	352.00	.00	.00	1913.10	6307.00	1922.28	.00	1924.31	8.65	11.45	550.59	2144.36
	5852.000	352.00	.00	.00	1913.10	6638.00	1922.83	.00	1924.84	8.03	11.37	583.74	2341.89

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LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	150.000	4623.00	1894.43	.00	.00	.23	34.29	.00
	150.000	5833.00	1896.08	1.65	.00	.28	67.46	.00
	243.600	4623.00	1895.42	.00	.99	.00	34.22	93.60
	243.600	5833.00	1896.93	1.51	.85	.00	35.01	93.60
	244.600	4623.00	1895.95	.00	.53	.00	35.01	1.00
	244.600	5833.00	1897.55	1.60	.62	.00	35.01	1.00
	450.000	4623.00	1895.83	.00	-.12	.00	35.77	205.40
*	450.000	5833.00	1898.42	2.59	.87	.00	158.48	205.40
*	544.000	4623.00	1896.49	.00	.66	.00	47.87	94.00
	544.000	5833.00	1898.39	1.90	-.03	.00	50.00	94.00
*	600.000	4623.00	1896.73	.00	.24	.00	47.58	56.00
	600.000	5833.00	1898.24	1.51	-.14	.00	50.00	56.00
*	700.000	4623.00	1896.99	.00	.27	.00	47.88	100.00
	700.000	5833.00	1898.23	1.23	-.02	.00	50.00	100.00
*	1200.000	4623.00	1898.60	.00	1.60	.00	47.90	500.00
*	1200.000	5833.00	1899.75	1.15	1.52	.00	50.00	500.00
*	1700.000	4623.00	1900.30	.00	1.70	.00	47.90	500.00
*	1700.000	5833.00	1901.47	1.17	1.72	.00	50.00	500.00
*	2000.000	4623.00	1901.30	.00	1.00	.00	47.90	300.00
*	2000.000	5833.00	1902.47	1.17	1.00	.00	50.00	300.00
*	2200.000	4623.00	1901.90	.00	.60	.00	47.90	200.00
*	2200.000	5833.00	1903.07	1.17	.60	.00	50.00	200.00
*	3724.000	4623.00	1906.95	.00	5.05	.00	47.74	1524.00
*	3724.000	5833.00	1909.15	2.21	6.09	.00	215.66	1524.00
	3823.000	4623.00	1907.54	.00	.59	.00	42.35	99.00
	3823.000	5833.00	1908.20	.67	-.95	.00	43.37	99.00
	4020.000	4623.00	1907.51	.00	-.03	.00	41.43	197.00
*	4020.000	5833.00	1908.57	1.06	.37	.00	43.01	197.00
*	4060.000	4623.00	1907.44	.00	-.07	.00	40.93	40.00
*	4060.000	5833.00	1908.61	1.17	.04	.00	42.67	40.00
*	4115.000	5779.00	1907.51	.00	.07	.00	39.57	55.00
*	4115.000	7081.00	1908.63	1.12	.02	.00	39.59	55.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4188.000	5779.00	1911.66	.00	4.16	.00	52.86	73.00
*	4188.000	7081.00	1913.61	1.94	4.98	.00	52.88	73.00
*	4189.000	5779.00	1911.27	.00	-.39	.00	52.83	1.00
*	4189.000	7081.00	1912.78	1.51	-.82	.00	52.86	1.00
	4246.000	5779.00	1911.37	.00	.10	.00	52.83	57.00
	4246.000	7081.00	1912.93	1.56	.14	.00	52.86	57.00
*	4247.000	6307.00	1912.04	.00	.67	.00	52.86	1.00
*	4247.000	6638.00	1915.57	3.53	2.64	.00	52.90	1.00
*	4360.000	6307.00	1911.96	.00	-.08	.00	57.00	113.00
*	4360.000	6638.00	1914.87	2.91	-.70	.00	57.00	113.00

*	4831.000	6307.00	1915.87	.00	3.92	.00	57.00	471.00
*	4831.000	6638.00	1916.10	.23	1.23	.00	57.00	471.00
*	4920.000	6307.00	1916.57	.00	.70	.00	57.00	89.00
*	4920.000	6638.00	1916.83	.26	.73	.00	57.00	89.00
*	5005.000	6307.00	1917.27	.00	.70	.00	57.00	85.00
*	5005.000	6638.00	1917.52	.25	.69	.00	57.00	85.00
*	5105.000	6307.00	1918.19	.00	.92	.00	35.01	100.00
*	5105.000	6638.00	1918.54	.35	1.02	.00	35.01	100.00
	5200.000	6307.00	1920.52	.00	2.33	.00	38.21	95.00
*	5200.000	6638.00	1920.96	.44	2.42	.00	38.21	95.00
	5500.000	6307.00	1921.80	.00	1.28	.00	48.21	300.00
	5500.000	6638.00	1922.30	.50	1.34	.00	48.21	300.00
	5852.000	6307.00	1922.28	.00	.48	.00	60.01	352.00
	5852.000	6638.00	1922.83	.55	.53	.00	60.01	352.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 450.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 450.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 544.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 544.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 544.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 700.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1200.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1200.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 1200.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1200.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1200.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 1700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1700.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1700.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 1700.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1700.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1700.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 2000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2000.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2000.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 2000.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2000.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2000.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 2200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2200.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2200.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 2200.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2200.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2200.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 3724.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 3724.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 4020.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4020.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

1

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CAUTION SECNO= 4060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4060.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4060.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4060.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4115.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4115.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4115.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4115.000 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 4188.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4188.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=   4189.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   4189.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   4247.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=   4247.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4360.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4360.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4360.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=   4360.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4831.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4831.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4831.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   4831.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4831.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4831.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   4920.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4920.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4920.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   4920.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4920.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   4920.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5005.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5005.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5005.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5005.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5005.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5005.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=   5105.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5105.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5105.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=   5105.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   5105.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   5105.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   5200.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
    15APR98      13:28:43                                                  PAGE   30
```

Paper Copy G
Interstate 15 to Craig Road supercritical

10- through 500-year flood events

```
1*********************************************
 *  HEC-2 WATER SURFACE PROFILES             *
 *                                           *
 *  Version   4.6.2;  May 1991               *
 *                                           *
 *  RUN DATE    20APR98    TIME   05:51:45   *
 *********************************************
```

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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*         (916) 756-1104                *
*****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
```



```
                                                                THIS RUN EXECUTED 20APR98    05:51:45

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1       FEMA 10-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLV WASH W/O DIVERSION

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0         2                     1      .0033                                        1890.1

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       0                   -1

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150


 QT         4       1281       2183       6307       6638

 NC       .03        .03       .014         .3         .1
     CRAIG BRIDGE CROSS-SECTION (JUST DOWNSTREAM)

 X1      5852          4       1000    1060.01        352        352        352
 GR    1924.1       1000     1913.1    1000.01     1913.1       1060     1924.1    1060.01


 X1      5500          4       1000    1048.21        300        300        300
 GR    1921.8       1000     1910.8    1000.01     1910.8     1048.2     1921.8    1048.21


 X1      5200          4       1000    1038.21         95         95         95
 GR    1919.8       1000     1908.8    1000.01     1908.8     1038.2     1919.8    1038.21


 X1      5105          4       1000    1035.01        100        100        100
 GR    1919.2       1000     1908.2    1000.01     1908.2       1035     1919.2    1035.01

     ADDED TRAPEZOIDAL SECTION
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```
 X1      5005          4       1000       1057         85         85         85
 GR    1916.7       1000     1906.2       1021     1906.2       1036     1916.7       1057


 X1      4920          4       1000       1057         89         89         89
 GR      1916       1000     1905.5       1021     1905.5       1036       1916       1057


 X1      4831          4       1000       1057        471        471        471
 GR    1915.3       1000     1904.8       1021     1904.8       1036     1915.3       1057


 NC       .03        .03       .014         .3         .1
   Left overbank topo from RR through Lone Mtn. should be extended/refined
    when additional mapping available:
```

```
   TRAPEZOIDAL TRANSITION INTO BRIDGE SECTION 113 FEET UPSTREAM OF BRIDGE
X1     4360          4       1000       1057        113        113        113
GR   1911.4       1000     1900.9       1021     1900.9       1036     1911.4       1057


QT        4       1281       2183       5779       7081

NC     .012       .012       .014         .5         .3

X1     4247         10          0       52.9          1          1          1
GR     1915          0       1899.9        0.1     1899.9       12.3     1899.9       13.5     1899.9       25.8
GR   1899.9         27       1899.9       39.3     1899.9       40.5     1899.9       52.8     1914.8       52.9

X1     4246         16          0       52.9         57         57         57
X3       10
BT      -20          0       1915       1915         .1       1915     1910.2       12.3     1914.9     1910.2
BT             12.3       1914.9     1899.9       13.5     1914.9     1899.9       13.5     1914.9     1910.2
BT             25.8       1914.9     1910.2       25.8     1914.9     1899.9         27     1914.9     1899.9
BT               27       1914.8     1910.2       39.3     1914.8     1910.2       39.3     1914.8     1899.9
BT             40.5       1914.8     1899.9       40.5     1914.8     1910.2       52.8     1914.8     1910.2
BT             52.9       1914.8     1914.8         55       1912       1912        115     1910.9     1910.9
BT              230         1912       1912        650     1913.1     1913.1
GR     1915          0       1899.9        0.1     1899.9       12.3     1899.9       13.5     1899.9       25.8
GR   1899.9         27       1899.9       39.3     1899.9       40.5     1899.9       52.8     1914.8       52.9
GR     1912         55       1910.9        115       1912        230     1913.1        650     1913.1        675
GR     1916       1090

  DOWNSTREAM SECTION OF RAILROAD BRIDGE
  BRIDGE IS SKEWED APPROX 35 DEGREES DISTANCES ARE TO THE CENTER OF THE CHANNEL
  ELEVATIONS HAVE BEEN ADJUSTED FOR DOWNSTREAM
   ADDED GR PTS FROM TOPO STA 65 TO 1125

X1     4189         17          0       52.9          1          1          1
X3       10
BT      -21          0     1914.8     1914.8         .1     1914.8     1909.7       12.3     1914.7     1909.7
BT             12.3       1914.7     1899.4       13.5     1914.7     1899.4       13.5     1914.7     1909.7
BT             25.8       1914.7     1909.7       25.8     1914.7     1899.4         27     1914.7     1899.4
BT               27       1914.6     1909.7       39.3     1914.6     1909.7       39.3     1914.6     1899.4
1
   20APR98      05:51:45                                                                                  PAGE    3


BT             40.5       1914.6     1899.4       40.5     1914.6     1909.7       52.8     1914.6     1909.7
BT             52.9       1914.6     1914.6         65       1912       1912         85       1912       1912
BT              140       1909.8     1909.8        300       1912       1912        685     1912.8     1912.8
GR   1914.8          0       1899.4        0.1     1899.4       12.3     1899.4       13.5     1899.4       25.8
GR   1899.4         27       1899.4       39.3     1899.4       40.5     1899.4       52.8     1914.6       52.9
GR     1912         65       1912         85       1909.8       140      1912         300      1912.8       685
GR   1912.8        710       1916       1125

  RR bridge elevations HAVE BEEN adjusted to NGVD '29 from NVD '88 (as surveyed)

X1     4188         17          0       52.9         73         73         73
GR     1915          0       1899.4        0.1     1899.4       12.3     1899.4       13.5     1899.4       25.8
GR   1899.4         27       1899.4       39.3     1899.4       40.5     1899.4       52.8     1914.8       52.9
GR     1912         65       1912         85       1909.8       140      1912         300      1912.8       685
GR   1912.8        710       1916       1125


NC     .035       .035       .014         .5         .3

QT        4       1025       1746       4623       5833
   CHANNEL SECTION CUT FROM KING CHARLES DIV. PLANS OVERBANK FROM 4020
X1     4115         29       1604     1643.6         55         55         55
X3       10
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907    1595.27     1909.3       1604     1898.8     1604.1
GR   1898.8     1643.5     1909.3     1643.6     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900

NH        3       .035        840       .014    1657.51       .035       2900

  CHANNEL SECTION CUT FROM KING CHARLES DIVERSION CHANNEL  OVERBANK DUPL020
X1     4060         29       1604     1647.8         40         40         40
X3       10          0          0          0          0          0          0          0          0
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907    1595.27     1909.3       1604     1898.76    1604.1
GR   1898.7       1632     1909.3     1647.8     1909.3    1657.51       1909    1686.54     1912.3    1705.34
GR     1913    1719.59       1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7
GR     1907    1781.99     1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73
GR     1912       2200     1912.4       2480     1912.4       2510       1916       2900


NC      .03        .03       .014         .3         .1

  'N'-CHANNEL DIVERSION
     SECTION OVERBANK FROM 840 TO 1170 CUT FROM TOPO 1528.6 TO 1820 FROM KENNY
X1     4020         28    1603.14    1646.95        197        197        197
X3       10          0          0          0          0          0          0          0          0
GR   1908.2        840       1908        900       1908        980       1904       1170     1907.2     1528.6
GR   1907.5     1550.5     1907.5     1570.6       1907    1595.27     1909.2    1603.14     1898.6    1603.2
GR   1898.6     1631.2     1909.1    1646.95       1909    1686.54     1912.3    1705.34       1913    1719.59
GR     1913    1740.66     1911.7    1747.43     1911.7    1757.13     1907.1     1771.7       1907    1781.99
GR   1910.6    1793.57     1910.7    1799.62     1910.3    1803.01     1910.1    1820.73       1912       2200
1
   20APR98      05:51:45                                                                                  PAGE    4
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```
GR   1912.4       2480      1912.4       2510       1916       2900
  Duplicate 22+20 (beginning of transition):

X1      3823          4        1000     1043.8         99         99         99
GR    1908.5       1000        1898    1000.01       1898       1028     1908.5     1043.8

NH         3       .035      1296.8       .014     1346.5       .035       1460
X1      3724         13      1296.8     1346.5       1524       1524       1524
X3        10
GR    1904.6        700      1904.6        745       1904        755       1904        785       1908       1190
GR      1908       1222      1907.6     1296.8     1897.6     1311.8     1897.6     1331.5     1907.6     1346.5
GR      1908       1430        1912       1450     1912.3       1460

NC      .014       .014       .014
X1      2200          4        1000       1050        200        200        200
GR    1902.6       1000      1892.6       1015     1892.6       1035     1902.6       1050

NC      0.030      0.030      0.014        0.3        0.1

X1      2000          4        1000       1050        300        300        300
GR      1902       1000        1892       1015       1892       1035       1902       1050

X1      1700          4        1000       1050        500        500        500
GR      1901       1000        1891       1015       1891       1035       1901       1050

X1      1200          4        1000       1050        500        500        500
GR    1899.3       1000      1889.3       1015     1889.3       1035     1899.3       1050

X1       700          4        1000       1050        100        100        100
GR    1897.7       1000      1887.7       1015     1887.7       1035     1897.7       1050

X1       600          4        1000       1050         56         56         56
GR    1897.4       1000      1887.4       1015     1887.4       1035     1897.7       1050

   Begin Transition XS 5+50 from As-Built Plans

X1       544          4        1000       1050         94         94         94
GR    1897.2       1000      1887.2       1015     1887.2       1035     1897.2       1050

  Duplicate 1+50 to 4+50 (beginning of transition):
1
   20APR98      05:51:45                                                                    PAGE    5


X1       450          8        1000       1036      205.4      205.4      205.4                  1.0
X3        10
GR      1900        900        1897        910       1896       1000       1886       1001       1886       1035
GR      1896       1036        1896       1060       1908       1120

X1     244.6          8        1000    1035.01          1          1          1
GR    1896.2       1000      1886.2    1000.01     1886.2     1017.1     1886.2    1017.11     1886.2     1017.9
GR    1886.2    1017.91      1886.2       1035     1896.2    1035.01

X1     243.6          8        1000    1035.01       93.6       93.6       93.6
GR    1896.2       1000      1886.2    1000.01     1886.2     1017.1     1896.2    1017.11     1896.2     1017.9
GR    1886.2    1017.91      1886.2       1035     1896.2    1035.01

  Add xsec 1+50 from as-built plans (rectangular):

X1       150         12        1000     1035.1
X3        10
GR      1900        900        1897        910       1896       1000       1886    1000.01       1886     1017.1
GR      1896    1017.11        1896     1017.9       1886    1017.91       1886       1035       1896     1035.1
GR      1896       1060        1908       1120

1
   20APR98      05:51:45                                                                    PAGE    6

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROP 1

 CCHV=      .300 CEHV=      .100
 *SECNO 5852.000
   5852.000       2.18   1915.28    1915.51    1890.10    1916.77       1.49        .00        .00    1924.10
     1281.0         .0    1281.0         .0         .0      130.9         .0         .0         .0    1924.10
        .00        .00       9.79       .00       .000       .014       .000       .000    1913.10    1000.01
    .003298         0.         0.         0.          0         47          5        .00      59.99    1060.00


 *SECNO 5500.000

 3301 HV CHANGED MORE THAN HVINS
```

5500.000	2.26	1913.06	1913.59	.00	1915.20	2.14	1.37	.20	1921.80
1281.0	.0	1281.0	.0	.0	109.1	.0	1.0	.4	1921.80
.01	.00	11.75	.00	.000	.014	.000	.000	1910.80	1000.01
.004646	352.	352.	352.	6	11	0	.00	48.19	1048.20

*SECNO 5200.000

5200.000	2.77	1911.57	1912.07	.00	1913.86	2.29	1.30	.04	1919.80
1281.0	.0	1281.0	.0	.0	105.4	.0	1.7	.7	1919.80
.02	.00	12.15	.00	.000	.014	.000	.000	1908.80	1000.01
.004051	300.	300.	300.	6	11	0	.00	38.20	1038.20

*SECNO 5105.000

5105.000	3.03	1911.23	1911.65	.00	1913.49	2.26	.36	.00	1919.20
1281.0	.0	1281.0	.0	.0	106.1	.0	1.9	.8	1919.20
.02	.00	12.07	.00	.000	.014	.000	.000	1908.20	1000.01
.003645	95.	95.	95.	8	11	0	.00	35.00	1035.00

*SECNO 5005.000

5005.000	4.21	1910.41	1911.06	.00	1913.02	2.62	.36	.11	1916.70
1281.0	.0	1281.0	.0	.0	98.7	.0	2.2	.9	1916.70
.02	.00	12.98	.00	.000	.014	.000	.000	1906.20	1012.58
.003590	100.	100.	100.	7	14	0	.00	31.85	1044.42

*SECNO 4920.000

4920.000	3.97	1909.47	1910.37	.00	1912.54	3.08	.34	.14	1916.00
1281.0	.0	1281.0	.0	.0	91.0	.0	2.4	1.0	1916.00
.02	.00	14.08	.00	.000	.014	.000	.000	1905.50	1013.07
.004504	85.	85.	85.	7	8	0	.00	30.87	1043.93

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SNDST

*SECNO 4831.000

4831.000	3.82	1908.62	1909.66	.00	1912.02	3.40	.43	.10	1915.30
1281.0	.0	1281.0	.0	.0	86.5	.0	2.5	1.0	1915.30
.02	.00	14.80	.00	.000	.014	.000	.000	1904.80	1013.36
.005179	89.	89.	89.	6	11	0	.00	30.29	1043.64

CCHV= .300 CEHV= .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

4360.000	3.46	1904.36	1905.76	.00	1908.79	4.44	2.91	.31	1911.40
1281.0	.0	1281.0	.0	.0	75.8	.0	3.4	1.3	1911.40
.03	.00	16.90	.00	.000	.014	.000	.000	1900.90	1014.08
.007520	471.	471.	471.	6	11	0	.00	28.83	1042.92

CCHV= .500 CEHV= .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.81

4247.000	1.28	1901.18	1902.53	.00	1906.80	5.61	1.41	.59	1915.00
1281.0	.0	1281.0	.0	.0	67.4	.0	3.6	1.4	1914.80
.03	.00	19.01	.00	.000	.014	.000	.000	1899.90	.09
.024620	113.	113.	113.	4	15	0	.00	52.72	52.81

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	1.40	1901.30	1902.65	.00	1906.71	5.42	.03	.06	1915.00
1281.0	.0	1281.0	.0	.0	68.6	.0	3.6	1.4	1914.80
.03	.00	18.68	.00	.000	.014	.000	.000	1899.90	.09
.026055	1.	1.	1.	7	22	0	-5.03	52.72	52.81

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SNDST

```
*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  21 MIN ELTRD=  1909.80 MAX ELLC=  1914.80


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000      1.61   1901.01   1902.15       .00   1905.13      4.13      1.19       .39   1914.80
    1281.0        .0    1281.0        .0        .0      78.6        .0       3.7       1.5   1914.60
       .03       .00     16.30       .00      .000      .014      .000      .000   1899.40       .09
   .017167       57.       57.       57.         7        22         0     -5.76     52.72     52.81
      .

*SECNO 4188.000
  4188.000      1.48   1900.88   1902.03       .00   1905.08      4.20       .02       .04   1915.00
    1281.0        .0    1281.0        .0        .0      77.9        .0       3.7       1.5   1914.80
       .03       .00     16.45       .00      .000      .014      .000      .000   1899.40       .09
   .015346        1.        1.        1.         9        14         0       .00     52.72     52.81


CCHV=      .500 CEHV=      .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      1.78   1900.58   1901.55       .00   1903.91      3.33       .91       .26   1909.30
    1025.0        .0    1025.0        .0        .0      70.0        .0       3.8       1.6   1909.30
       .03       .00     14.64       .00      .000      .014      .000      .000   1898.80   1604.08
   .009919       73.       73.       73.         7        14         0       .00     39.43   1643.52


1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
1
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    SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          HL          OLOSS       L-BANK ELEV
    Q           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA         R-BANK ELEV
    TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
    SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST


3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4060.000      3.39   1902.09   1902.09       .00   1903.65      1.56       .23      2.71   1909.30
    1025.0        .0    1025.0        .0        .0     102.3        .0       3.9       1.6   1909.30
       .04       .00     10.02       .00      .000      .014      .000      .000   1898.70   1604.07
   .002321       55.       55.       55.        20        14         0       .00     32.98   1637.05


CCHV=      .300 CEHV=      .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      3.24   1901.84   1901.94       .00   1903.51      1.68       .10       .03   1909.20
    1025.0        .0    1025.0        .0        .0      98.7        .0       4.0       1.7   1909.10
       .04       .00     10.39       .00      .000      .014      .000      .000   1898.60   1603.18
   .002597       40.       40.       40.         2         5         0       .00     32.88   1636.06


*SECNO 3823.000
  3823.000      3.14   1901.14   1901.35       .00   1902.94      1.80       .54       .04   1908.50
    1025.0        .0    1025.0        .0        .0      95.2        .0       4.5       1.8   1908.50
       .04       .00     10.77       .00      .000      .014      .000      .000   1898.00   1000.01
   .002899      197.      197.      197.         5         8         0       .00     32.71   1032.72


1490 NH CARD USED
*SECNO 3724.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      3.93   1901.53   1901.53       .00   1903.14      1.62       .25       .35   1907.60
    1025.0        .0    1025.0        .0        .0     100.5        .0       4.7       1.9   1907.60
       .05       .00     10.20       .00      .000      .014      .000      .000   1897.60   1305.91
   .002167       99.       99.       99.        20        11         0       .00     31.48   1337.39


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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

2200.000	3.22	1895.82	1896.49	.00	1898.37	2.55	4.49	.28	1902.60
1025.0	.0	1025.0	.0	.0	79.9	.0	7.8	3.0	1902.60
.08	.00	12.82	.00	.000	.014	.000	.000	1892.60	1010.17
.004235	1524.	1524.	1524.	5	5	0	.00	29.66	1039.83

CCHV= .300 CEHV= .100

*SECNO 2000.000

2000.000	3.48	1895.48	1895.90	.00	1897.59	2.11	.73	.04	1902.00
1025.0	.0	1025.0	.0	.0	87.9	.0	8.2	3.1	1902.00
.08	.00	11.66	.00	.000	.014	.000	.000	1892.00	1009.77
.003207	200.	200.	200.	5	11	0	.00	30.46	1040.23

*SECNO 1700.000

1700.000	3.46	1894.46	1894.90	.00	1896.61	2.15	.97	.01	1901.00
1025.0	.0	1025.0	.0	.0	87.2	.0	8.8	3.3	1901.00
.09	.00	11.76	.00	.000	.014	.000	.000	1891.00	1009.81
.003291	300.	300.	300.	7	8	0	.00	30.38	1040.19

*SECNO 1200.000

1200.000	3.43	1892.73	1893.20	.00	1894.92	2.19	1.67	.01	1899.30
1025.0	.0	1025.0	.0	.0	86.3	.0	9.8	3.7	1899.30
.10	.00	11.88	.00	.000	.014	.000	.000	1889.30	1009.85
.003391	500.	500.	500.	6	8	0	.00	30.29	1040.15

*SECNO 700.000

700.000	3.53	1891.23	1891.61	.00	1893.29	2.06	1.62	.01	1897.70
1025.0	.0	1025.0	.0	.0	88.9	.0	10.8	4.0	1897.70
.11	.00	11.53	.00	.000	.014	.000	.000	1887.70	1009.72
.003104	500.	500.	500.	4	8	0	.00	30.55	1040.28

*SECNO 600.000

600.000	3.54	1890.94	1891.31	.00	1892.98	2.04	.31	.00	1897.40
1025.0	.0	1025.0	.0	.0	89.4	.0	11.0	4.1	1897.70
.12	.00	11.47	.00	.000	.014	.000	.000	1887.40	1009.69
.003048	100.	100.	100.	8	8	0	.00	30.47	1040.16

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 544.000

544.000	3.48	1890.68	1891.10	.00	1892.79	2.11	.17	.02	1897.20
1025.0	.0	1025.0	.0	.0	88.0	.0	11.2	4.1	1897.20
.12	.00	11.65	.00	.000	.014	.000	.000	1887.20	1009.77
.003201	56.	56.	56.	7	8	0	.00	30.46	1040.23

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	2.18	1889.18	1890.03	.00	1892.11	2.94	.43	.25	1897.00
1025.0	.0	1025.0	.0	.0	74.6	.0	11.3	4.2	1897.00
.12	.00	13.75	.00	.000	.014	.000	.000	1887.00	1000.78
.006923	94.	94.	94.	5	11	0	.00	34.44	1035.22

*SECNO 244.600

3301 HV CHANGED MORE THAN HVINS

244.600	2.44	1888.64	1889.18	.00	1890.89	2.25	1.16	.07	1896.20
1025.0	.0	1025.0	.0	.0	85.2	.0	11.7	4.3	1896.20
.12	.00	12.03	.00	.000	.014	.000	.000	1886.20	1000.01
.004668	205.	205.	205.	6	11	0	.00	34.99	1035.00

*SECNO 243.600

3265 DIVIDED FLOW

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   243.600      2.59   1888.79   1889.22       .00   1890.86      2.07       .00       .02   1896.20
    1025.0        .0    1025.0        .0        .0      88.8        .0      11.7       4.3   1896.20
       .12       .00     11.54       .00      .000      .014      .000      .000   1886.20   1000.01
   .004719        1.        1.        1.         4        11         0       .00     34.19   1035.00


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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *SECNO 150.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

    150.000      3.03   1889.03   1889.03       .00   1890.55      1.52       .34       .16   1896.00
     1025.0        .0    1025.0        .0        .0     103.7        .0      11.9       4.4   1896.00
        .13       .00      9.88       .00      .000      .014      .000      .000   1886.00   1000.01
   .002958        94.       94.       94.        20         8         0       .00     34.22   1035.03


 T1       FEMA 50-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLVW WASH W/O DIVERSION

 J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0         3                     1       .0033                                        1890.9

 J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2

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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 2

 CCHV=      .300 CEHV=      .100
 *SECNO 5852.000
   5852.000      3.05   1916.15   1916.54   1890.90   1918.36      2.22       .00       .00   1924.10
    2183.0        .0    2183.0        .0        .0     182.7        .0        .0        .0   1924.10
       .00       .00     11.95       .00      .000      .014      .000      .000   1913.10   1000.01
   .003264        0.        0.        0.         0        14         3       .00     60.00   1060.00


 *SECNO 5500.000

 3301 HV CHANGED MORE THAN HVINS

   5500.000      3.39   1914.19   1914.78       .00   1916.97      2.78      1.23       .17   1921.80
    2183.0        .0    2183.0        .0        .0     163.1        .0       1.4        .4   1921.80
       .01       .00     13.38       .00      .000      .014      .000      .000   1910.80   1000.01
   .003727       352.      352.      352.         6        11         0       .00     48.20   1048.20


 *SECNO 5200.000
   5200.000      4.18   1912.98   1913.45       .00   1915.89      2.91      1.04       .04   1919.80
    2183.0        .0    2183.0        .0        .0     159.4        .0       2.5        .7   1919.80
       .01       .00     13.69       .00      .000      .014      .000      .000   1908.80   1000.01
   .003224       300.      300.      300.         6        11         0       .00     38.20   1038.20


 *SECNO 5105.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   5105.000      4.95   1913.15   1913.15       .00   1915.62      2.47       .26       .04   1919.20
    2183.0        .0    2183.0        .0        .0     173.1        .0       2.9        .8   1919.20
       .02       .00     12.61       .00      .000      .014      .000      .000   1908.20   1000.01
   .002336        95.       95.       95.        20         8         0       .00     35.00   1035.00


 *SECNO 5005.000

 3301 HV CHANGED MORE THAN HVINS

   5005.000      5.75   1911.95   1912.69       .00   1915.13      3.18       .27       .21   1916.70
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2183.0	.0	2183.0	.0	.0	152.5	.0	3.2	.9	1916.70
.02	.00	14.31	.00	.000	.014	.000	.000	1906.20	1009.49
.003127	100.	100.	100.	8	11	0	.00	38.01	1047.51

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4920.000

3301 HV CHANGED MORE THAN HVINS

4920.000	5.44	1910.94	1912.00	.00	1914.67	3.74	.30	.17	1916.00
2183.0	.0	2183.0	.0	.0	140.7	.0	3.5	1.0	1916.00
.02	.00	15.51	.00	.000	.014	.000	.000	1905.50	1010.12
.003901	85.	85.	85.	7	8	0	.00	36.75	1046.88

*SECNO 4831.000

4831.000	5.25	1910.05	1911.29	.00	1914.18	4.13	.37	.12	1915.30
2183.0	.0	2183.0	.0	.0	133.8	.0	3.8	1.0	1915.30
.02	.00	16.31	.00	.000	.014	.000	.000	1904.80	1010.50
.004483	89.	89.	89.	7	11	0	.00	35.99	1046.50

CCHV= .300 CEHV= .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

4360.000	4.72	1905.62	1907.38	.00	1911.18	5.57	2.57	.43	1911.40
2183.0	.0	2183.0	.0	.0	115.3	.0	5.2	1.4	1911.40
.03	.00	18.94	.00	.000	.014	.000	.000	1900.90	1011.56
.006767	471.	471.	471.	5	11	0	.00	33.87	1045.44

CCHV= .500 CEHV= .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

4247.000	1.92	1901.82	1903.65	.00	1909.11	7.30	1.21	.86	1915.00
2183.0	.0	2183.0	.0	.0	100.7	.0	5.4	1.5	1914.80
.03	.00	21.68	.00	.000	.014	.000	.000	1899.90	.09
.019306	113.	113.	113.	8	15	0	.00	52.73	52.81

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4246.000

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	2.09	1901.99	1903.84	.00	1909.01	7.02	.02	.08	1915.00
2183.0	.0	2183.0	.0	.0	102.7	.0	5.4	1.5	1914.80
.03	.00	21.26	.00	.000	.014	.000	.000	1899.90	.09
.022182	1.	1.	1.	7	15	0	-7.53	52.73	52.81

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 21 MIN ELTRD= 1909.80 MAX ELLC= 1914.80

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	2.28	1901.68	1903.34	.00	1907.56	5.88	1.10	.34	1914.80
2183.0	.0	2183.0	.0	.0	112.2	.0	5.6	1.6	1914.60
.03	.00	19.46	.00	.000	.014	.000	.000	1899.40	.09
.017036	57.	57.	57.	11	15	0	-8.22	52.73	52.82

*SECNO 4188.000

4188.000	2.11	1901.51	1903.15	.00	1907.50	5.99	.02	.05	1915.00
2183.0	.0	2183.0	.0	.0	111.2	.0	5.6	1.6	1914.80

```
      .03       .00     19.64       .00      .000      .014      .000      .000   1899.40       .09
   .014016        1.        1.        1.         9        14         0       .00    52.73     52.81


CCHV=     .500 CEHV=     .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1909.30 ELREA=     1909.30

  4115.000      2.45   1901.25   1902.73       .00   1906.34      5.09       .89       .27   1909.30
    1746.0        .0    1746.0        .0        .0      96.4        .0       5.8       1.7   1909.30
       .03       .00     18.11       .00      .000      .014      .000      .000   1898.80   1604.08
   .010313       73.       73.       73.        11        14         0       .00     39.45   1643.52


1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1909.30 ELREA=     1909.30

  4060.000      4.33   1903.03   1903.46       .00   1905.66      2.63       .28       .80   1909.30
    1746.0        .0    1746.0        .0        .0     134.1        .0       5.9       1.7   1909.30
       .03       .00     13.02       .00      .000      .014      .000      .000   1898.70   1604.06
   .002996       55.       55.       55.        20        14         0       .00     34.40   1638.46


CCHV=     .300 CEHV=     .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1909.20 ELREA=     1909.10

  4020.000      4.27   1902.87   1903.31       .00   1905.53      2.66       .12       .01   1909.20
    1746.0        .0    1746.0        .0        .0     133.3        .0       6.0       1.8   1909.10
       .03       .00     13.10       .00      .000      .014      .000      .000   1898.60   1603.18
   .003055       40.       40.       40.        12         8         0       .00     34.43   1637.61


*SECNO 3823.000
  3823.000      4.30   1902.30   1902.72       .00   1904.93      2.64       .60       .00   1908.50
    1746.0        .0    1746.0        .0        .0     134.0        .0       6.6       1.9   1908.50
       .04       .00     13.03       .00      .000      .014      .000      .000   1898.00   1000.01
   .003011      197.      197.      197.         7         8         0       .00     34.45   1034.46


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    20APR98      05:51:45                                                                          PAGE   17

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 3724.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1907.60 ELREA=     1907.60

  3724.000      5.39   1902.99   1902.99       .00   1905.10      2.11       .24       .33   1907.60
    1746.0        .0    1746.0        .0        .0     149.6        .0       7.0       2.0   1907.60
       .04       .00     11.67       .00      .000      .014      .000      .000   1897.60   1303.72
   .002021       99.       99.       99.        20        11         0       .00     35.86   1339.58


*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42

  2200.000      4.40   1897.00   1897.95       .00   1900.45      3.46      4.25       .40   1902.60
    1746.0        .0    1746.0        .0        .0     117.0        .0      11.6       3.2   1902.60
       .07       .00     14.92       .00      .000      .014      .000      .000   1892.60   1008.40
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   .004083     1524.     1524.     1524.        5         5         0       .00     33.20   1041.60


CCHV=     .300 CEHV=     .100
*SECNO 2000.000
  2000.000     4.64   1896.64   1897.35       .00   1899.67      3.03       .74       .04   1902.00
    1746.0       .0    1746.0       .0        .0     125.0       .0      12.2       3.4   1902.00
       .07       .00     13.96       .00      .000      .014      .000      .000   1892.00   1008.04
   .003378      200.      200.      200.         7        11         0       .00     33.92   1041.96


*SECNO 1700.000
  1700.000     4.65   1895.65   1896.37       .00   1898.66      3.01      1.01       .00   1901.00
    1746.0       .0    1746.0       .0        .0     125.4       .0      13.0       3.6   1901.00
       .08       .00     13.92       .00      .000      .014      .000      .000   1891.00   1008.02
   .003348      300.      300.      300.         8         8         0       .00     33.95   1041.98

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   20APR98     05:51:45                                                                        PAGE   18

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 1200.000
  1200.000     4.64   1893.94   1894.67       .00   1896.97      3.03      1.68       .01   1899.30
    1746.0       .0    1746.0       .0        .0     125.0       .0      14.5       4.0   1899.30
       .09       .00     13.97       .00      .000      .014      .000      .000   1889.30   1008.05
   .003384      500.      500.      500.         7         8         0       .00     33.91   1041.95


*SECNO 700.000
   700.000     4.70   1892.40   1893.07       .00   1895.31      2.91      1.64       .01   1897.70
    1746.0       .0    1746.0       .0        .0     127.6       .0      15.9       4.4   1897.70
       .10       .00     13.69       .00      .000      .014      .000      .000   1887.70   1007.93
   .003192      500.      500.      500.         5         8         0       .00     34.14   1042.07


*SECNO 600.000
   600.000     4.78   1892.18   1892.77       .00   1894.99      2.81       .31       .01   1897.40
    1746.0       .0    1746.0       .0        .0     129.8       .0      16.2       4.5   1897.70
       .10       .00     13.45       .00      .000      .014      .000      .000   1887.40   1007.81
   .003024      100.      100.      100.         8         8         0       .00     34.17   1042.98


*SECNO 544.000
   544.000     4.73   1891.93   1892.56       .00   1894.80      2.87       .17       .02   1897.20
    1746.0       .0    1746.0       .0        .0     128.4       .0      16.4       4.5   1897.20
       .10       .00     13.60       .00      .000      .014      .000      .000   1887.20   1007.89
   .003133       56.       56.       56.         8         8         0       .00     34.21   1042.11


*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

    450.000     3.21   1890.21   1891.31       .00   1894.10      3.89       .39       .31   1897.00
    1746.0       .0    1746.0       .0        .0     110.3       .0      16.6       4.6   1897.00
       .10       .00     15.83       .00      .000      .014      .000      .000   1887.00   1000.68
   .005840       94.       94.       94.         5        11         0       .00     34.64   1035.32


*SECNO 244.600
   244.600     3.37   1889.57   1890.45       .00   1892.96      3.39      1.09       .05   1896.20
    1746.0       .0    1746.0       .0        .0     118.1       .0      17.2       4.7   1896.20
       .11       .00     14.78       .00      .000      .014      .000      .000   1886.20   1000.01
   .004843      205.      205.      205.         6        11         0       .00     35.00   1035.00

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   20APR98     05:51:45                                                                        PAGE   19

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 243.600

3265 DIVIDED FLOW

    243.600     3.58   1889.78   1890.51       .00   1892.93      3.15       .01       .02   1896.20
    1746.0       .0    1746.0       .0        .0     122.5       .0      17.2       4.7   1896.20
       .11       .00     14.25       .00      .000      .014      .000      .000   1886.20   1000.01
   .005243         1.        1.        1.         4        11         0       .00     34.19   1035.00


*SECNO 150.000

3265 DIVIDED FLOW
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 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

    150.000      4.31   1890.31   1890.31       .00   1892.49      2.18       .37       .12   1896.00
     1746.0        .0    1746.0        .0        .0     147.4        .0      17.5       4.8   1896.00
        .11        .00     11.84       .00       .000      .014       .000       .000   1886.00   1000.01
     .003057      94.       94.       94.        20        11         0        .00     34.24   1035.04

1
 PROFILE FOR STREAM  LNLVW WASH W/O DIVERSION


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1886.     1891.     1896.     1901.     1906.     1911.     1916.     1921.     1926.     1931.
     SECNO   CUMDIS

   5852.00      0.                                                        I     WC   E       .      L
                50.                                                        I     WC   E       .      L
               100.                                                       .I     WC   E       .      L
               150.                                                      .I      WC   E       .     L
               200.                                                      .I      WC.  E       .     L
               250.                                                      .I      WC.  E       .    L
               300.                                                      I       WC . E       .   L
               350.                                                      I       W C . E       .  L
   5500.00     400.                                                      I       W C . E       .  L
               450.                                                     .I.      WC   . E      .L
               500.                                                     I .      WC   .E       L
               550.                                                     I .     WC    .E       L
               600.                                                    .I .     WC    .E      L.
               650.                                                    .I .     WC    E       L.
   5200.00     700.                                                    .I .     WC    E       L.
   5105.00     750.                                                   .I  .     W     E.      L
               800.                                                  .I   .     WC    E.   L
   5005.00     850.                                                  I    .     WC    E .L
               900.                                                  I    .     W C   E .L
   4920.00     950.                                                 .I.   .     W C   E  L
              1000.                                                 I .   .     W.C   E L.
   4831.00    1050.                                                 I .   .     W .C  E  L.
              1100.                                                .I .   .     W  C  E L .
              1150.                                               .I  .   .     W  C.    E L  .
              1200.                                              .I   .   .     W  C .   E L  .
              1250.                                             .I    .   .     W  C  .  EL   .
              1300.                                            .I     .   .     W  C  .  EL   .
              1350.                                            .I     .   .     W  C  .  EL   .
              1400.                                           .I      .   .     W  C  .  EL   .
              1450.                                           .I      .   .     W  C  .  EL   .
   4360.00    1500.                                          I        .   .     W. C  .  EL   .
              1550.                                        .I.        .   .     W  C. .  E.  L.
              1600.                                        .I .  W    C   .     .  .  E  .   L.
   4247.00    1650.                                        .I .  W    C   .     .  .  E  .   L.
   4246.00    1700.                                        .I .  W    C   .     .  .  E  .   L.
   4189.00    1750.                                       .I  . W     C   .     E  .  .  .   RL.
   4188.00    1800.                                       .I  . W     C   .     E  .  .  .   L .
   4115.00    1850.                                      .I   . W     C   .     .E M  L  .   . .
   4060.00    1900.                                      .I   .   WC      E.    .  M  L  .   . .
   4020.00    1950.                                      .I   .   WC      E.    .  M L  .   . .
              2000.                                      .I   .  WC       E.    .  ML .   . .
   3823.00    2050.                                     .I    .  W       E .   .  L  .   . .
              2100.                                     .I    .  WC      E .M  L  .   . .
   3724.00    2150.                                    .I     .  W       ME .  L  .   . .
              2200.                                    .I     .  W       ME .  L  .   . .
              2250.                                    .I     .  W       ME .  L  .   . .
              2300.                                   .I      .  W       E  .  L  .   . .
              2350.                                   .I      .  WC      E  .  L  .   . .
              2400.                                   .I      .  W       E  .  L  .   . .
              2450.                                  .I       .  W       E  .L    .   . .
              2500.                                  .I       .  WC      E  .L    .   . .
              2550.                                  .I       .  W       E  .L    .   . .
              2600.                                  I        .  WC      EM .L    .   . .
              2650.                                  I        .  WC      EM .L    .   . .
              2700.                                  I        .  W       EM .L    .   . .
              2750.                                 .I        .  WC      EM .L.   .   . .
              2800.                                 .I        .  WC      EM .L.   .   . .
              2850.                                 .I        .  WC.     EM .L.   .   . .
              2900.                                I .        .  WC.     EM .L .  .   . .
              2950.                                I .        .  WC.     E M .L .  .   . .
              3000.                                I .        .  WC .    E M .L .  .   . .
              3050.                               .I .        .  WC .    E M .L .  .   . .
              3100.                               .I .        .  WC .    E M .L .  .   . .
              3150.                               .I .        .  WC .    E M .L .  .   . .
              3200.                              .I  .        .  WC .    E M .L .  .   . .
              3250.                              .I  .        .  W C .   E M .L .  .   . .
              3300.                              .I  .        .  WC  .   E M .L .  .   . .
              3350.                             .I   .        .  WC  .   E M .L .  .   . .
              3400.                             .I   .        .  W C .   E M .L .  .   . .
              3450.                             .I   .        .  WC  .   E M .L .  .   . .
              3500.                            .I    .        .  W C .   E M .L .  .   . .
              3550.                            .I    .        .  W C .   E M .L .  .   . .
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          3600.  .          .   I      .  WC    E.  ML    .         .         .         .         .         .         .
          3650.  .          .  I       . W C    E.  L     .         .         .         .         .         .         .
 2200.00  3700.  .          .  I       . W C    E.  L     .         .         .         .         .         .         .
          3750.  .          .  I       . W C    E.  L     .         .         .         .         .         .         .
          3800.  .          .  I       . WC     E.  L     .         .         .         .         .         .         .
          3850.  .          . I        .W C     E . L     .         .         .         .         .         .         .
 2000.00  3900.  .          . I        .W C     E . L     .         .         .         .         .         .         .
          3950.  .          . I        .WC      E . L     .         .         .         .         .         .         .
          4000.  .          .I         .WC      E .L      .         .         .         .         .         .         .
          4050.  .          .I         W C      E .L      .         .         .         .         .         .         .
          4100.  .          .I         WC       E .L      .         .         .         .         .         .         .
          4150.  .          I          WC       E  L      .         .         .         .         .         .         .
 1700.00  4200.  .          I         W.C       E  L      .         .         .         .         .         .         .
          4250.  .          I         WC        E  L      .         .         .         .         .         .         .
          4300.  .         I.         WC        E  L.     .         .         .         .         .         .         .
          4350.  .         I.        W C        E  L.     .         .         .         .         .         .         .
          4400.  .         I.        WC.        E  L.     .         .         .         .         .         .         .
          4450.  .        I .        WC.        E  L .    .         .         .         .         .         .         .
          4500.  .        I .       W C.        E  L .    .         .         .         .         .         .         .
          4550.  .        I .       WC .        E  L .    .         .         .         .         .         .         .
          4600.  .       I  .       WC .        E  L  .   .         .         .         .         .         .         .
          4650.  .       I  .      W C .        E  L  .   .         .         .         .         .         .         .
 1200.00  4700.  .       I  .      WC  .        E  L  .   .         .         .         .         .         .         .
          4750.  .      I   .      WC  .        E  L  .   .         .         .         .         .         .         .
          4800.  .      I   .     W C  .        E  L  .   .         .         .         .         .         .         .
          4850.  .      I   .     WC   .        E  L  .   .         .         .         .         .         .         .
          4900.  .     I    .     WC   .        E  L  .   .         .         .         .         .         .         .
          4950.  .     I    .    W C   .        E  L  .   .         .         .         .         .         .         .
          5000.  .     I    .    WC    .        E  L  .   .         .         .         .         .         .         .
          5050.  .    I     .    WC    .        E  L  .   .         .         .         .         .         .         .
          5100.  .    I     .   W C    .        E  L  .   .         .         .         .         .         .         .
          5150.  .    I     .   WC     .        E  L  .   .         .         .         .         .         .         .
  700.00  5200.  .   I      .   WC     .        E  L  .   .         .         .         .         .         .         .
          5250.  .   I      .   WC     .        E  L  .   .         .         .         .         .         .         .
  600.00  5300.  .   I      .  W C     .        E  L  .   .         .         .         .         .         .         .
  544.00  5350.  .  I       .  WC      .        E  L  .   .         .         .         .         .         .         .
          5400.  .  I       .  W C     .        E  L  M   .         .         .         .         .         .         .
  450.00  5450.  .  I       .  W .C    .        E  L  .   M         .         .         .         .         .         .
          5500.  .  I       .  W C     .        E  L  .   M         .         .         .         .         .         .
          5550.  . I        .  W C     .        E  .L  M  .         .         .         .         .         .         .
          5600.  . I        .  W C.    .        E  .L M   .         .         .         .         .         .         .
  244.60  5650.  I          .  W C.    .        E  L      .         .         .         .         .         .         .
  243.60  5700.  I          .  WC.     .        E  L      .         .         .         .         .         .         .
  150.00  5750.  I          .  W.      .        E  L      .         M         .         .         .         .         .
1
   20APR98       05:51:45                                                                                    PAGE    20


 T1       FEMA 100-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLVW WASH W/O DIVERSION

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  4                     1       .0033                                      1894.2

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       3


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   20APR98       05:51:45                                                                                    PAGE    21


     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 3

 CCHV=      .300 CEHV=      .100
 *SECNO 5852.000
   5852.000       5.92    1919.02    1920.08    1894.20    1923.92       4.90        .00        .00    1924.10
     6307.0         .0     6307.0         .0         .0     355.0         .0         .0         .0    1924.10
        .00        .00      17.77        .00       .000       .014       .000       .000    1913.10    1000.00
    .003327         0.         0.         0.          0         17          5        .00      60.00    1060.01


 *SECNO 5500.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   5500.000       8.08    1918.88    1918.88        .00    1922.95       4.07        .92        .43    1921.80
     6307.0         .0     6307.0         .0         .0     389.5         .0        3.0         .4    1921.80
        .01        .00      16.19        .00       .000       .014       .000       .000    1910.80    1000.00
    .002110       352.       352.       352.         20         11          0        .00      48.20    1048.21


 *SECNO 5200.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
  5200.000      9.46   1918.26   1918.26       .00   1922.99      4.73       .66      1.15   1919.80
    6307.0         .0    6307.0       .0         .0    361.3         .0       5.6        .7   1919.80
       .01        .00     17.46       .00       .000     .014       .000      .000   1908.80   1000.00
   .002311       300.      300.      300.         20        8          0       .00     38.21   1038.21


*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000      9.99   1918.19   1918.19       .00   1923.24      5.05       .23       .90   1919.20
    6307.0         .0    6307.0       .0         .0    349.7         .0        6.4        .8   1919.20
       .01        .00     18.04       .00       .000     .014       .000      .000   1908.20   1000.00
   .002449        95.       95.       95.         20        8          0       .00     35.01   1035.01


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   20APR98      05:51:45                                                                          PAGE   22

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 5005.000

3301 HV CHANGED MORE THAN HVINS

  5005.000      8.94   1915.14   1917.27       .00   1922.29      7.15       .32       .63   1916.70
    6307.0         .0    6307.0       .0         .0    293.8         .0        7.1        .9   1916.70
       .01        .00     21.47       .00       .000     .014       .000      .000   1906.20   1003.13
   .004376       100.      100.      100.         7        8          0       .00     50.75   1053.88


*SECNO 4920.000
  4920.000      8.80   1914.30   1916.55       .00   1921.80      7.50       .38       .10   1916.00
    6307.0         .0    6307.0       .0         .0    287.0         .0        7.7       1.0   1916.00
       .01        .00     21.98       .00       .000     .014       .000      .000   1905.50   1003.40
   .004663        85.       85.       85.         10       11          0       .00     50.21   1053.60


*SECNO 4831.000
  4831.000      8.69   1913.49   1915.85       .00   1921.29      7.80       .43       .09   1915.30
    6307.0         .0    6307.0       .0         .0    281.4         .0        8.3       1.1   1915.30
       .02        .00     22.41       .00       .000     .014       .000      .000   1904.80   1003.62
   .004917        89.       89.       89.         8       11          0       .00     49.76   1053.38


CCHV=      .300 CEHV=      .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

  4360.000      8.25   1909.15   1911.95       .00   1918.30      9.16      2.57       .41   1911.40
    6307.0         .0    6307.0       .0         .0    259.7         .0       11.2       1.6   1911.40
       .02        .00     24.29       .00       .000     .014       .000      .000   1900.90   1004.51
   .006113       471.      471.      471.         6       11          0       .00     47.98   1052.49


CCHV=      .500 CEHV=      .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.61

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  4247.000      3.93   1903.83   1907.08       .00   1915.89     12.06       .97      1.45   1915.00
    5779.0         .0    5779.0       .0         .0    207.4         .0       11.8       1.8   1914.80
       .02        .00     27.87       .00       .000     .014       .000      .000   1899.90       .07
   .013357       113.      113.      113.        14       11          0       .00     52.75     52.83


*SECNO 4246.000

3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  20 MIN ELTRD=  1910.90 MAX ELLC=  1915.00


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1915.00 ELREA=      1914.80

  4246.000      4.32   1904.22   1907.43       .00   1915.70     11.48       .02       .17   1915.00
    5779.0         .0    5779.0       .0         .0    212.5         .0       11.8       1.8   1914.80
       .02        .00     27.19       .00       .000     .014       .000      .000   1899.90       .07
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   .018947       1.       1.       1.        6       12        0    -15.57     52.76     52.83


*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  21 MIN ELTRD=  1909.80 MAX ELLC=  1914.80


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1914.80 ELREA=      1914.60

  4189.000      4.54   1903.94   1906.92       .00   1914.38     10.44      1.01       .31   1914.80
    5779.0        .0    5779.0        .0        .0     222.9        .0      12.1       1.8   1914.60
       .02       .00     25.93       .00      .000      .014      .000      .000   1899.40       .07
   .016601       57.       57.       57.         7        12         0    -16.33     52.76     52.83


*SECNO 4188.000
  4188.000      4.18   1903.58   1906.57       .00   1914.25     10.67       .01       .11   1915.00
    5779.0        .0    5779.0        .0        .0     220.5        .0      12.1       1.8   1914.80
       .02       .00     26.21       .00      .000      .014      .000      .000   1899.40       .07
   .011006        1.        1.        1.         9        14         0       .00     52.75     52.83


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .500 CEHV=      .300
*SECNO 4115.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4115.000      4.68   1903.48   1906.30       .00   1913.22      9.74       .75       .28   1909.30
    4623.0        .0    4623.0        .0        .0     184.6        .0      12.4       1.9   1909.30
       .02       .00     25.04       .00      .000      .014      .000      .000   1898.80   1604.06
   .009431       73.       73.       73.         6        14         0       .00     39.49   1643.54


1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .65


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.30 ELREA=      1909.30

  4060.000      7.17   1905.87   1907.44       .00   1911.74      5.87       .32      1.16   1909.30
    4623.0        .0    4623.0        .0        .0     237.7        .0      12.7       2.0   1909.30
       .02       .00     19.45       .00      .000      .014      .000      .000   1898.70   1604.03
   .003963       55.       55.       55.         9        14         0       .00     38.65   1642.69


CCHV=      .300 CEHV=      .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1909.20 ELREA=      1909.10

  4020.000      7.14   1905.74   1907.28       .00   1911.58      5.84       .16       .00   1909.20
    4623.0        .0    4623.0        .0        .0     238.4        .0      12.9       2.0   1909.10
       .03       .00     19.39       .00      .000      .014      .000      .000   1898.60   1603.16
   .003939       40.       40.       40.         5        11         0       .00     38.76   1641.91


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 3823.000
  3823.000      7.37   1905.37   1906.68       .00   1910.80      5.43       .74       .04   1908.50
    4623.0        .0    4623.0        .0        .0     247.2        .0      14.0       2.2   1908.50
       .03       .00     18.70       .00      .000      .014      .000      .000   1898.00   1000.00
   .003558      197.      197.      197.         8        11         0       .00     39.09   1039.09


1490 NH CARD USED
*SECNO 3724.000
3260 CROSS SECTION   3724.00 EXTENDED      1.71 FEET
```

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1907.60 ELREA= 1907.60

3724.000	8.70	1906.30	1906.86	.00	1910.38	4.08	.28	.14	1907.60
4623.0	.0	4623.0	.0	.0	285.3	.0	14.6	2.3	1907.60
.03	.00	16.21	.00	.000	.014	.000	.000	1897.60	1298.74
.002353	99.	99.	99.	4	14	0	.00	45.82	1344.56

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

2200.000	7.88	1900.48	1901.89	.00	1905.76	5.28	4.25	.36	1902.60
4623.0	.0	4623.0	.0	.0	250.7	.0	24.0	3.8	1902.60
.05	.00	18.44	.00	.000	.014	.000	.000	1892.60	1003.18
.003369	1524.	1524.	1524.	6	8	0	.00	43.63	1046.82

CCHV= .300 CEHV= .100

*SECNO 2000.000

2000.000	7.96	1899.96	1901.30	.00	1905.09	5.12	.66	.02	1902.00
4623.0	.0	4623.0	.0	.0	254.5	.0	25.1	4.0	1902.00
.06	.00	18.16	.00	.000	.014	.000	.000	1892.00	1003.05
.003231	200.	200.	200.	8	11	0	.00	43.90	1046.95

*SECNO 1700.000

1700.000	7.94	1898.94	1900.33	.00	1904.10	5.16	.97	.01	1901.00
4623.0	.0	4623.0	.0	.0	253.5	.0	26.9	4.3	1901.00
.06	.00	18.23	.00	.000	.014	.000	.000	1891.00	1003.08
.003265	300.	300.	300.	7	8	0	.00	43.83	1046.92

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1200.000

1200.000	7.91	1897.21	1898.63	.00	1902.44	5.23	1.65	.02	1899.30
4623.0	.0	4623.0	.0	.0	252.0	.0	29.8	4.8	1899.30
.07	.00	18.35	.00	.000	.014	.000	.000	1889.30	1003.14
.003322	500.	500.	500.	10	8	0	.00	43.72	1046.86

*SECNO 700.000

700.000	7.96	1895.66	1897.03	.00	1900.79	5.13	1.64	.01	1897.70
4623.0	.0	4623.0	.0	.0	254.4	.0	32.7	5.4	1897.70
.08	.00	18.17	.00	.000	.014	.000	.000	1887.70	1003.05
.003235	500.	500.	500.	8	8	0	.00	43.89	1046.95

*SECNO 600.000

600.000	8.09	1895.49	1896.75	.00	1900.45	4.96	.32	.02	1897.40
4623.0	.0	4623.0	.0	.0	258.6	.0	33.3	5.5	1897.70
.08	.00	17.88	.00	.000	.014	.000	.000	1887.40	1002.86
.003078	100.	100.	100.	6	8	0	.00	43.92	1046.78

*SECNO 544.000

544.000	8.01	1895.21	1896.52	.00	1900.26	5.04	.17	.02	1897.20
4623.0	.0	4623.0	.0	.0	256.5	.0	33.6	5.5	1897.20
.08	.00	18.02	.00	.000	.014	.000	.000	1887.20	1002.98
.003161	56.	56.	56.	7	8	0	.00	44.04	1047.02

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1897.00 ELREA= 1897.00

450.000	6.89	1893.89	1895.21	.00	1899.70	5.81	.33	.23	1897.00
4623.0	.0	4623.0	.0	.0	239.0	.0	34.2	5.6	1897.00
.08	.00	19.34	.00	.000	.014	.000	.000	1887.00	1000.31
.003889	94.	94.	94.	7	8	0	.00	35.38	1035.69

*SECNO 244.600

244.600	6.79	1892.99	1894.36	.00	1898.86	5.87	.81	.02	1896.20
4623.0	.0	4623.0	.0	.0	237.7	.0	35.3	5.8	1896.20
.08	.00	19.45	.00	.000	.014	.000	.000	1886.20	1000.00
.004041	205.	205.	205.	7	8	0	.00	35.00	1035.01

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 243.600

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

243.600	7.36	1893.56	1894.45	.00	1898.80	5.24	.00	.06	1896.20
4623.0	.0	4623.0	.0	.0	251.7	.0	35.3	5.8	1896.20
.08	.00	18.36	.00	.000	.014	.000	.000	1886.20	1000.00
.004783	1.	1.	1.	5	11	0	.00	34.21	1035.01

*SECNO 150.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

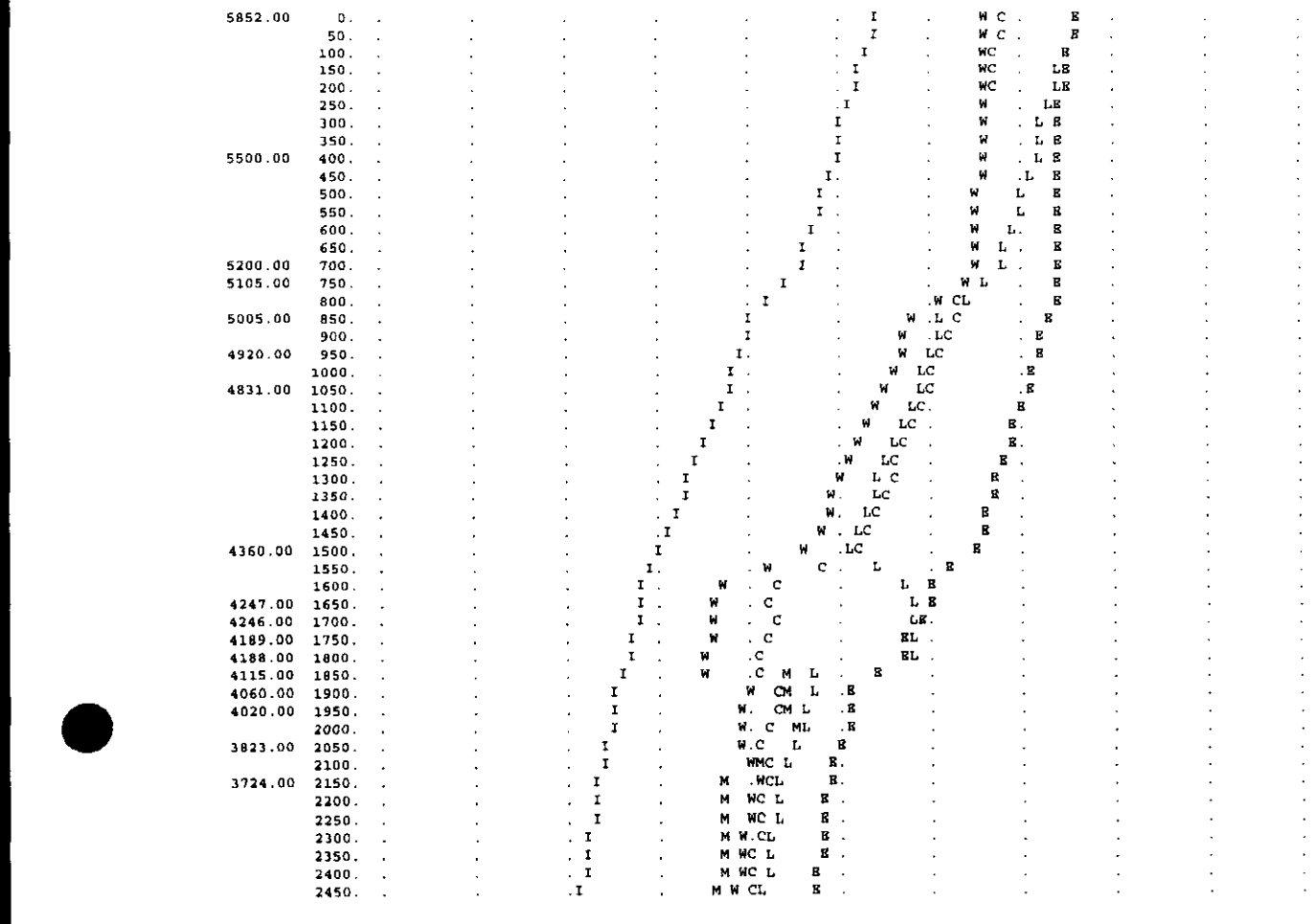
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1896.00 ELREA= 1896.00

150.000	8.26	1894.26	1894.26	.00	1898.41	4.15	.38	.10	1896.00
4623.0	.0	4623.0	.0	.0	282.8	.0	35.9	5.8	1896.00
.08	.00	16.35	.00	.000	.014	.000	.000	1886.00	1000.00
.003491	94.	94.	94.	20	8	0	.00	34.29	1035.08

1
PROFILE FOR STREAM LNLVW WASH W/O DIVERSION

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA



```
          2500.  .          .          .I         .       M WC.L     E  .          .          .          .          .          .
          2550.  .          .          .I         .       M WC.L     E  .          .          .          .          .          .
          2600.  .          .          I          .       MW CL      E  .          .          .          .          .          .
          2650.  .          .          I          .       MWC L      E  .          .          .          .          .          .
          2700.  .          .          I          .       W C L      E  .          .          .          .          .          .
          2750.  .          .         I.          .       W CL.      E  .          .          .          .          .          .
          2800.  .          .         I.          .      MWC L.      E  .          .          .          .          .          .
          2850.  .          .         I.          .      W C L.      E  .          .          .          .          .          .
          2900.  .          .        I .          .      W CL .     E   .          .          .          .          .          .
          2950.  .          .        I .          .     WM CL .     E   .          .          .          .          .          .
          3000.  .          .        I .          .     WMC L .     E   .          .          .          .          .          .
          3050.  .          .       I  .          .     WMCL  .    E    .          .          .          .          .          .
          3100.  .          .       I  .          .    W MCL  .    E    .          .          .          .          .          .
          3150.  .          .       I  .          .    W C L  .    E    .          .          .          .          .          .
          3200.  .          .      I   .          .    WMCL   .   E     .          .          .          .          .          .
          3250.  .          .      I   .          .   W MCL   .   E     .          .          .          .          .          .
          3300.  .          .      I   .          .   W C L   .   E     .          .          .          .          .          .
          3350.  .          .     I    .          .  .W  CL   .  E      .          .          .          .          .          .
          3400.  .          .     I    .          .  .W  CL   .  E      .          .          .          .          .          .
          3450.  .          .     I    .          .  .W CML   .  E      .          .          .          .          .          .
          3500.  .          .    I     .          .  W  CL    .  E      .          .          .          .          .          .
          3550.  .          .    I     .          .  W  CL    .  E      .          .          .          .          .          .
          3600.  .          .    I     .          .  W CML    .  E      .          .          .          .          .          .
          3650.  .          .   I      .          . W. CL     .  E      .          .          .          .          .          .
2200.00   3700.  .          .   I      .          . W. CL     .  E      .          .          .          .          .          .
          3750.  .          .  I       .          . W.C L     .  E      .          .          .          .          .          .
          3800.  .          .  I       .          .W .C L     .  E      .          .          .          .          .          .
          3850.  .          . I        .          .W .CL      .  E      .          .          .          .          .          .
2000.00   3900.  .          . I        .          .W .CL      .  E      .          .          .          .          .          .
          3950.  .          . I        .          .W C L      .  E      .          .          .          .          .          .
          4000.  .          .I         .          .W  CL      .  E      .          .          .          .          .          .
          4050.  .          .I         .          .W  CL      .  E      .          .          .          .          .          .
          4100.  .          .I         .          .W C.L      .  E      .          .          .          .          .          .
          4150.  .          I          .          .W  CL      .  E      .          .          .          .          .          .
1700.00   4200.  .          I          .          .W  CL      .  E      .          .          .          .          .          .
          4250.  .          I          .          .W C L      .  E      .          .          .          .          .          .
          4300.  .         I.          .          .W  CL.     .  E      .          .          .          .          .          .
          4350.  .         I.          .          .W  CL.     .  E      .          .          .          .          .          .
          4400.  .         I.          .          .W  C L.    .  E      .          .          .          .          .          .
          4450.  .        I .          .          .W  CL .    .  E      .          .          .          .          .          .
          4500.  .        I .          .          .W  CL .    .  E      .          .          .          .          .          .
          4550.  .        I .          .          .W  C L .   .  E      .          .          .          .          .          .
          4600.  .       I  .          .          .W  CL  .   .  E      .          .          .          .          .          .
          4650.  .       I  .          .          .W  CL  .   .  E      .          .          .          .          .          .
1200.00   4700.  .       I  .          .          .W  C L .   .  E      .          .          .          .          .          .
          4750.  .      I   .          .          .W  CL  .   .  E      .          .          .          .          .          .
          4800.  .      I   .          .          .W  CL  .   .  E      .          .          .          .          .          .
          4850.  .      I   .          .          .W  C L .   .  E      .          .          .          .          .          .
          4900.  .     I    .          .          .W  CL  .   .  E      .          .          .          .          .          .
          4950.  .     I    .          .          .W  CL  .   .  E      .          .          .          .          .          .
          5000.  .     I    .          .          .W C L  .   .  E      .          .          .          .          .          .
          5050.  .    I     .          .          W  CL   .   .  E      .          .          .          .          .          .
          5100.  .    I     .          .          W  CL   .   .  E      .          .          .          .          .          .
          5150.  .    I     .          .          W C L   .   .  E      .          .          .          .          .          .
 700.00   5200.  .   I      .          .         W. CL    .   .  E      .          .          .          .          .          .
          5250.  .   I      .          .         W. CL    .   E. .      .          .          .          .          .          .
 600.00   5300.  .   I      .          .         W. CL    .   E. .      .          .          .          .          .          .
 544.00   5350.  .  I       .          .        W .CL     .   E. .      .          .          .          .          .          .
          5400.  .  I       .          .       W  C L     M  E  .      .          .          .          .          .          .
 450.00   5450.  .  I       .          .      W C . L     E  M  .      .          .          .          .          .          .
          5500.  .  I       .          .     W  C . L     EM    .      .          .          .          .          .          .
          5550.  .I         .          .     W  C .L    M E    .      .          .          .          .          .          .
          5600.  .I         .          .    W  C  .L M  E      .      .          .          .          .          .          .
 244.60   5650.  I          .          .    W  C  L     E      .      .          .          .          .          .          .
 243.60   5700.  I          .          .     W C  L     E      .      .          .          .          .          .          .
 150.00   5750.  I          .          .      W   L     E  M   .      .          .          .          .          .          .
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    20APR98       05:51:45                                                                                          PAGE   28


 T1       FEMA 500-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       LNLVW WASH W/O DIVERSION

 J1  ICHECK    INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0         5                     1      .0033                                          1895.8

 J2  NPROF     IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       4


1
    20APR98       05:51:45                                                                                          PAGE   29


     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 4

 CCHV=      .300 CEHV=      .100
 *SECNO 5852.000
   5852.000       6.11    1919.21    1920.32    1895.80    1924.30       5.09        .00        .00    1924.10
     6638.0         .0     6638.0         .0         .0      366.7         .0         .0         .0    1924.10
```

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      .00       .00     18.10       .00      .000      .014      .000      .000   1913.10   1000.00
   .003331        0.        0.        0.         0        17         5       .00     60.00   1060.01


*SECNO 5500.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5500.000      8.36   1919.16   1919.16       .00   1923.37      4.21       .92       .43   1921.80
    6638.0        .0    6638.0        .0        .0     402.9        .0       3.1        .4   1921.80
       .01       .00     16.48       .00      .000      .014      .000      .000   1910.80   1000.00
   .002112       352.      352.      352.        20        11         0       .00     48.21   1048.21


*SECNO 5200.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5200.000      9.79   1918.59   1918.59       .00   1923.48      4.90       .66      1.19   1919.80
    6638.0        .0    6638.0        .0        .0     373.8        .0       5.8        .7   1919.80
       .01       .00     17.76       .00      .000      .014      .000      .000   1908.80   1000.00
   .002320       300.      300.      300.        20         8         0       .00     38.21   1038.21


*SECNO 5105.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  5105.000     10.34   1918.54   1918.54       .00   1923.76      5.22       .23       .93   1919.20
    6638.0        .0    6638.0        .0        .0     361.9        .0       6.6        .8   1919.20
       .01       .00     18.34       .00      .000      .014      .000      .000   1908.20   1000.00
   .002461        95.       95.       95.        20         8         0       .00     35.01   1035.01


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   20APR98      05:51:45                                                                    PAGE   30

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 5005.000

3301 HV CHANGED MORE THAN HVINS

  5005.000      9.11   1915.31   1917.52       .00   1922.77      7.46       .32       .67   1916.70
    6638.0        .0    6638.0        .0        .0     302.9        .0       7.3        .9   1916.70
       .01       .00     21.91       .00      .000      .014      .000      .000   1906.20   1002.77
   .004463       100.      100.      100.         7         8         0       .00     51.46   1054.23


*SECNO 4920.000
  4920.000      8.99   1914.49   1916.80       .00   1922.28      7.79       .39       .10   1916.00
    6638.0        .0    6638.0        .0        .0     296.3        .0       7.9       1.0   1916.00
       .01       .00     22.40       .00      .000      .014      .000      .000   1905.50   1003.03
   .004736        85.       85.       85.        10        11         0       .00     50.95   1053.97


*SECNO 4831.000
  4831.000      8.89   1913.69   1916.10       .00   1921.76      8.08       .43       .09   1915.30
    6638.0        .0    6638.0        .0        .0     291.1        .0       8.5       1.1   1915.30
       .02       .00     22.81       .00      .000      .014      .000      .000   1904.80   1003.23
   .004972        89.       89.       89.         9        11         0       .00     50.53   1053.77


CCHV=      .300 CEHV=      .100
*SECNO 4360.000

3301 HV CHANGED MORE THAN HVINS

  4360.000      8.45   1909.35   1912.20       .00   1918.77      9.42      2.59       .40   1911.40
    6638.0        .0    6638.0        .0        .0     269.5        .0      11.6       1.7   1911.40
       .02       .00     24.63       .00      .000      .014      .000      .000   1900.90   1004.10
   .006123       471.      471.      471.         6        11         0       .00     48.80   1052.90


CCHV=      .500 CEHV=      .300
*SECNO 4247.000

3301 HV CHANGED MORE THAN HVINS

  4247.000      4.85   1904.75   1908.13       .00   1916.64     11.89       .89      1.23   1915.00
    7081.0        .0    7081.0        .0        .0     255.9        .0      12.2       1.8   1914.80
       .02       .00     27.67       .00      .000      .014      .000      .000   1899.90       .07
   .010352       113.      113.      113.        15         8         0       .00     52.76     52.83


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   20APR98      05:51:45                                                                    PAGE   31
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4246.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 20 MIN ELTRD= 1910.90 MAX ELLC= 1915.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1915.00 ELREA= 1914.80

4246.000	5.38	1905.28	1908.51	.00	1916.40	11.12	.01	.23	1915.00
7081.0	.0	7081.0	.0	.0	264.7	.0	12.3	1.8	1914.80
.02	.00	26.76	.00	.000	.014	.000	.000	1899.90	.06
.015573	1.	1.	1.	6	15	0	-19.39	52.77	52.84

*SECNO 4189.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 21 MIN ELTRD= 1909.80 MAX ELLC= 1914.80

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1914.80 ELREA= 1914.60

4189.000	5.59	1904.99	1908.01	.00	1915.31	10.32	.84	.24	1914.80
7081.0	.0	7081.0	.0	.0	274.7	.0	12.6	1.9	1914.60
.02	.00	25.78	.00	.000	.014	.000	.000	1899.40	.06
.014086	57.	57.	57.	7	15	0	-20.12	52.77	52.84

*SECNO 4188.000

4188.000	5.14	1904.54	1907.64	.00	1915.15	10.62	.01	.15	1915.00
7081.0	.0	7081.0	.0	.0	270.8	.0	12.6	1.9	1914.80
.02	.00	26.15	.00	.000	.014	.000	.000	1899.40	.07
.008681	1.	1.	1.	9	11	0	.00	52.77	52.83

CCHV= .500 CEHV= .300
*SECNO 4115.000
1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4115.000	6.00	1904.80	1907.56	.00	1914.22	9.42	.57	.36	1909.30
5833.0	.0	5833.0	.0	.0	236.8	.0	13.0	1.9	1909.30
.02	.00	24.63	.00	.000	.014	.000	.000	1898.80	1604.04
.007022	73.	73.	73.	5	14	0	.00	39.51	1643.56

1490 NH CARD USED
*SECNO 4060.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.30 ELREA= 1909.30

4060.000	9.33	1908.03	1909.35	.00	1913.04	5.01	.22	1.63	1909.30
5833.0	.0	5833.0	.0	.0	324.6	.0	13.4	2.0	1909.30
.02	.00	17.97	.00	.000	.014	.000	.000	1898.70	1604.01
.002615	55.	55.	55.	20	20	0	.00	41.89	1645.90

CCHV= .300 CEHV= .100
*SECNO 4020.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1909.20 ELREA= 1909.10

4020.000	9.24	1907.84	1909.48	.00	1912.92	5.08	.11	.02	1909.20
5833.0	.0	5833.0	.0	.0	322.5	.0	13.7	2.0	1909.10
.02	.00	18.08	.00	.000	.014	.000	.000	1898.60	1603.15
.002669	40.	40.	40.	7	20	0	.00	41.90	1645.04

*SECNO 3823.000

3823.000	9.14	1907.14	1908.03	.00	1912.34	5.21	.54	.04	1908.50
5833.0	.0	5833.0	.0	.0	318.6	.0	15.1	2.2	1908.50

```
      .03       .00     18.31       .00      .000      .014      .000      .000   1898.00   1000.00
   .002766      197.      197.      197.         8         8         0       .00     41.75   1041.75


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    20APR98      05:51:45                                                                      PAGE   33

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


1490 NH CARD USED
*SECNO 3724.000
3280 CROSS SECTION    3724.00 EXTENDED      2.86 FEET


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1907.60 ELREA=      1907.60

  3724.000      9.86   1907.46   1907.74       .00   1912.03      4.57       .25       .06   1907.60
     5833.0        .0    5833.0        .0        .0     340.0        .0      15.9       2.3   1907.60
       .03       .00     17.15       .00       .000      .014      .000      .000   1897.60   1297.01
   .002315       99.       99.       99.         2        22         0       .00     49.28   1346.29


*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

  2200.000      8.96   1901.56   1903.05       .00   1907.45      5.90      4.18       .40   1902.60
     5833.0        .0    5833.0        .0        .0     299.3        .0      27.1       4.0   1902.60
       .05       .00     19.49       .00       .000      .014      .000      .000   1892.60   1001.57
   .003292      1524.     1524.     1524.         6         8         0       .00     46.86   1048.43


CCHV=      .300 CEHV=      .100
*SECNO 2000.000
  2000.000      9.01   1901.01   1902.50       .00   1906.79      5.78       .65       .01   1902.00
     5833.0        .0    5833.0        .0        .0     302.2        .0      28.5       4.2   1902.00
       .05       .00     19.30       .00       .000      .014      .000      .000   1892.00   1001.48
   .003205      200.      200.      200.         5         8         0       .00     47.05   1048.52


*SECNO 1700.000
  1700.000      8.99   1899.99   1901.49       .00   1905.82      5.82       .97       .01   1901.00
     5833.0        .0    5833.0        .0        .0     301.2        .0      30.5       4.5   1901.00
       .06       .00     19.36       .00       .000      .014      .000      .000   1891.00   1001.51
   .003234      300.      300.      300.         7         8         0       .00     46.98   1048.49


*SECNO 1200.000
  1200.000      8.95   1898.25   1899.80       .00   1904.16      5.91      1.63       .03   1899.30
     5833.0        .0    5833.0        .0        .0     299.0        .0      34.0       5.1   1899.30
       .07       .00     19.51       .00       .000      .014      .000      .000   1889.30   1001.58
   .003300      500.      500.      500.        10         8         0       .00     46.84   1048.42


1
    20APR98      05:51:45                                                                      PAGE   34

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 700.000
   700.000      8.99   1896.69   1898.20       .00   1902.51      5.83      1.63       .01   1897.70
     5833.0        .0    5833.0        .0        .0     301.1        .0      37.4       5.6   1897.70
       .07       .00     19.37       .00       .000      .014      .000      .000   1887.70   1001.51
   .003238      500.      500.      500.         8         8         0       .00     46.97   1048.49


*SECNO 600.000
   600.000      9.12   1896.52   1897.95       .00   1902.18      5.66       .32       .02   1897.40
     5833.0        .0    5833.0        .0        .0     305.5        .0      38.1       5.7   1897.70
       .07       .00     19.09       .00       .000      .014      .000      .000   1887.40   1001.32
   .003097      100.      100.      100.         5         8         0       .00     46.97   1048.29


*SECNO 544.000
   544.000      9.04   1896.24   1897.68       .00   1901.98      5.74       .18       .02   1897.20
     5833.0        .0    5833.0        .0        .0     303.4        .0      38.5       5.8   1897.20
       .07       .00     19.23       .00       .000      .014      .000      .000   1887.20   1001.44
   .003172       56.       56.       56.         7         8         0       .00     47.12   1048.56


*SECNO 450.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1897.00 ELREA=      1897.00

   450.000      8.42   1895.42   1896.49       .00   1901.56      6.13       .31       .12   1897.00
     5833.0        .0    5833.0        .0        .0     293.5        .0      39.2       5.9   1897.00
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      .08       .00     19.87       .00      .000      .014      .000      .000   1887.00   1000.16
   .003391       94.       94.       94.         8        11         0       .00     35.68   1035.84


*SECNO 244.600
   244.600      8.25   1894.45   1895.70       .00   1900.78      6.33       .72       .06   1896.20
    5833.0        .0    5833.0        .0        .0     289.0        .0      40.5       6.0   1896.20
       .08       .00     20.18       .00      .000      .014      .000      .000   1886.20   1000.00
   .003627       205.      205.      205.         7         8         0       .00     35.01   1035.01


*SECNO 243.600

3265 DIVIDED FLOW

1
   20APR98      05:51:45                                                                        PAGE   35

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
   243.600      9.37   1895.57   1895.86       .00   1900.72      5.15       .00       .02   1896.20
    5833.0        .0    5833.0        .0        .0     320.4        .0      40.5       6.0   1896.20
       .08       .00     18.20       .00      .000      .014      .000      .000   1886.20   1000.00
   .003993         1.        1.        1.        20         8         0       .00     34.22   1035.01


*SECNO 150.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1896.00 ELREA=      1896.00

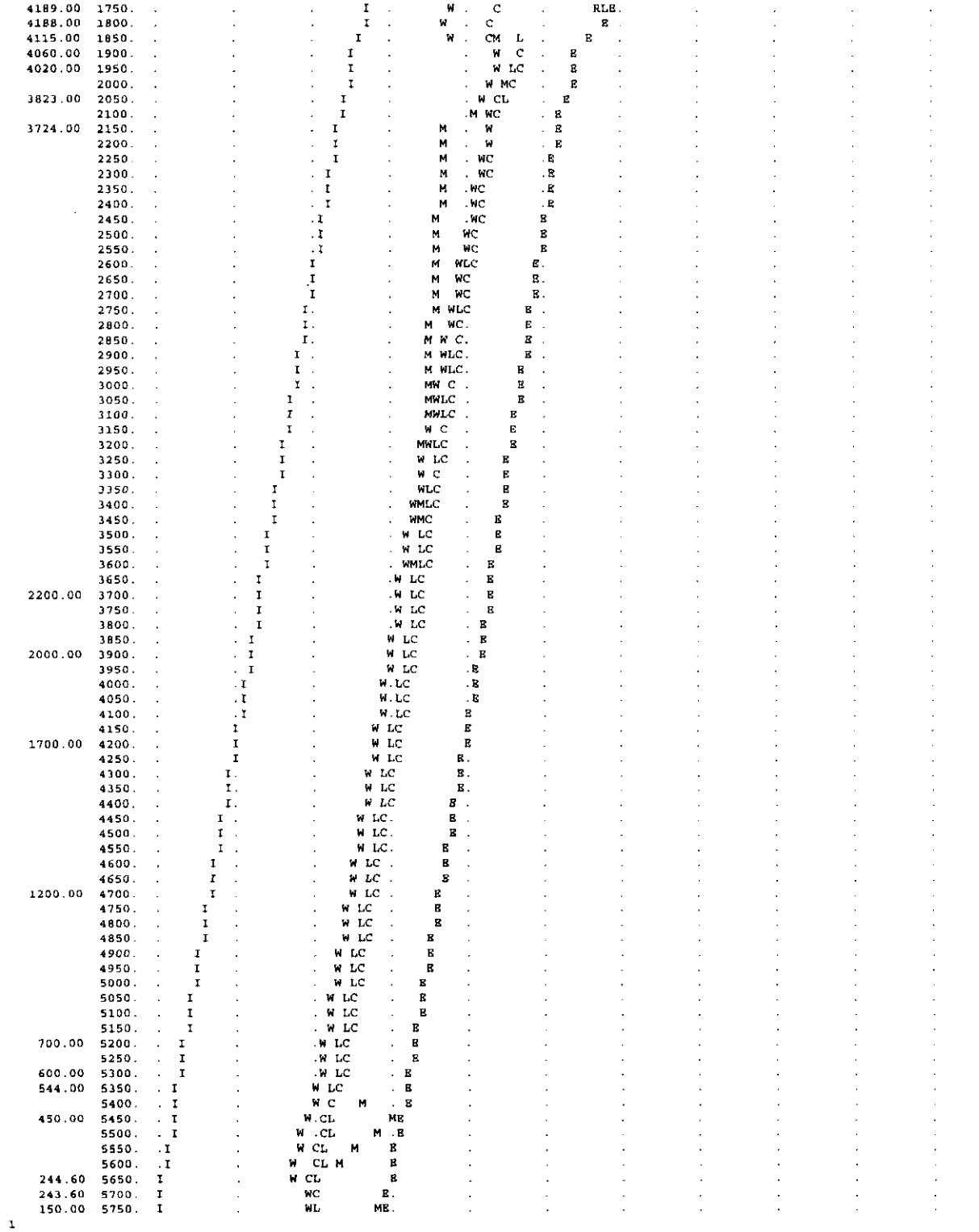
   150.000      9.62   1895.62   1895.62       .00   1900.49      4.87       .36       .08   1896.00
    5833.0        .0    5833.0        .0        .0     329.5        .0      41.2       6.1   1896.00
       .08       .00     17.70       .00      .000      .014      .000      .000   1886.00   1000.00
   .003706       94.       94.       94.        20        11         0       .00     34.31   1035.10


1
PROFILE FOR STREAM  LNLVW WASH W/O DIVERSION


PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


ELEVATION  1886.     1891.     1896.     1901.     1906.     1911.     1916.     1921.     1926.     1931.
    SECNO   CUMDIS

  5852.00      0.  .         .         .         .         .         .  I      .     W  C.     LE  .         .
               50.  .         .         .         .         .         .  I      .     W C .     E   .         .
              100.  .         .         .         .         .         . I       .     W C .     LE  .         .
              150.  .         .         .         .         .         . I       .     W C .    L E  .         .
              200.  .         .         .         .         .         . I       .     WC  .    L E  .         .
              250.  .         .         .         .         .        .I         .     WC  .   L E   .         .
              300.  .         .         .         .         .        I          .     WC  . L  E    .         .
              350.  .         .         .         .         .        I          .     W   . L  E    .         .
  5500.00     400.  .         .         .         .         .        I          .     W   . L  E    .         .
              450.  .         .         .         .         .       I.          .     W   .L   E    .         .
              500.  .         .         .         .         .      I .          .     W   L    E    .         .
              550.  .         .         .         .         .      I .          .     W   L    E    .         .
              600.  .         .         .         .         .     I   .         .     W  L.    E    .         .
              650.  .         .         .         .         .    I    .         .    W  L .    E    .         .
  5200.00     700.  .         .         .         .         .    I    .         .    W  L .    E    .         .
  5105.00     750.  .         .         .         .         .   I     .         .    WL   .    E    .         .
              800.  .         .         .         .        . I    .  .         . W C     .    E    .         .
  5005.00     850.  .         .         .         .        I      .  .        W L C      .   E    .         .
              900.  .         .         .         .        I      .  .       W  .LC      .  E     .         .
  4920.00     950.  .         .         .         .       I.      .  .      W  L C      .  E     .         .
             1000.  .         .         .         .      I .      .  .     W  L.C       . E      .         .
  4831.00    1050.  .         .         .         .      I .      .  .    W   LC        . E      .         .
             1100.  .         .         .         .     I  .      .  .   W   LC.        .E       .         .
             1150.  .         .         .         .    I   .      .  .  W  L C.        E        .         .
             1200.  .         .         .         .   I    .      .  . W  L C .       E         .         .
             1250.  .         .         .         .  I     .      .  .W  L C  .      E.         .         .
             1300.  .         .         .         . I      .      . .W  L C   .     E  .         .         .
             1350.  .         .         .         . I      .      .W   LC     .     E  .         .         .
             1400.  .         .         .         .I       .      W.  LC      .    E   .         .         .
             1450.  .         .         .        .I        .      W . L C     .    E   .         .         .
  4360.00    1500.  .         .         .        I         .      W  .LC      .    E   .         .         .
             1550.  .         .         .       I.         .  W   C.   L      .   E    .         .         .
             1600.  .         .         .       I .        W.   C     .      L . E    .         .         .
  4247.00    1650.  .         .         .       I .       W .   C     .      L .E     .         .         .
  4246.00    1700.  .         .         .       I .        W.    C    .      L .E     .         .         .
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THIS RUN EXECUTED 20APR98 05:51:46

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5852.000	.00	.00	.00	1913.10	1281.00	1915.28	1915.51	1916.77	32.98	9.79	130.90	223.05
	5852.000	.00	.00	.00	1913.10	2183.00	1916.15	1916.54	1918.36	32.64	11.95	182.72	382.08
	5852.000	.00	.00	.00	1913.10	6307.00	1919.02	1920.08	1923.92	33.27	17.77	354.99	1093.37
	5852.000	.00	.00	.00	1913.10	6638.00	1919.21	1920.32	1924.30	33.31	18.10	366.72	1150.05
	5500.000	352.00	.00	.00	1910.80	1281.00	1913.06	1913.59	1915.20	46.46	11.75	109.06	187.94
	5500.000	352.00	.00	.00	1910.80	2183.00	1914.19	1914.78	1916.97	37.27	13.38	163.12	357.60
*	5500.000	352.00	.00	.00	1910.80	6307.00	1918.88	1918.88	1922.95	21.10	16.19	389.46	1372.95
*	5500.000	352.00	.00	.00	1910.80	6638.00	1919.16	1919.16	1923.37	21.12	16.48	402.91	1444.52
	5200.000	300.00	.00	.00	1908.80	1281.00	1911.57	1912.07	1913.86	40.51	12.15	105.43	201.27
	5200.000	300.00	.00	.00	1908.80	2183.00	1912.98	1913.45	1915.89	32.24	13.69	159.40	384.48
*	5200.000	300.00	.00	.00	1908.80	6307.00	1918.26	1918.26	1922.99	23.11	17.46	361.32	1312.02
*	5200.000	300.00	.00	.00	1908.80	6638.00	1918.59	1918.59	1923.48	23.20	17.76	373.84	1378.15
	5105.000	95.00	.00	.00	1908.20	1281.00	1911.23	1911.65	1913.49	36.45	12.07	106.13	212.19
*	5105.000	95.00	.00	.00	1908.20	2183.00	1913.15	1913.15	1915.62	23.36	12.61	173.05	451.69
*	5105.000	95.00	.00	.00	1908.20	6307.00	1918.19	1918.19	1923.24	24.49	18.04	349.70	1274.43
*	5105.000	95.00	.00	.00	1908.20	6638.00	1918.54	1918.54	1923.76	24.61	18.34	361.88	1338.00
	5005.000	100.00	.00	.00	1906.20	1281.00	1910.41	1911.06	1913.02	35.90	12.98	98.67	213.78
	5005.000	100.00	.00	.00	1906.20	2183.00	1911.95	1912.69	1915.13	31.27	14.31	152.51	390.37
	5005.000	100.00	.00	.00	1906.20	6307.00	1915.14	1917.27	1922.29	43.76	21.47	293.82	953.46
	5005.000	100.00	.00	.00	1906.20	6638.00	1915.31	1917.52	1922.77	44.63	21.91	302.92	993.59
	4920.000	85.00	.00	.00	1905.50	1281.00	1909.47	1910.37	1912.54	45.04	14.08	90.98	190.88
	4920.000	85.00	.00	.00	1905.50	2183.00	1910.94	1912.00	1914.67	39.01	15.51	140.73	349.52
	4920.000	85.00	.00	.00	1905.50	6307.00	1914.30	1916.55	1921.80	46.63	21.98	286.99	923.58
	4920.000	85.00	.00	.00	1905.50	6638.00	1914.49	1916.80	1922.28	47.36	22.40	296.35	964.57
	4831.000	89.00	.00	.00	1904.80	1281.00	1908.62	1909.66	1912.02	51.79	14.80	86.55	177.99
	4831.000	89.00	.00	.00	1904.80	2183.00	1910.05	1911.29	1914.18	44.83	16.31	133.80	326.05
	4831.000	89.00	.00	.00	1904.80	6307.00	1913.49	1915.85	1921.29	49.17	22.41	281.42	899.43
	4831.000	89.00	.00	.00	1904.80	6638.00	1913.69	1916.10	1921.76	49.72	22.81	291.06	941.38

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	4360.000	471.00	.00	.00	1900.90	1281.00	1904.36	1905.76	1908.79	75.20	16.90	75.80	147.72
	4360.000	471.00	.00	.00	1900.90	2183.00	1905.62	1907.38	1911.18	67.67	18.94	115.28	265.37
	4360.000	471.00	.00	.00	1900.90	6307.00	1909.15	1911.95	1918.30	61.13	24.29	259.69	806.66
	4360.000	471.00	.00	.00	1900.90	6638.00	1909.35	1912.20	1918.77	61.23	24.63	269.53	848.34
*	4247.000	113.00	.00	.00	1899.90	1281.00	1901.18	1902.53	1906.80	246.20	19.01	67.38	81.64
*	4247.000	113.00	.00	.00	1899.90	2183.00	1901.82	1903.65	1909.11	193.06	21.68	100.71	157.11
*	4247.000	113.00	.00	.00	1899.90	5779.00	1903.83	1907.08	1915.89	133.57	27.87	207.37	500.04
	4247.000	113.00	.00	.00	1899.90	7081.00	1904.75	1908.13	1916.64	103.52	27.67	255.92	695.97
	4246.000	1.00	1910.90	1915.00	1899.90	1281.00	1901.30	1902.65	1906.71	260.55	18.68	68.59	79.36
	4246.000	1.00	1910.90	1915.00	1899.90	2183.00	1901.99	1903.84	1909.01	221.82	21.26	102.67	146.57
	4246.000	1.00	1910.90	1915.00	1899.90	5779.00	1904.22	1907.43	1915.70	189.47	27.19	212.53	419.84
	4246.000	1.00	1910.90	1915.00	1899.90	7081.00	1905.28	1908.51	1916.40	155.73	26.76	264.65	567.43
	4189.000	57.00	1909.80	1914.80	1899.40	1281.00	1901.01	1902.15	1905.13	171.67	16.30	78.57	97.77
	4189.000	57.00	1909.80	1914.80	1899.40	2183.00	1901.68	1903.34	1907.56	170.36	19.46	112.17	167.25
	4189.000	57.00	1909.80	1914.80	1899.40	5779.00	1903.94	1906.92	1914.38	166.01	25.93	222.89	448.52
	4189.000	57.00	1909.80	1914.80	1899.40	7081.00	1904.99	1908.01	1915.31	140.86	25.78	274.65	596.61
	4188.000	1.00	.00	.00	1899.40	1281.00	1900.88	1902.03	1905.08	153.46	16.45	77.87	103.41
	4188.000	1.00	.00	.00	1899.40	2183.00	1901.51	1903.15	1907.50	140.16	19.64	111.17	184.39
	4188.000	1.00	.00	.00	1899.40	5779.00	1903.58	1906.57	1914.25	110.06	26.21	220.49	550.86
	4188.000	1.00	.00	.00	1899.40	7081.00	1904.54	1907.64	1915.15	86.81	26.15	270.77	760.00
	4115.000	73.00	.00	.00	1898.80	1025.00	1900.58	1901.55	1903.91	99.19	14.64	70.01	102.92
	4115.000	73.00	.00	.00	1898.80	1746.00	1901.25	1902.73	1906.34	103.13	18.11	96.43	171.93
	4115.000	73.00	.00	.00	1898.80	4623.00	1903.48	1906.30	1913.22	94.31	25.04	184.62	476.04
	4115.000	73.00	.00	.00	1898.80	5833.00	1904.80	1907.56	1914.22	70.22	24.63	236.83	696.06
*	4060.000	55.00	.00	.00	1898.70	1025.00	1902.09	1902.09	1903.65	23.21	10.02	102.30	212.74
*	4060.000	55.00	.00	.00	1898.70	1746.00	1903.03	1903.46	1905.66	29.96	13.02	134.06	318.99
*	4060.000	55.00	.00	.00	1898.70	4623.00	1905.87	1907.44	1911.74	39.63	19.45	237.70	734.34
*	4060.000	55.00	.00	.00	1898.70	5833.00	1908.03	1909.35	1913.04	26.15	17.97	324.64	1140.62
	4020.000	40.00	.00	.00	1898.60	1025.00	1901.84	1901.94	1903.51	25.97	10.39	98.68	201.13
	4020.000	40.00	.00	.00	1898.60	1746.00	1902.87	1903.31	1905.53	30.55	13.10	133.31	315.87
	4020.000	40.00	.00	.00	1898.60	4623.00	1905.74	1907.28	1911.58	39.39	19.39	238.42	736.56
	4020.000	40.00	.00	.00	1898.60	5833.00	1907.84	1909.48	1912.92	26.69	18.08	322.55	1128.99
	3823.000	197.00	.00	.00	1898.00	1025.00	1901.14	1901.35	1902.94	28.99	10.77	95.18	190.38
	3823.000	197.00	.00	.00	1898.00	1746.00	1902.30	1902.72	1904.93	30.11	13.03	133.98	318.20
	3823.000	197.00	.00	.00	1898.00	4623.00	1905.37	1906.68	1910.80	35.58	18.70	247.16	775.06
	3823.000	197.00	.00	.00	1898.00	5833.00	1907.14	1908.03	1912.34	27.66	18.31	318.55	1109.02
*	3724.000	99.00	.00	.00	1897.60	1025.00	1901.53	1901.53	1903.14	21.67	10.20	100.46	220.20
*	3724.000	99.00	.00	.00	1897.60	1746.00	1902.99	1902.99	1905.10	20.21	11.67	149.62	388.40
	3724.000	99.00	.00	.00	1897.60	4623.00	1906.30	1906.86	1910.38	23.53	16.21	285.27	952.98
	3724.000	99.00	.00	.00	1897.60	5833.00	1907.46	1907.74	1912.03	23.15	17.15	340.03	1212.21

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2200.000	1524.00	.00	.00	1892.60	1025.00	1895.82	1896.49	1898.37	42.35	12.82	79.94	157.50
*	2200.000	1524.00	.00	.00	1892.60	1746.00	1897.00	1897.95	1900.45	40.83	14.92	117.01	273.24
	2200.000	1524.00	.00	.00	1892.60	4623.00	1900.48	1901.89	1905.76	33.69	18.44	250.67	796.43
	2200.000	1524.00	.00	.00	1892.60	5833.00	1901.56	1903.05	1907.45	32.92	19.49	299.29	1016.66
	2000.000	200.00	.00	.00	1892.00	1025.00	1895.48	1895.90	1897.59	32.07	11.66	87.94	180.99
	2000.000	200.00	.00	.00	1892.00	1746.00	1896.64	1897.35	1899.67	33.78	13.96	125.05	300.41
	2000.000	200.00	.00	.00	1892.00	4623.00	1899.96	1901.30	1905.09	32.31	18.16	254.50	813.31
	2000.000	200.00	.00	.00	1892.00	5833.00	1901.01	1902.50	1906.79	32.05	19.30	302.22	1030.37
	1700.000	300.00	.00	.00	1891.00	1025.00	1894.46	1894.90	1896.61	32.91	11.76	87.16	178.66
	1700.000	300.00	.00	.00	1891.00	1746.00	1895.65	1896.37	1898.66	33.48	13.92	125.44	301.77
	1700.000	300.00	.00	.00	1891.00	4623.00	1898.94	1900.33	1904.10	32.65	18.23	253.53	809.04
	1700.000	300.00	.00	.00	1891.00	5833.00	1899.99	1901.49	1905.82	32.34	19.36	301.24	1025.75
	1200.000	500.00	.00	.00	1889.30	1025.00	1892.73	1893.20	1894.92	33.91	11.88	86.27	176.03
	1200.000	500.00	.00	.00	1889.30	1746.00	1893.94	1894.67	1896.97	33.84	13.97	124.96	300.13
	1200.000	500.00	.00	.00	1889.30	4623.00	1897.21	1898.63	1902.44	33.22	18.35	251.96	802.10
	1200.000	500.00	.00	.00	1889.30	5833.00	1898.25	1899.80	1904.16	33.00	19.51	299.01	1015.38
	700.000	500.00	.00	.00	1887.70	1025.00	1891.23	1891.61	1893.29	31.04	11.53	88.93	183.96
	700.000	500.00	.00	.00	1887.70	1746.00	1892.40	1893.07	1895.31	31.92	13.69	127.56	309.05
	700.000	500.00	.00	.00	1887.70	4623.00	1895.66	1897.03	1900.79	32.35	18.17	254.40	812.86
	700.000	500.00	.00	.00	1887.70	5833.00	1896.69	1898.20	1902.51	32.38	19.37	301.08	1025.00
	600.000	100.00	.00	.00	1887.40	1025.00	1890.94	1891.31	1892.98	30.48	11.47	89.37	185.65
	600.000	100.00	.00	.00	1887.40	1746.00	1892.18	1892.77	1894.99	30.24	13.45	129.80	317.49
	600.000	100.00	.00	.00	1887.40	4623.00	1895.49	1896.75	1900.45	30.78	17.88	258.57	833.31
	600.000	100.00	.00	.00	1887.40	5833.00	1896.52	1897.95	1902.18	30.97	19.09	305.48	1048.16
	544.000	56.00	.00	.00	1887.20	1025.00	1890.68	1891.10	1892.79	32.01	11.65	88.00	181.18
	544.000	56.00	.00	.00	1887.20	1746.00	1891.93	1892.56	1894.80	31.33	13.60	128.40	321.96
	544.000	56.00	.00	.00	1887.20	4623.00	1895.21	1896.52	1900.26	31.61	18.02	256.52	822.20
	544.000	56.00	.00	.00	1887.20	5833.00	1896.24	1897.68	1901.98	31.72	19.23	303.36	1035.70
*	450.000	94.00	.00	.00	1887.00	1025.00	1889.18	1890.03	1892.11	69.23	13.75	74.55	123.19
	450.000	94.00	.00	.00	1887.00	1746.00	1890.21	1891.31	1894.10	58.40	15.83	110.30	228.47
	450.000	94.00	.00	.00	1887.00	4623.00	1893.89	1895.21	1899.70	38.89	19.34	238.99	741.29
	450.000	94.00	.00	.00	1887.00	5833.00	1895.42	1896.49	1901.56	33.91	19.87	293.55	1001.62
	244.600	205.40	.00	.00	1886.20	1025.00	1888.64	1889.18	1890.89	46.68	12.03	85.19	150.03
	244.600	205.40	.00	.00	1886.20	1746.00	1889.57	1890.45	1892.96	48.43	14.78	118.14	250.90
	244.600	205.40	.00	.00	1886.20	4623.00	1892.99	1894.36	1898.86	40.41	19.45	237.69	727.24
	244.600	205.40	.00	.00	1886.20	5833.00	1894.45	1895.70	1900.78	36.27	20.18	288.98	968.57
	243.600	1.00	.00	.00	1886.20	1025.00	1888.79	1889.22	1890.86	47.19	11.54	88.78	149.20
	243.600	1.00	.00	.00	1886.20	1746.00	1889.78	1890.51	1892.93	52.43	14.25	122.51	241.13
	243.600	1.00	.00	.00	1886.20	4623.00	1893.56	1894.45	1898.80	47.83	18.36	251.74	668.44
*	243.600	1.00	.00	.00	1886.20	5833.00	1895.57	1895.86	1900.72	39.93	18.20	320.41	923.12

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	150.000	93.60	.00	.00	1886.00	1025.00	1889.03	1889.03	1890.55	29.58	9.88	103.72	188.46
*	150.000	93.60	.00	.00	1886.00	1746.00	1890.31	1890.31	1892.49	30.57	11.84	147.42	315.80
*	150.000	93.60	.00	.00	1886.00	4623.00	1894.26	1894.26	1898.41	34.91	16.35	282.83	782.40
*	150.000	93.60	.00	.00	1886.00	5833.00	1895.62	1895.62	1900.49	37.06	17.70	329.50	958.17

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LNLV WASH W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	5852.000	1281.00	1915.28	.00	.00	25.18	59.99	.00
	5852.000	2183.00	1916.15	.86	.00	25.25	60.00	.00
	5852.000	6307.00	1919.02	2.87	.00	24.82	60.00	.00
	5852.000	6638.00	1919.21	.20	.00	23.41	60.00	.00
	5500.000	1281.00	1913.06	.00	-2.22	.00	48.19	352.00
	5500.000	2183.00	1914.19	1.12	-1.96	.00	48.20	352.00
*	5500.000	6307.00	1918.88	4.70	-.14	.00	48.20	352.00
*	5500.000	6638.00	1919.16	.28	-.05	.00	48.21	352.00
	5200.000	1281.00	1911.57	.00	-1.49	.00	38.20	300.00
	5200.000	2183.00	1912.98	1.41	-1.21	.00	38.20	300.00
*	5200.000	6307.00	1918.26	5.28	-.62	.00	38.21	300.00
*	5200.000	6638.00	1918.59	.33	-.57	.00	38.21	300.00
	5105.000	1281.00	1911.23	.00	-.34	.00	35.00	95.00
*	5105.000	2183.00	1913.15	1.92	.17	.00	35.00	95.00
*	5105.000	6307.00	1918.19	5.05	-.07	.00	35.01	95.00
*	5105.000	6638.00	1918.54	.35	-.05	.00	35.01	95.00
	5005.000	1281.00	1910.41	.00	-.82	.00	31.85	100.00
	5005.000	2183.00	1911.95	1.55	-1.19	.00	38.01	100.00
	5005.000	6307.00	1915.14	3.18	-3.06	.00	50.75	100.00
	5005.000	6638.00	1915.31	.18	-3.23	.00	51.46	100.00

	4920.000	1281.00	1909.47	.00	-.94	.00	30.87	85.00
	4920.000	2183.00	1910.94	1.47	-1.02	.00	36.75	85.00
	4920.000	6307.00	1914.30	3.37	-.83	.00	50.21	85.00
	4920.000	6638.00	1914.49	.18	-.83	.00	50.95	85.00
	4831.000	1281.00	1908.62	.00	-.85	.00	30.29	89.00
	4831.000	2183.00	1910.05	1.43	-.89	.00	35.99	89.00
	4831.000	6307.00	1913.49	3.44	-.82	.00	49.76	89.00
	4831.000	6638.00	1913.69	.20	-.80	.00	50.53	89.00
	4360.000	1281.00	1904.36	.00	-4.26	.00	28.83	471.00
	4360.000	2183.00	1905.62	1.26	-4.43	.00	33.87	471.00
	4360.000	6307.00	1909.15	3.53	-4.34	.00	47.98	471.00
	4360.000	6638.00	1909.35	.20	-4.34	.00	48.80	471.00
*	4247.000	1281.00	1901.18	.00	-3.17	.00	52.72	113.00
*	4247.000	2183.00	1901.82	.63	-3.80	.00	52.73	113.00
*	4247.000	5779.00	1903.83	2.01	-5.32	.00	52.75	113.00
	4247.000	7081.00	1904.75	.92	-4.60	.00	52.76	113.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4246.000	1281.00	1901.30	.00	.11	.00	52.72	1.00
	4246.000	2183.00	1901.99	.69	.17	.00	52.73	1.00
	4246.000	5779.00	1904.22	2.23	.39	.00	52.76	1.00
	4246.000	7081.00	1905.28	1.06	.53	.00	52.77	1.00
	4189.000	1281.00	1901.01	.00	-.29	.00	52.72	57.00
	4189.000	2183.00	1901.68	.68	-.31	.00	52.73	57.00
	4189.000	5779.00	1903.94	2.25	-.28	.00	52.76	57.00
	4189.000	7081.00	1904.99	1.06	-.29	.00	52.77	57.00
	4188.000	1281.00	1900.88	.00	-.13	.00	52.72	1.00
	4188.000	2183.00	1901.51	.63	-.17	.00	52.73	1.00
	4188.000	5779.00	1903.58	2.07	-.36	.00	52.75	1.00
	4188.000	7081.00	1904.54	.95	-.46	.00	52.77	1.00
	4115.000	1025.00	1900.58	.00	-.30	.00	39.43	73.00
	4115.000	1746.00	1901.25	.67	-.26	.00	39.45	73.00
	4115.000	4623.00	1903.48	2.23	-.10	.00	39.49	73.00
	4115.000	5833.00	1904.80	1.32	.27	.00	39.51	73.00
*	4060.000	1025.00	1902.09	.00	1.51	.00	32.98	55.00
*	4060.000	1746.00	1903.03	.94	1.78	.00	34.40	55.00
*	4060.000	4623.00	1905.87	2.84	2.38	.00	38.65	55.00
*	4060.000	5833.00	1908.03	2.16	3.23	.00	41.89	55.00
	4020.000	1025.00	1901.84	.00	-.25	.00	32.88	40.00
	4020.000	1746.00	1902.87	1.03	-.16	.00	34.43	40.00
	4020.000	4623.00	1905.74	2.87	-.13	.00	38.76	40.00
	4020.000	5833.00	1907.84	2.10	-.19	.00	41.90	40.00
	3823.000	1025.00	1901.14	.00	-.70	.00	32.71	197.00
	3823.000	1746.00	1902.30	1.16	-.57	.00	34.45	197.00
	3823.000	4623.00	1905.37	3.07	-.37	.00	39.09	197.00
	3823.000	5833.00	1907.14	1.77	-.70	.00	41.75	197.00
*	3724.000	1025.00	1901.53	.00	.39	.00	31.48	99.00
*	3724.000	1746.00	1902.99	1.46	.69	.00	35.86	99.00
	3724.000	4623.00	1906.30	3.32	.94	.00	45.82	99.00
	3724.000	5833.00	1907.46	1.15	.32	.00	49.28	99.00
	2200.000	1025.00	1895.82	.00	-5.71	.00	29.66	1524.00
*	2200.000	1746.00	1897.00	1.18	-5.99	.00	33.20	1524.00
	2200.000	4623.00	1900.48	3.49	-5.82	.00	43.63	1524.00
	2200.000	5833.00	1901.56	1.07	-5.90	.00	46.86	1524.00
	2000.000	1025.00	1895.48	.00	-.33	.00	30.46	200.00
	2000.000	1746.00	1896.64	1.16	-.35	.00	33.92	200.00
	2000.000	4623.00	1899.96	3.32	-.52	.00	43.90	200.00
	2000.000	5833.00	1901.01	1.04	-.55	.00	47.05	200.00

1

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1700.000	1025.00	1894.46	.00	-1.02	.00	30.38	300.00
	1700.000	1746.00	1895.65	1.19	-.99	.00	33.95	300.00
	1700.000	4623.00	1898.94	3.29	-1.03	.00	43.83	300.00
	1700.000	5833.00	1899.99	1.05	-1.02	.00	46.98	300.00
	1200.000	1025.00	1892.73	.00	-1.73	.00	30.29	500.00
	1200.000	1746.00	1893.94	1.20	-1.71	.00	33.91	500.00
	1200.000	4623.00	1897.21	3.27	-1.73	.00	43.72	500.00
	1200.000	5833.00	1898.25	1.04	-1.75	.00	46.84	500.00
	700.000	1025.00	1891.23	.00	-1.51	.00	30.55	500.00
	700.000	1746.00	1892.40	1.18	-1.53	.00	34.14	500.00
	700.000	4623.00	1895.66	3.26	-1.55	.00	43.89	500.00
	700.000	5833.00	1896.69	1.03	-1.56	.00	46.97	500.00
	600.000	1025.00	1890.94	.00	-.29	.00	30.47	100.00
	600.000	1746.00	1892.18	1.24	-.22	.00	34.17	100.00

	600.000	4623.00	1895.49	3.31	-.17	.00	43.92	100.00
	600.000	5833.00	1896.52	1.03	-.17	.00	46.97	100.00
	544.000	1025.00	1890.68	.00	-.26	.00	30.46	56.00
	544.000	1746.00	1891.93	1.25	-.25	.00	34.21	56.00
	544.000	4623.00	1895.21	3.28	-.28	.00	44.04	56.00
	544.000	5833.00	1896.24	1.03	-.28	.00	47.12	56.00
*	450.000	1025.00	1889.18	.00	-1.50	.00	34.44	94.00
	450.000	1746.00	1890.21	1.04	-1.72	.00	34.64	94.00
	450.000	4623.00	1893.89	3.68	-1.33	.00	35.38	94.00
	450.000	5833.00	1895.42	1.54	-.82	.00	35.68	94.00
	244.600	1025.00	1888.64	.00	-.54	.00	34.99	205.40
	244.600	1746.00	1889.57	.93	-.64	.00	35.00	205.40
	244.600	4623.00	1892.99	3.42	-.90	.00	35.00	205.40
	244.600	5833.00	1894.45	1.46	-.97	.00	35.01	205.40
	243.600	1025.00	1888.79	.00	.16	.00	34.19	1.00
	243.600	1746.00	1889.78	.99	.21	.00	34.19	1.00
	243.600	4623.00	1893.56	3.78	.57	.00	34.21	1.00
*	243.600	5833.00	1895.57	2.01	1.12	.00	34.22	1.00
*	150.000	1025.00	1889.03	.00	.24	.00	34.22	93.60
*	150.000	1746.00	1890.31	1.28	.53	.00	34.24	93.60
*	150.000	4623.00	1894.26	3.95	.70	.00	34.29	93.60
*	150.000	5833.00	1895.62	1.36	.05	.00	34.31	93.60

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 5500.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5500.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5500.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5500.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5500.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5500.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 5200.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5200.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5200.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5200.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5200.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5200.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 5105.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5105.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 5105.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5105.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5105.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 4247.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4247.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 4247.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 4060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4060.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 4060.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 4060.000 PROFILE= 2 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 4060.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO= 4060.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 4060.000 PROFILE= 4 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 4060.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 3724.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 3724.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 3724.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 3724.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 2200.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 450.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 243.600 PROFILE= 4 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 243.600 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL

1

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CAUTION SECNO= 150.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 150.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 150.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 150.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 150.000 PROFILE= 3 CRITICAL DEPTH ASSUMED

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 CAUTION SECNO=    150.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    150.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=    150.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    150.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    150.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
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Paper Copy H
"N" Channel

10- to 50-year flood event

```
1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    16APR98    TIME   08:13:07  *
 *******************************************
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*          (916) 756-1104               *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                 X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX  XXXXX             XXXXXXX
```

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1
    16APR98      08:13:07                                                    PAGE    1


                                                    THIS RUN EXECUTED 16APR98    08:13:07

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC
 T1      FEMA 10-YEAR HEC-2 ANALYSIS
 T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3      N CHANNEL w/DIVERSION AT NLVDB

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2                   1         0                                   1902.9

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150


 QT        2       256       436
 NC     .014      .014      .014        .3        .1
   1661.9
 X1     707.6         8      1000   1009.51        69        69        69
 GR    1909.3      1000    1898.8   1000.01    1898.8    1004.3    1904.8    1004.31    1904.8    1005.1
 GR    1898.8   1005.11    1898.8    1009.5    1909.3   1009.51

 NC                                     .5        .3
   Upstream end Donovan Culvert
   1592.8
 X1     638.6         8      1000   1016.51         1         1         1
 GR    1904.4      1000    1898.4   1000.01    1898.4    1007.8    1904.4    1007.81    1904.4    1008.7
 GR    1898.4   1008.71    1898.4    1016.5    1904.4   1016.51
   1591.8

 X1     637.6         8      1000   1016.51      66.1      66.1      66.1
 BT        -8      1000    1908.4    1904.4   1000.01    1908.4    1904.4     1007.8    1908.4    1904.4
 BT             1007.81    1908.4    1904.4    1008.7    1908.4    1904.4    1008.71    1908.4    1904.4
 BT              1016.5    1908.4    1904.4   1016.51    1908.4    1904.4
 GR    1904.4      1000    1898.4   1000.01    1898.4    1007.8    1904.4    1007.81    1904.4    1008.7
 GR    1898.4   1008.71    1898.4    1016.5    1904.4   1016.51
   1525.7
1
    16APR98      08:13:07                                                    PAGE    2


 X1     571.5         8      1000   1016.51         1         1         1
 BT        -8      1000      1908      1904   1000.01      1908      1904     1007.8      1908      1904
 BT             1007.81      1908      1904    1008.7      1908      1904    1008.71      1908      1904
 BT              1016.5      1908      1904   1016.51      1908      1904
 GR      1904      1000      1898   1000.01      1898    1007.8      1904    1007.81      1904    1008.7
 GR      1898   1008.71      1898    1016.5      1904   1016.51
   1524.7

 X1     570.5         8      1000   1016.51      24.3      24.3      24.3
 GR      1904      1000      1898   1000.01      1898    1007.8      1898    1007.81      1898    1008.7
 GR      1898   1008.71      1898    1016.5      1904   1016.51
   Downstream end Donovan Culvert
```

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NC      .014       .014       .014        .3        .1
  1500.4
X1     546.2          4       1000       1038      50.0      50.0      50.0
GR    1904.9       1000     1897.9       1014    1897.9      1024    1904.9      1038

  1450.4

X1     496.2          4       1000       1038      50.0      50.0      50.0
GR    1904.6       1000     1897.6       1014    1897.6      1024    1904.6      1038

  1400.4

X1     446.2          4       1000       1038      50.0      50.0      50.0
GR    1904.3       1000     1897.3       1014    1897.3      1024    1904.3      1038

  1350.4

X1     396.2          4       1000       1038      50.0      50.0      50.0
GR    1904.0       1000     1897.0       1014    1897.0      1024    1904.0      1038

  1300.4

X1     346.2          4       1000       1038     200.0     200.0     200.0
GR    1903.7       1000     1896.7       1014    1896.7      1024    1903.7      1038

    1100

X1     146.2          4       1000       1038     121.2     121.2     121.2
GR    1902.6       1000     1895.6       1014    1895.6      1024    1902.6      1038

   978.8

X1       25           4       1000       1038      24.0      24.0      24.0
GR    1901.9       1000     1894.9       1014    1894.9      1024    1901.9      1038

1
   16APR98      08:13:07                                                    PAGE    3


NC      .014       .014       .014        .5        .3
   954.8
X1          1          8       1000    1025.01         1         1         1
GR    1900.7       1000     1894.7    1000.01    1894.7    1012.0    1900.7    1012.01    1900.7    1012.8
GR    1894.7    1013.01     1894.7     1025.0    1900.7   1025.01
   953.8

X1          0          8       1000    1025.01
BT         -8       1000     1905.7     1900.7   1000.01    1905.7    1900.7    1012.00    1905.7    1900.7
BT          1012.01          1905.7     1900.7    1012.8    1905.7    1900.7    1013.01    1905.7    1900.7
BT               1025       1905.7     1900.7   1025.01    1905.7    1900.7
GR    1900.7       1000     1894.7    1000.01    1894.7    1012.0    1900.7    1012.01    1900.7    1012.8
GR    1894.7    1013.01     1894.7     1025.0    1900.7   1025.01

1
   16APR98      08:13:07                                                    PAGE    4

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 1
0

 CCHV=     .300 CEHV=     .100
 *SECNO 707.600

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
    707.600      2.99   1901.79   1901.79   1902.90   1903.30      1.50       .00       .00   1909.30
      256.0        .0     256.0        .0        .0      26.0        .0        .0        .0   1909.30
        .00        .00      9.84       .00      .000      .014      .000      .000   1898.80   1000.01
    .006325         0.        0.        0.         0        14         0       .00      8.70   1009.50


 CCHV=     .500 CEHV=     .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

    638.600      1.31   1899.71   1900.43       .00   1902.18      2.47       .63       .48   1904.40
      256.0        .0     256.0        .0        .0      20.3        .0        .0        .0   1904.40
        .00        .00     12.61       .00      .000      .014      .000      .000   1898.40   1000.01
    .014571        69.       69.       69.         6        14         0       .00     15.59   1016.50


 *SECNO 637.600

 3265 DIVIDED FLOW
```

```
3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1908.40 MAX ELLC=  1904.40

   637.600      1.30   1899.70   1900.42      .00   1902.16      2.46      .01      .00   1904.40
     256.0        .0     256.0        .0        .0      20.3        .0        .0        .0   1904.40
       .00        .00     12.59       .00       .000      .014      .000      .000   1898.40   1000.01
   .014498         1.        1.        1.         2        19         0       .00     15.59   1016.50


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    16APR98      08:13:07                                                                    PAGE    5

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 571.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD=   8 MIN ELTRD=  1908.00 MAX ELLC=  1904.00

   571.500      1.60   1899.60   1900.02      .00   1901.23      1.62      .69       .25   1904.00
     256.0        .0     256.0        .0        .0      25.1        .0        .1        .0   1904.00
       .00        .00     10.22       .00       .000      .014      .000      .000   1898.00   1000.01
   .007797        66.       66.       66.         6        19         0       .00     15.59   1016.50


*SECNO 570.500
   570.500      1.48   1899.48   1899.95      .00   1901.18      1.70      .01       .04   1904.00
     256.0        .0     256.0        .0        .0      24.5        .0        .1        .0   1904.00
       .00        .00     10.45       .00       .000      .014      .000      .000   1898.00   1000.01
   .007137         1.        1.        1.         5        11         0       .00     16.49   1016.50


CCHV=      .300 CEHV=      .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   546.200      2.31   1900.21   1900.21      .00   1901.10       .89      .10       .08   1904.90
     256.0        .0     256.0        .0        .0      33.8        .0        .1        .1   1904.90
       .00        .00      7.57       .00       .000      .014      .000      .000   1897.90   1009.38
   .002583        24.       24.       24.        20        14         0       .00     19.25   1028.62


*SECNO 496.200
   496.200      2.08   1899.68   1899.91      .00   1900.86      1.18      .16       .09   1904.60
     256.0        .0     256.0        .0        .0      29.4        .0        .1        .1   1904.60
       .01        .00      8.70       .00       .000      .014      .000      .000   1897.60   1009.84
   .003833        50.       50.       50.         4         5         0       .00     18.31   1028.16


1
    16APR98      08:13:07                                                                    PAGE    6

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 446.200
   446.200      1.98   1899.28   1899.62      .00   1900.61      1.33      .21       .04   1904.30
     256.0        .0     256.0        .0        .0      27.7        .0        .2        .1   1904.30
       .01        .00      9.24       .00       .000      .014      .000      .000   1897.30   1010.03
   .004538        50.       50.       50.         7         8         0       .00     17.94   1027.97


*SECNO 396.200
   396.200      1.94   1898.94   1899.32      .00   1900.35      1.41      .24       .03   1904.00
     256.0        .0     256.0        .0        .0      26.9        .0        .2        .1   1904.00
       .01        .00      9.53       .00       .000      .014      .000      .000   1897.00   1010.13
   .004954        50.       50.       50.         7         8         0       .00     17.75   1027.87


*SECNO 346.200
   346.200      1.89   1898.59   1899.01      .00   1900.07      1.48      .26       .02   1903.70
     256.0        .0     256.0        .0        .0      26.3        .0        .2        .1   1903.70
       .01        .00      9.75       .00       .000      .014      .000      .000   1896.70   1010.20
   .005296        50.       50.       50.         6        11         0       .00     17.61   1027.80


*SECNO 146.200
   146.200      1.89   1897.49   1897.91      .00   1898.99      1.50      1.07      .01   1902.60
     256.0        .0     256.0        .0        .0      26.0        .0        .3        .2   1902.60
       .02        .00      9.83       .00       .000      .014      .000      .000   1895.60   1010.22
   .005416       200.      200.      200.         7        11         0       .00     17.56   1027.78
```

```
*SECNO 25.000
    25.000      1.87   1896.77   1897.21       .00   1898.31      1.54       .67       .01   1901.90
    256.0        .0     256.0        .0         .0      25.7        .0        .4        .3   1901.90
      .02        .00      9.96       .00       .000      .014      .000      .000   1894.90   1010.26
   .005619      121.      121.      121.          7        11         0       .00     17.48   1027.74


CCHV=     .500 CEHV=     .300
*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

     1.000       .90   1895.60   1896.22       .00   1897.78      2.17       .22       .32   1900.70
     256.0        .0     256.0        .0         .0      21.6        .0        .4        .3   1900.70
       .02        .00      11.83      .00       .000      .014      .000      .000   1894.70   1000.01
    .017179      24.       24.       24.         13        15         0       .00     24.02   1025.00


*SECNO  .000

3265 DIVIDED FLOW


3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

      .000       .92   1895.62   1896.22       .00   1897.74      2.12       .02       .02   1900.70
     256.0        .0     256.0        .0         .0      21.9        .0        .4        .3   1900.70
       .02        .00      11.68      .00       .000      .014      .000      .000   1894.70   1000.01
    .016506       1.        1.        1.          0        15         0       .00     24.02   1025.00


1
 PROFILE FOR STREAM  N CHANNEL w/DIVERSION AT


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.      1897.      1899.      1901.      1903.      1905.      1907.      1909.      1911.      1913.
     SECNO   CUMDIS

    707.60      0.  .          .          .I         .          .W         .E         .          .          .L         .          .          .
               10.  .          .          I          .          .W         .E         .          .          .L.        .          .          .
               20.  .          .          I          .          .WC        .E         .          .          .L         .          .          .
               30.  .          .          I          .          .WC        .E         .          .          .L         .          .          .
               40.  .          .          I.         .          W. C       E          .          .          L.         .          .          .
               50.  .          .          I.         .          W .C       E.         .          .          .L         .          .          .
               60.  .          .          I.         .          W  C       E .        .          .          . L        .          .          .
    638.60     70.  .          .          I.         .          W   C.     E  .       .          L.         .          .          .          .
    637.60     80.  .          .          I.         .          W   C.     E  .       .          L.         .          .          .          .
               90.  .          .          I .        .          W  C .     E  .       .          L .        .          .          .          .
              100.  .          .          I .        .          W  C .     E  .       .          L .        .          .          .          .
              110.  .          .          I .        .          W  C .     E  .       .          L .        .          .          .          .
              120.  .          .          I  .       .          W C  .     E  .       .          L  .       .          .          .          .
              130.  .          .          I  .       .          W C  .     E  .       .          L  .       .          .          .          .
    571.50    140.  .          .          I  .       .          W C  .     E  .       .          L  .       .          .          .          .
    570.50    150.  .          .          I  .       .          W C  .     E  .       .          L  .       .          .          .          .
              160.  .          .          I  .       .          W C  .     E  .       .          L  .       .          .          .          .
    546.20    170.  .          .          I  .       .          W  .     E  .       .          .L .       .          .          .          .
              180.  .          .          I  .       .          W  .     E  .       .          .L .       .          .          .          .
              190.  .          .          I  .       .          WC .     E  .       .          L  .       .          .          .          .
              200.  .          .          I  .       .          WC .     E  .       .          L  .       .          .          .          .
              210.  .          .          I  .       .          WC .     E  .       .          L  .       .          .          .          .
    496.20    220.  .          .          I  .       .          WC .     E  .       .          L  .       .          .          .          .
              230.  .          .          I  .       .          WC .     E  .       .          L. .       .          .          .          .
              240.  .          .          I  .       .          WC .     E  .       .          L. .       .          .          .          .
              250.  .          .          I  .       .          WC .     E  .       .          L. .       .          .          .          .
              260.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
    446.20    270.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
              280.  .          .          I  .       .          WC  .     E. .       .          L  .       .          .          .          .
              290.  .          .          I  .       .          W C .     E. .       .          L  .       .          .          .          .
              300.  .          .          I  .       .          W C .     E. .       .          L  .       .          .          .          .
              310.  .          .          I  .       .          WC  .     E. .       .          L  .       .          .          .          .
    396.20    320.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
              330.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
              340.  .          .          I  .       .          WC  .     E  .       .          L  .       .          .          .          .
              350.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
              360.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
    346.20    370.  .          .          I  .       .          W C .     E  .       .          L  .       .          .          .          .
              380.  .          .          I  .       .          W.C .     E  .       .          L  .       .          .          .          .
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            390.  .        I.        W.C    E  .          .   L     .        .        .        .        .        .
            400.  .        I.        W.C    E  .          .   L     .        .        .        .        .        .
            410.  .        I.       W C     E  .          .   L     .        .        .        .        .        .
            420.  .        I.       W C     E  .          .   L     .        .        .        .        .        .
            430.  .       I .       W C     E  .          .  L      .        .        .        .        .        .
            440.  .       I .       W C     E  .          .  L      .        .        .        .        .        .
            450.  .       I .      W C.     E  .          .  L      .        .        .        .        .        .
            460.  .       I .      W C.     E  .          .  L      .        .        .        .        .        .
            470.  .      I  .      W C.     E  .          . L       .        .        .        .        .        .
            480.  .      I  .     W  C.     E  .          . L       .        .        .        .        .        .
            490.  .      I  .     W C .     E  .          . L       .        .        .        .        .        .
            500.  .     I   .     W C .     E  .          .L        .        .        .        .        .        .
            510.  .     I   .     W C .     E  .          .L        .        .        .        .        .        .
            520.  .     I   .    W C  .     E  .          .L        .        .        .        .        .        .
            530.  .     I   .    W C  .     E  .          .L        .        .        .        .        .        .
            540.  .    I    .    W C  .    E   .          L         .        .        .        .        .        .
            550.  .    I    .    W C  .    E   .          L         .        .        .        .        .        .
            560.  .    I    .   W C     .   E  .          L         .        .        .        .        .        .
    146.20  570.  .    I    .   W C     .E     .          L         .        .        .        .        .        .
            580.  .   I     .   W C     .E     .         L.         .        .        .        .        .        .
            590.  .   I     .  W C      .E     .         L.         .        .        .        .        .        .
            600.  .   I     .  W C      .E     .         L.         .        .        .        .        .        .
            610.  .  I      .  W C      E      .        L .         .        .        .        .        .        .
            620.  .  I      . W  C      E      .        L .         .        .        .        .        .        .
            630.  .  I      . W C       E      .        L .         .        .        .        .        .        .
            640.  . I       . W C       E.     .       L  .         .        .        .        .        .        .
            650.  . I       . W C       E.     .       L  .         .        .        .        .        .        .
            660.  . I       .W C        E.     .       L  .         .        .        .        .        .        .
            670.  . I       .W C        E.     .       L  .         .        .        .        .        .        .
            680.  .I        .W C        E .    .     L    .         .        .        .        .        .        .
     25.00  690.  .I        W  C        E .    .     L    .         .        .        .        .        .        .
            700.  .I      W C         E  .    .   L      .         .        .        .        .        .        .
      1.00  710.  I     W  C .      E    .    L          .         .        .        .        .        .        .
       .00  720.  I     W  C .      E    .    L          .         .        .        .        .        .        .
1
    16APR98       08:13:07                                                                              PAGE    8


 T1       FEMA 50-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       N CHANNEL

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                     1          0                                        1904.2

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2


1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 2
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600

 3265 DIVIDED FLOW

 3720 CRITICAL DEPTH ASSUMED
    707.600       4.26    1903.06    1903.06    1904.20    1905.21       2.15        .00        .00    1909.30
      436.0         .0      436.0         .0         .0       37.0         .0         .0         .0    1909.30
        .00        .00      11.77        .00       .000       .014       .000       .000    1898.80    1000.01
    .007564         0.         0.         0.          0         14          0        .00       8.70    1009.50


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41

    638.600       1.85    1900.25    1901.29        .00    1903.80       3.55        .71        .70    1904.40
      436.0         .0      436.0         .0         .0       28.8         .0         .1         .0    1904.40
        .00        .00      15.12        .00       .000       .014       .000       .000    1898.40    1000.01
    .014993        69.        69.        69.          9         14          0        .00      15.59    1016.50


 *SECNO 637.600

 3265 DIVIDED FLOW


 3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD= 1908.40 MAX ELLC=  1904.40
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637.600	1.87	1900.27	1901.29	.00	1903.77	3.51	.01	.01	1904.40
436.0	.0	436.0	.0	.0	29.0	.0	.1	.0	1904.40
.00	.00	15.03	.00	.000	.014	.000	.000	1898.40	1000.01
.014723	1.	1.	1.	0	12	0	.00	15.59	1016.50

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 571.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.00 MAX ELLC= 1904.00

571.500	2.18	1900.18	1900.89	.00	1902.72	2.54	.76	.29	1904.00
436.0	.0	436.0	.0	.0	34.1	.0	.1	.0	1904.00
.00	.00	12.79	.00	.000	.014	.000	.000	1898.00	1000.01
.009254	66.	66.	66.	5	12	0	.00	15.59	1016.50

*SECNO 570.500

570.500	2.03	1900.03	1900.78	.00	1902.67	2.63	.01	.05	1904.00
436.0	.0	436.0	.0	.0	33.5	.0	.1	.0	1904.00
.00	.00	13.02	.00	.000	.014	.000	.000	1898.00	1000.01
.007855	1.	1.	1.	9	11	0	.00	16.50	1016.50

CCHV= .300 CEHV= .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

546.200	2.53	1900.43	1901.02	.00	1902.45	2.02	.16	.06	1904.90
436.0	.0	436.0	.0	.0	38.2	.0	.1	.1	1904.90
.00	.00	11.40	.00	.000	.014	.000	.000	1897.90	1008.93
.005301	24.	24.	24.	4	14	0	.00	20.15	1029.07

*SECNO 496.200

496.200	2.51	1900.11	1900.73	.00	1902.17	2.06	.27	.01	1904.60
436.0	.0	436.0	.0	.0	37.9	.0	.2	.1	1904.60
.00	.00	11.51	.00	.000	.014	.000	.000	1897.60	1008.96
.005445	50.	50.	50.	6	11	0	.00	20.08	1029.04

*SECNO 446.200

446.200	2.50	1899.80	1900.43	.00	1901.89	2.08	.27	.01	1904.30
436.0	.0	436.0	.0	.0	37.6	.0	.2	.1	1904.30
.01	.00	11.58	.00	.000	.014	.000	.000	1897.30	1008.99
.005542	50.	50.	50.	6	11	0	.00	20.03	1029.01

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 396.200

396.200	2.49	1899.49	1900.13	.00	1901.60	2.11	.28	.01	1904.00
436.0	.0	436.0	.0	.0	37.4	.0	.3	.1	1904.00
.01	.00	11.65	.00	.000	.014	.000	.000	1897.00	1009.01
.005629	50.	50.	50.	6	11	0	.00	19.99	1028.99

*SECNO 346.200

346.200	2.48	1899.18	1899.82	.00	1901.31	2.13	.28	.01	1903.70
436.0	.0	436.0	.0	.0	37.3	.0	.3	.1	1903.70
.01	.00	11.70	.00	.000	.014	.000	.000	1896.70	1009.02
.005701	50.	50.	50.	6	11	0	.00	19.95	1028.98

*SECNO 146.200

146.200	2.51	1898.11	1898.72	.00	1900.18	2.07	1.12	.01	1902.60
436.0	.0	436.0	.0	.0	37.7	.0	.5	.2	1902.60
.01	.00	11.56	.00	.000	.014	.000	.000	1895.60	1008.98
.005506	200.	200.	200.	8	11	0	.00	20.05	1029.02

*SECNO 25.000

25.000	2.49	1897.39	1898.03	.00	1899.50	2.11	.68	.01	1901.90
436.0	.0	436.0	.0	.0	37.4	.0	.6	.3	1901.90
.02	.00	11.65	.00	.000	.014	.000	.000	1894.90	1009.01

```
    .005637      121.      121.      121.         6        11         0       .00     19.98   1028.99


CCHV=      .500 CEHV=      .300
*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.61

     1.000      1.34   1896.04   1896.87       .00   1898.91      2.87       .21       .38   1900.70
     436.0        .0     436.0        .0        .0      32.1        .0        .6        .3   1900.70
       .02       .00     13.60       .00      .000      .014      .000      .000   1894.70   1000.01
   .014566       24.       24.       24.        13        11         0       .00     24.03   1025.00

1
   16APR98      08:13:07                                                                        PAGE   12

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO  .000

3265 DIVIDED FLOW


3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

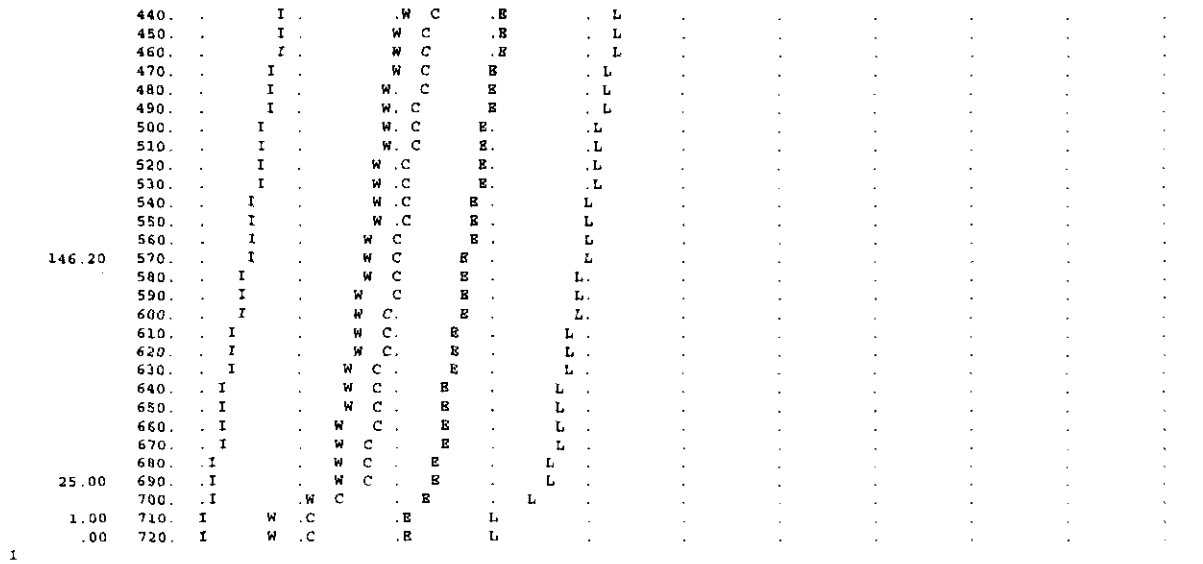
      .000      1.34   1896.04   1896.86       .00   1898.89      2.85       .01       .01   1900.70
     436.0        .0     436.0        .0        .0      32.2        .0        .6        .3   1900.70
       .02       .00     13.55       .00      .000      .014      .000      .000   1894.70   1000.01
   .014427         1.        1.        1.         2        19         0       .00     24.03   1025.00

1
PROFILE FOR STREAM  N CHANNEL


PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
    SECNO   CUMDIS

   707.60      0.  .         .         .I        .         . W       . E       .         . L       .         .
              10.  .         .         I         .        WC         . E       .        L.         .         .
              20.  .         .         I         .      WC.          .E        .     L   .         .         .
              30.  .         .         I         .    W C .         E.        . L       .         .         .
              40.  .         .        I.         .   W  C  .        E .       L.        .         .         .
              50.  .         .        I.         . W  C    .       E  .    L  .         .         .         .
              60.  .         .        I.        W   C      .      E   . L    .         .         .         .
   638.60     70.  .         .        I.       W  .  C     .      E  L.      .         .         .         .
   637.60     80.  .         .        I.       W  .  C     .     E   L.      .         .         .         .
              90.  .         .       I .       W  .  C     .     E  L .     .         .         .         .
             100.  .         .       I .       W  . C      .    E   L .     .         .         .         .
             110.  .         .       I .       W  . C      .   E    L .     .         .         .         .
             120.  .         .      I  .       W  . C      .  E     L .     .         .         .         .
             130.  .         .      I  .       W  .C       . E      L .     .         .         .         .
   571.50    140.  .         .      I  .       W  .C       E        L .     .         .         .         .
   570.50    150.  .         .      I  .       W  C        E        L .     .         .         .         .
             160.  .         .     I   .       W  .C      E.        L .     .         .         .         .
   546.20    170.  .         .     I   .        W. C      E.         .L     .         .         .         .
             180.  .         .     I   .        W .C      E .        .L     .         .         .         .
             190.  .         .    I    .        W .C      E .        L      .         .         .         .
             200.  .         .    I    .        W .C      E .        L      .         .         .         .
             210.  .         .    I    .        W  C      E .        L      .         .         .         .
   496.20    220.  .         .    I    .        W  C      E  .       L      .         .         .         .
             230.  .         .   I     .        W  C      E  .       L.     .         .         .         .
             240.  .         .   I     .       W   C      E  .       L.     .         .         .         .
             250.  .         .   I     .       W  C.      E  .       L.     .         .         .         .
             260.  .         .  I      .       W  C.      E  .       L .    .         .         .         .
   446.20    270.  .         .  I      .       W  C.      E  .       L .    .         .         .         .
             280.  .         .  I      .      W  C .      E  .       L .    .         .         .         .
             290.  .         . I       .      W  C .      E  .      L  .    .         .         .         .
             300.  .         . I       .      W  C .      E  .      L  .    .         .         .         .
             310.  .         . I       .     W   C .      E  .      L  .    .         .         .         .
   396.20    320.  .         . I       .     W   C .      E  .      L  .    .         .         .         .
             330.  .         .I        .     W   C .      E  .     L   .    .         .         .         .
             340.  .         .I        .    W    C .      E  .     L   .    .         .         .         .
             350.  .         .I        .    W   C  .      E  .     L   .    .         .         .         .
             360.  .         I         .    W   C  .      E  .    L    .    .         .         .         .
   346.20    370.  .         I         .   W    C  .      E  .    L    .    .         .         .         .
             380.  .         I         .   W   C  .      E  .    L    .    .         .         .         .
             390.  .        I.         .   W   C  .      E  .   L     .    .         .         .         .
             400.  .        I.         .   W   C  .      E  .   L     .    .         .         .         .
             410.  .        I.         .  W    C  .      E  .   L     .    .         .         .         .
             420.  .        I.         .  W    C  .      E  .   L     .    .         .         .         .
             430.  .       I  .        .  W    C  .     .E  .   L     .    .         .         .         .
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THIS RUN EXECUTED 16APR98 08:13:07

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

N CHANNEL w/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	707.600	.00	.00	.00	1898.80	256.00	1901.79	1901.79	1903.30	63.25	9.84	26.01	32.19
*	707.600	.00	.00	.00	1898.80	436.00	1903.06	1903.06	1905.21	75.64	11.77	37.04	50.13
*	638.600	69.00	.00	.00	1898.40	256.00	1899.71	1900.43	1902.18	145.71	12.61	20.30	21.21
*	638.600	69.00	.00	.00	1898.40	436.00	1900.25	1901.29	1903.80	149.93	15.12	28.84	35.61
	637.600	1.00	1908.40	1904.40	1898.40	256.00	1899.70	1900.42	1902.16	144.98	12.59	20.33	21.26
	637.600	1.00	1908.40	1904.40	1898.40	436.00	1900.27	1901.29	1903.77	147.23	15.03	29.02	35.93
	571.500	66.10	1908.00	1904.00	1898.00	256.00	1899.60	1900.02	1901.23	77.97	10.22	25.05	28.99
	571.500	66.10	1908.00	1904.00	1898.00	436.00	1900.18	1900.89	1902.72	92.54	12.79	34.10	45.32
	570.500	1.00	.00	.00	1898.00	256.00	1899.48	1899.95	1901.18	71.37	10.45	24.49	30.30
	570.500	1.00	.00	.00	1898.00	436.00	1900.03	1900.78	1902.67	78.55	13.02	33.48	49.20
*	546.200	24.30	.00	.00	1897.90	256.00	1900.21	1900.21	1901.10	25.83	7.57	33.82	50.37
	546.200	24.30	.00	.00	1897.90	436.00	1900.43	1901.02	1902.45	53.01	11.40	38.24	59.88
	496.200	50.00	.00	.00	1897.60	256.00	1899.68	1899.91	1900.86	38.33	8.70	29.41	41.35
	496.200	50.00	.00	.00	1897.60	436.00	1900.11	1900.73	1902.17	54.45	11.51	37.88	59.09
	446.200	50.00	.00	.00	1897.30	256.00	1899.28	1899.62	1900.61	45.38	9.24	27.71	38.00
	446.200	50.00	.00	.00	1897.30	436.00	1899.80	1900.43	1901.89	55.42	11.58	37.64	58.57
	396.200	50.00	.00	.00	1897.00	256.00	1898.94	1899.32	1900.35	49.54	9.53	26.87	36.37
	396.200	50.00	.00	.00	1897.00	436.00	1899.49	1900.13	1901.60	56.29	11.65	37.43	58.11
	346.200	50.00	.00	.00	1896.70	256.00	1898.59	1899.01	1900.07	52.96	9.75	26.25	35.18
	346.200	50.00	.00	.00	1896.70	436.00	1899.18	1899.82	1901.31	57.01	11.70	37.27	57.74
	146.200	200.00	.00	.00	1895.60	256.00	1897.49	1897.91	1898.99	54.16	9.83	26.04	34.78
	146.200	200.00	.00	.00	1895.60	436.00	1898.11	1898.72	1900.18	55.06	11.56	37.73	58.76

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	25.000	121.20	.00	.00	1894.90	256.00	1896.77	1897.21	1898.31	56.19	9.96	25.71	34.15
	25.000	121.20	.00	.00	1894.90	436.00	1897.39	1898.03	1899.50	56.37	11.65	37.42	58.07
*	1.000	24.00	.00	.00	1894.70	256.00	1895.60	1896.22	1897.78	171.79	11.83	21.64	19.53
*	1.000	24.00	.00	.00	1894.70	436.00	1896.04	1896.87	1898.91	145.66	13.60	32.07	36.13
	.000	1.00	1905.70	1900.70	1894.70	256.00	1895.62	1896.22	1897.74	165.06	11.68	21.91	19.93

.000	1.00	1905.70	1900.70	1894.70	436.00	1896.04	1896.86	1898.89	144.27	13.55	32.17	36.30

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N CHANNEL w/DIVERSION AT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	707.600	256.00	1901.79	.00	.00	-1.11	8.70	.00
*	707.600	436.00	1903.06	1.27	.00	-1.14	8.70	.00
*	638.600	256.00	1899.71	.00	-2.08	.00	15.59	69.00
*	638.600	436.00	1900.25	.54	-2.81	.00	15.59	69.00
	637.600	256.00	1899.70	.00	-.01	.00	15.59	1.00
	637.600	436.00	1900.27	.56	.02	.00	15.59	1.00
	571.500	256.00	1899.60	.00	-.10	.00	15.59	66.10
	571.500	436.00	1900.18	.58	-.08	.00	15.59	66.10
	570.500	256.00	1899.48	.00	-.12	.00	16.49	1.00
	570.500	436.00	1900.03	.55	-.15	.00	16.50	1.00
*	546.200	256.00	1900.21	.00	.73	.00	19.25	24.30
	546.200	436.00	1900.43	.22	.40	.00	20.15	24.30
	496.200	256.00	1899.68	.00	-.53	.00	18.31	50.00
	496.200	436.00	1900.11	.43	-.32	.00	20.08	50.00
	446.200	256.00	1899.28	.00	-.40	.00	17.94	50.00
	446.200	436.00	1899.80	.52	-.31	.00	20.03	50.00
	396.200	256.00	1898.94	.00	-.35	.00	17.75	50.00
	396.200	436.00	1899.49	.56	-.31	.00	19.99	50.00
	346.200	256.00	1898.59	.00	-.34	.00	17.61	50.00
	346.200	436.00	1899.18	.59	-.31	.00	19.95	50.00
	146.200	256.00	1897.49	.00	-1.10	.00	17.56	200.00
	146.200	436.00	1898.11	.62	-1.07	.00	20.05	200.00
	25.000	256.00	1896.77	.00	-.72	.00	17.48	121.20
	25.000	436.00	1897.39	.62	-.72	.00	19.98	121.20
*	1.000	256.00	1895.60	.00	-1.17	.00	24.02	24.00
*	1.000	436.00	1896.04	.44	-1.35	.00	24.03	24.00
	.000	256.00	1895.62	.00	.02	.00	24.02	1.00
	.000	436.00	1896.04	.42	.00	.00	24.03	1.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 707.600 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 707.600 PROFILE= 2 CRITICAL DEPTH ASSUMED

WARNING SECNO= 638.600 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 638.600 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 546.200 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 546.200 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 546.200 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 1.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

Paper Copy I
"N" Channel

100- and 500-year flood events

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1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    16APR98    TIME   08:13:40  *
 *******************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*        (916) 756-1104              *
**************************************
```

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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X     X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
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1
    16APR98      08:13:40                                                    PAGE    1


                                                        THIS RUN EXECUTED 16APR98    08:13:40

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

AC

T1      FEMA 100-YEAR HEC-2 ANALYSIS
T2      BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
T3      N CHANNEL W/O DIVERSION AT NLVDB

J1  ICHECK    INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                2                     1                                          1907.5

J2  NPROF     IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150


QT        2       1156       1248
NC     .014       .014       .014         .3         .1
  1661.9
X1    707.6          8       1000    1009.51         69         69         69
GR   1909.3       1000     1898.8    1000.01    1898.8     1004.3     1904.8    1004.31     1904.8     1005.1
GR   1898.8    1005.11     1898.8     1009.5    1909.3    1009.51
NC                                        .5         .3
  Upstream end Donovan Culvert
  1592.8
X1    638.6          8       1000    1016.51          1          1          1
GR   1904.4       1000     1898.4    1000.01    1898.4     1007.8     1904.4    1007.81     1904.4     1008.7
GR   1898.4    1008.71     1898.4     1016.5    1904.4    1016.51
  1591.8

X1    637.6          8       1000    1016.51       66.1       66.1       66.1
BT       -8       1000     1908.4     1904.4    1000.01     1908.4     1904.4     1007.8     1908.4     1904.4
BT          1007.81       1908.4     1904.4     1008.7     1908.4     1904.4    1008.71     1908.4     1904.4
BT           1016.5       1908.4     1904.4    1016.51     1908.4     1904.4
GR   1904.4       1000     1898.4    1000.01    1898.4     1007.8     1904.4    1007.81     1904.4     1008.7
GR   1898.4    1008.71     1898.4     1016.5    1904.4    1016.51
  1525.7
1
    16APR98      08:13:40                                                    PAGE    2


X1    571.5          8       1000    1016.51          1          1          1
BT       -8       1000       1908       1904    1000.01       1908       1904       1007.8       1908       1904
BT          1007.81         1908       1904     1008.7       1908       1904      1008.71       1908       1904
BT           1016.5         1908       1904    1016.51       1908       1904
GR     1904       1000       1898    1000.01       1898     1007.8       1904      1007.81       1904     1008.7
GR     1898    1008.71       1898     1016.5       1904    1016.51
  1524.7

X1    570.5          8       1000    1016.51       24.3       24.3       24.3
GR     1904       1000       1898    1000.01       1898     1007.8       1898      1007.81       1898     1008.7
GR     1898    1008.71       1898     1016.5       1904    1016.51
  Downstream end Donovan Culvert
  UPRR culvert flow of 819 cfs for the 100 yr and 1278 for the 500 yr enters
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  the channel from the left bank n values were increased by 20% from 0.014 to
  0.017 to account for the effects of inflow

QT        2       1429       1674
NC     .017       .017       .017         .3         .1
  1500.4
X1    546.2          4       1000       1038       50.0       50.0       50.0
GR   1904.9       1000     1897.9       1014     1897.9       1024     1904.9       1038


QT        2       1702       2100
  1450.4
X1    496.2          4       1000       1038       50.0       50.0       50.0
GR   1904.6       1000     1897.6       1014     1897.6       1024     1904.6       1038

QT        2       1975       2526
  1400.4
X1    446.2          4       1000       1038       50.0       50.0       50.0
GR   1904.3       1000     1897.3       1014     1897.3       1024     1904.3       1038

  1350.4

X1    396.2          4       1000       1038       50.0       50.0       50.0
GR   1904.0       1000     1897.0       1014     1897.0       1024     1904.0       1038

  1300.4

X1    346.2          4       1000       1038      200.0      200.0      200.0
GR   1903.7       1000     1896.7       1014     1896.7       1024     1903.7       1038

    1100

X1    146.2          4       1000       1038      121.2      121.2      121.2
GR   1902.6       1000     1895.6       1014     1895.6       1024     1902.6       1038
   978.8
1
   16APR98      08:13:40                                                                PAGE     3


X1        25         4       1000       1038       24.0       24.0       24.0
GR   1901.9       1000     1894.9       1014     1894.9       1024     1901.9       1038


NC      .014       .014       .014         .5         .3
   954.8
X1         1          8       1000    1025.01          1          1          1
GR   1900.7       1000     1894.7    1000.01     1894.7     1012.0     1900.7    1012.01     1900.7    1012.8
GR   1894.7    1013.01     1894.7     1025.0     1900.7    1025.01
   953.8

X1         0          8       1000    1025.01
BT        -8       1000     1905.7     1900.7    1000.01     1905.7     1900.7    1012.00     1905.7    1900.7
BT           1012.01       1905.7     1900.7     1012.8     1905.7     1900.7    1013.01     1905.7    1900.7
BT              1025       1905.7     1900.7    1025.01     1905.7     1900.7
GR   1900.7       1000     1894.7    1000.01     1894.7     1012.0     1900.7    1012.01     1900.7    1012.8
GR   1894.7    1013.01     1894.7     1025.0     1900.7    1025.01

1
   16APR98      08:13:40                                                                PAGE     4

    SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      OLOSS  L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA  R-BANK ELEV
    TIME       VLOB       VCH        VROB        XNL      XNCH        XNR       WTN      ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR     ITRIAL       IDC     ICONT     CORAR     TOPWID      ENDST


 *PROF 1
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600
 3720 CRITICAL DEPTH ASSUMED
    707.600      8.20   1907.00    1907.00    1907.50    1910.89       3.89       .00        .00   1909.30
     1156.0        .0     1156.0         .0         .0       73.0         .0        .0         .0   1909.30
        .00       .00      15.83        .00       .000       .014       .000      .000    1898.80   1000.00
    .009258        0.         0.         0.          0         10          0       .00       9.51   1009.51


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

    638.600      3.58   1901.98    1903.91        .00    1908.66       6.67       .84       1.39   1904.40
     1156.0        .0     1156.0         .0         .0       55.8         .0        .1         .0   1904.40
        .00       .00      20.73        .00       .000       .014       .000      .000    1898.40   1000.00
    .016608       69.        69.        69.         11         14          0       .00      15.60   1016.51


 *SECNO 637.600

 3265 DIVIDED FLOW
```

```
3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1908.40 MAX ELLC=  1904.40

   637.600      3.58   1901.98   1904.04      .00   1908.63      6.65      .02       .01   1904.40
    1156.0       .0    1156.0        .0       .0      55.9        .0       .1        .0   1904.40
       .00       .00     20.69       .00     .000      .014      .000     .000   1898.40   1000.00
   .016521        1.        1.        1.        2         9         0      .00     15.60   1016.51


*SECNO 571.500

3265 DIVIDED FLOW

1
    16APR98      08:13:40                                                                    PAGE    5

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1908.00 MAX ELLC=  1904.00

   571.500      4.03   1902.03   1903.64      .00   1907.29      5.26      .93       .42   1904.00
    1156.0       .0    1156.0        .0       .0      62.8        .0       .2        .0   1904.00
       .00       .00     18.40       .00     .000      .014      .000     .000   1898.00   1000.00
   .012065        66.       66.       66.        3         9         0      .00     15.61   1016.51


*SECNO 570.500
   570.500      3.74   1901.74   1903.33      .00   1907.18      5.44      .01       .09   1904.00
    1156.0       .0    1156.0        .0       .0      61.8        .0       .2        .0   1904.00
       .00       .00     18.72       .00     .000      .014      .000     .000   1898.00   1000.00
   .008806        1.        1.        1.        9        11         0      .00     16.50   1016.51


CCHV=      .300 CEHV=      .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

   546.200      4.43   1902.33   1903.77      .00   1906.87      4.54      .23       .09   1904.90
    1429.0       .0    1429.0        .0       .0      83.6        .0       .2        .1   1904.90
       .00       .00     17.10       .00     .000      .017      .000     .000   1897.90   1005.14
   .009678        24.       24.       24.        5        14         0      .00     27.72   1032.86


*SECNO 496.200

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .62

   496.200      5.59   1903.19   1904.05      .00   1906.39      3.20      .34       .13   1904.60
    1702.0       .0    1702.0        .0       .0     118.5        .0       .4        .1   1904.60
       .00       .00     14.36       .00     .000      .017      .000     .000   1897.60   1002.81
   .005314        50.       50.       50.        4        11         0      .00     32.37   1035.19


1
    16APR98      08:13:40                                                                    PAGE    6

     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 446.200

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   446.200      6.92   1904.22   1904.22      .00   1906.45      2.23      .19       .29   1904.30
    1975.0       .0    1975.0        .0       .0     164.9        .0       .5        .1   1904.30
       .00       .00     11.97       .00     .000      .017      .000     .000   1897.30   1000.16
   .002927        50.       50.       50.       20        11         0      .00     37.68   1037.84


*SECNO 396.200
   396.200      6.61   1903.61   1903.93      .00   1906.18      2.57      .16       .10   1904.00
    1975.0       .0    1975.0        .0       .0     153.6        .0       .7        .2   1904.00
       .01       .00     12.86       .00     .000      .017      .000     .000   1897.00   1000.78
   .003549        50.       50.       50.        4         5         0      .00     36.45   1037.22


*SECNO 346.200
   346.200      6.43   1903.13   1903.62      .00   1905.93      2.80      .19       .07   1903.70
    1975.0       .0    1975.0        .0       .0     147.1        .0       .9        .2   1903.70
       .01       .00     13.42       .00     .000      .017      .000     .000   1896.70   1001.13
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    .003985       50.       50.       50.        8         8         0       .00     35.73   1036.87


*SECNO 146.200
   146.200       6.18   1901.78   1902.52       .00   1904.95      3.17       .86       .11   1902.60
    1975.0         .0    1975.0        .0         .0     138.3         .0       1.5        .4   1902.60
       .01        .00     14.28       .00       .000       .017      .000      .000   1895.60   1001.63
   .004711       200.      200.      200.         8         8         0       .00     34.73   1036.37


*SECNO 25.000
    25.000       6.08   1900.98   1901.83       .00   1904.31      3.33       .59       .05   1901.90
    1975.0         .0    1975.0        .0         .0     134.9         .0       1.9        .5   1901.90
       .01        .00     14.64       .00       .000       .017      .000      .000   1894.90   1001.83
   .005035       121.      121.      121.         6         8         0       .00     34.34   1036.17


CCHV=      .500 CEHV=      .300
1
   16APR98       08:13:40                                                                    PAGE    7


     SECNO       DEPTH       CWSEL       CRIWS       WSELK          EG          HV          HL       OLOSS   L-BANK ELEV
     Q           QLOB        QCH         QROB        ALOB           ACH         AROB        VOL      TWA     R-BANK ELEV
     TIME        VLOB        VCH         VROB        XNL            XNCH        XNR         WTN      ELMIN   SSTA
     SLOPE       XLOBL       XLCH        XLOBR       ITRIAL         IDC         ICONT       CORAR    TOPWID  ENDST


*SECNO 1.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

     1.000       5.10   1899.80   1900.66       .00   1903.83      4.03       .13       .35   1900.70
    1975.0         .0    1975.0        .0         .0     122.6         .0       2.0        .5   1900.70
       .01        .00     16.11       .00       .000       .014      .000      .000   1894.70   1000.00
   .005939        24.       24.       24.         9         5         0       .00     24.18   1025.01


*SECNO  .000

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF  1900.700 EGLC=  1903.597 EGC=  1903.598 WSEL=  1900.553

3265 DIVIDED FLOW


3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

7185 MINIMUM SPECIFIC ENERGY
       .000       5.11   1899.81   1900.70       .00   1903.82      4.01       .01       .01   1900.70
    1975.0         .0    1975.0        .0         .0     122.9         .0       2.0        .5   1900.70
       .01        .00     16.07       .00       .000       .014      .000      .000   1894.70   1000.00
   .005898         1.        1.        1.         0        12         0       .00     24.18   1025.01


1
 PROFILE FOR STREAM  N CHANNEL W/O DIVERSION


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
     SECNO   CUMDIS

    707.60      0.  .         .         .I        .         .         .         .W        .L        .E        .         .
               10.  .         .         I         .         .         .         WC.       .         L.        E.        .
               20.  .         .         I         .         .         .       W C .       L         .       E .       .
               30.  .         .         I         .         .         .W    C     . L       .         E       .         .
               40.  .         .       I.          .         .       W .   C     L.        .         .E      .         .
               50.  .         .       I.          .         .     W       C     L         .         .  E      .         .
               60.  .         .       I.          .         W       C . L       .         .         .E        .         .
    638.60     70.  .         .       I.          .       W .       C L.        .         .         E         .         .
    637.60     80.  .         .       I.          .       W .         C L.      .         .         E         .         .
               90.  .         .     I .           .       W .       C L .       .         .       E.          .         .
              100.  .         .     I .           .       W .       C L .       .         .     E .           .         .
              110.  .         .     I .           .       W .       C L .       .         .   E .             .         .
              120.  .         .   I   .           .       W .     C L   .       .         . E               .         .
              130.  .         .   I   .           .       W .     C L   .       .       E   .               .         .
    571.50    140.  .         .   I   .           .       W .     C L   .       .     E     .               .         .
    570.50    150.  .         .   I   .           .     W   .   C   L   .       .   E       .               .         .
              160.  .         .  I    .           .     W   .   C   L   .       . E         .               .         .
    546.20    170.  .         .  I    .           .       W .     C     .L      .E          .               .         .
              180.  .         .  I    .           .         W.    C     .L    E            .               .         .
              190.  .         . I     .           .         W     C     L     E            .               .         .
              200.  .         .  I    .           .         .W    C     L   E.             .               .         .
              210.  .         .  I    .           .         . W   C     L   E.             .               .         .
    496.20    220.  .         .  I    .           .         . W   C     L E .             .               .         .
              230.  .         .   I   .           .         .  W  C     L E.              .               .         .
              240.  .         .  I    .           .         .   W C     L E.              .               .         .
              250.  .         .  I    .           .         .     WC    L E.              .               .         .
              260.  .         .   I   .           .         .     WL    . E.              .               .         .
    446.20    270.  .         .  I    .           .         .     W     . E.              .               .         .
              280.  .         .  I    .           .         .     WL    . E .             .               .         .
              290.  .         . I     .           .         .     WC    . E .             .               .         .
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            300.  .          . I          .          .          .          WC  .          E  .          .          .          .          .
            310.  .          . I          .          .          .          WCL .          E  .          .          .          .          .
    396.20  320.  .          . I          .          .          .          WCL .         E   .          .          .          .          .
            330.  .          .I           .          .          .          W C .         S   .          .          .          .          .
            340.  .          .I           .          .          .          W C .         E   .          .          .          .          .
            350.  .          .I           .          .          .         W CL .         E   .          .          .          .          .
            360.  .          I            .          .          .         W C  .        E    .          .          .          .          .
    346.20  370.  .          I            .          .          .         W  C .        E    .          .          .          .          .
            380.  .          I            .          .          .         W CL .        E    .          .          .          .          .
            390.  .         I.            .          .          .        .W  C .        E    .          .          .          .          .
            400.  .         I.            .          .          .        .W  C .       E     .          .          .          .          .
            410.  .         I.            .          .          .        .W  C .       E     .          .          .          .          .
            420.  .         I.            .          .          .        W  CL .       E     .          .          .          .          .
            430.  .        I .            .          .          .        W  C  .       E     .          .          .          .          .
            440.  .        I .            .          .          .        W  C  .      E      .          .          .          .          .
            450.  .        I .            .          .          .       W. CL  .      E      .          .          .          .          .
            460.  .        I .            .          .          .       W  CL  .      E      .          .          .          .          .
            470.  .       I  .            .          .          .       W. C   .      E      .          .          .          .          .
            480.  .       I  .            .          .          .       W . C  .     E       .          .          .          .          .
            490.  .       I  .            .          .          .       W .CL  .     E       .          .          .          .          .
            500.  .      I   .            .          .          .       W .C   .     E       .          .          .          .          .
            510.  .      I   .            .          .          .      W  .C   .     E       .          .          .          .          .
            520.  .      I   .            .          .          .      W  CL   .    E        .          .          .          .          .
            530.  .      I   .            .          .          .      W  CL   .    E        .          .          .          .          .
            540.  .     I    .            .          .          .     W   C    .    E        .          .          .          .          .
            550.  .     I    .            .          .          .     W   C    .    E        .          .          .          .          .
            560.  .    I     .            .          .          .     W  CL    .   E         .          .          .          .          .
    146.20  570.  .    I     .            .          .          .    W   CL    .   E         .          .          .          .          .
            580.  .   I      .            .          .          .    W   C.    .   E         .          .          .          .          .
            590.  .   I      .            .          .          .    W   C.    .   E         .          .          .          .          .
            600.  .   I      .            .          .          .   W    CL.   .  E          .          .          .          .          .
            610.  .  I       .            .          .          .   W    C  .  .  E          .          .          .          .          .
            620.  .  I       .            .          .          .   W    C  .  .  E          .          .          .          .          .
            630.  .  I       .            .          .          .  W    CL  .  .  E          .          .          .          .          .
            640.  . I        .            .          .          .  W    C   .  E.           .          .          .          .          .
            650.  . I        .            .          .          .  W    C   .  E.           .          .          .          .          .
            660.  . I        .            .          .          . W     C   .  E.           .          .          .          .          .
            670.  . I        .            .          .          . W    CL   .  E.           .          .          .          .          .
            680.  .I         .            .          .          . W    C    .  E           .          .          .          .          .
     25.00  690.  .I         .            .          .          .W     C    .  E           .          .          .          .          .
            700.  .I         .            .          .          W.    CL    .  E           .          .          .          .          .
      1.00  710.  I          .            .          .     W    C          .  E           .          .          .          .          .
       .00  720.  I          .            .          .     W    C          .  E           .          .          .          .          .
1
    16APR98       08:13:40                                                                                                    PAGE    8


 T1       FEMA 500-YEAR HEC-2 ANALYSIS
 T2       BY NORTHWEST HYDRAULIC CONSULTANTS, SACRAMENTO
 T3       N CHANNEL W/O DIVERSION AT NLVDB

 J1  ICHECK    INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                     1                                          1908.6

 J2  NPROF     IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       2

1
    16APR98       08:13:40                                                                                                    PAGE    9


      SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
      Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
      TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
      SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


  *PROF 2
0

 CCHV=      .300 CEHV=      .100
 *SECNO 707.600
 3720 CRITICAL DEPTH ASSUMED
    707.600       8.60    1907.40    1907.40    1908.60    1911.49       4.09        .00        .00    1909.30
     1248.0         .0     1248.0         .0         .0       76.9         .0         .0         .0    1909.30
        .00        .00      16.22        .00       .000       .014       .000       .000    1898.80    1000.00
    .009341         0.         0.         0.          0         10          0        .00       9.51    1009.51


 CCHV=      .500 CEHV=      .300
 *SECNO 638.600

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

    638.600       3.77    1902.17    1904.25        .00    1909.18       7.01        .85       1.46    1904.40
     1248.0         .0     1248.0         .0         .0       58.7         .0         .1         .0    1904.40
        .00        .00      21.25        .00       .000       .014       .000       .000    1898.40    1000.00
    .016835        69.        69.        69.         12         14          0        .00      15.61    1016.51


 *SECNO 637.600

 3265 DIVIDED FLOW
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3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.40 MAX ELLC= 1904.40

637.600	3.77	1902.17	1904.11	.00	1909.16	6.98	.02	.01	1904.40
1248.0	.0	1248.0	.0	.0	58.8	.0	.1	.0	1904.40
.00	.00	21.21	.00	.000	.014	.000	.000	1898.40	1000.00
.016746	1.	1.	1.	2	9	0	.00	15.61	1016.51

*SECNO 571.500

3265 DIVIDED FLOW

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 8 MIN ELTRD= 1908.00 MAX ELLC= 1904.00

571.500	4.23	1902.23	1903.71	.00	1907.78	5.55	.94	.43	1904.00
1248.0	.0	1248.0	.0	.0	66.0	.0	.2	.0	1904.00
.00	.00	18.91	.00	.000	.014	.000	.000	1898.00	1000.00
.012346	66.	66.	66.	5	9	0	.00	15.61	1016.51

*SECNO 570.500

570.500	3.93	1901.93	1903.60	.00	1907.68	5.74	.01	.10	1904.00
1248.0	.0	1248.0	.0	.0	64.9	.0	.2	.0	1904.00
.00	.00	19.23	.00	.000	.014	.000	.000	1898.00	1000.00
.008889	1.	1.	1.	9	11	0	.00	16.50	1016.51

CCHV= .300 CEHV= .100
*SECNO 546.200

3301 HV CHANGED MORE THAN HVINS

546.200	4.94	1902.84	1904.27	.00	1907.34	4.50	.21	.12	1904.90
1674.0	.0	1674.0	.0	.0	98.3	.0	.3	.1	1904.90
.00	.00	17.02	.00	.000	.017	.000	.000	1897.90	1004.11
.008530	24.	24.	24.	6	14	0	.00	29.78	1033.89

*SECNO 496.200
3280 CROSS SECTION 496.20 EXTENDED .13 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

496.200	7.13	1904.73	1904.73	.00	1907.02	2.29	.22	.20	1904.60
2100.0	.0	2100.0	.0	.0	173.1	.0	.4	.1	1904.60
.00	.00	12.13	.00	.000	.017	.000	.000	1897.60	1000.00
.002877	50.	50.	50.	20	11	0	.00	38.00	1038.00

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 446.200
3280 CROSS SECTION 446.20 EXTENDED .70 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

446.200	7.70	1905.00	1905.00	.00	1907.62	2.62	.15	.85	1904.30
2526.0	.0	2526.0	.0	.0	194.6	.0	.6	.1	1904.30
.00	.00	12.98	.00	.000	.017	.000	.000	1897.30	1000.00
.002919	50.	50.	50.	20	8	0	.00	38.00	1038.00

*SECNO 396.200
3280 CROSS SECTION 396.20 EXTENDED .39 FEET

396.200	7.40	1904.40	1904.71	.00	1907.35	2.96	.16	.10	1904.00
2526.0	.0	2526.0	.0	.0	183.0	.0	.8	.2	1904.00
.01	.00	13.80	.00	.000	.017	.000	.000	1897.00	1000.00
.003514	50.	50.	50.	4	5	0	.00	38.00	1038.00

*SECNO 346.200

```
3280 CROSS SECTION    346.20 EXTENDED       .23 FEET

   346.200      7.22   1903.92   1904.39       .00   1907.10      3.18       .19       .07   1903.70
    2526.0        .0    2526.0        .0        .0     176.6        .0       1.0        .2   1903.70
       .01       .00     14.31       .00      .000      .017      .000      .000   1896.70   1000.00
   .003917       50.       50.       50.        10         8         0       .00     38.00   1038.00


*SECNO 146.200
   146.200      6.97   1902.57   1903.29       .00   1906.13      3.57       .85       .12   1902.60
    2526.0        .0    2526.0        .0        .0     166.7        .0       1.8        .4   1902.60
       .01       .00     15.15       .00      .000      .017      .000      .000   1895.60   1000.07
   .004653      200.      200.      200.         7         8         0       .00     37.86   1037.93


*SECNO 25.000
    25.000      6.87   1901.77   1902.61       .00   1905.50      3.73       .58       .05   1901.90
    2526.0        .0    2526.0        .0        .0     162.9        .0       2.3        .5   1901.90
       .01       .00     15.51       .00      .000      .017      .000      .000   1894.90   1000.27
   .004954      121.      121.      121.         7         8         0       .00     37.46   1037.73


1
   16APR98      08:13:40                                                                        PAGE   12

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .500 CEHV=      .300
*SECNO 1.000
3280 CROSS SECTION       1.00 EXTENDED       .47 FEET

     1.000      6.48   1901.18   1901.74       .00   1905.22      4.05       .12       .16   1900.70
    2526.0        .0    2526.0        .0        .0     156.4        .0       2.4        .5   1900.70
       .01       .00     16.15       .00      .000      .014      .000      .000   1894.70   1000.00
   .005021       24.       24.       24.         7         5         0       .00     25.01   1025.01


*SECNO  .000

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF  1900.700 EGLC=  1905.438 EGC=  1910.149 WSEL=  1906.679

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF  1900.700 EGLC=  1905.438 EGC=  1905.443 WSEL=  1900.693

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=    8 MIN ELTRD=  1905.70 MAX ELLC=  1900.70

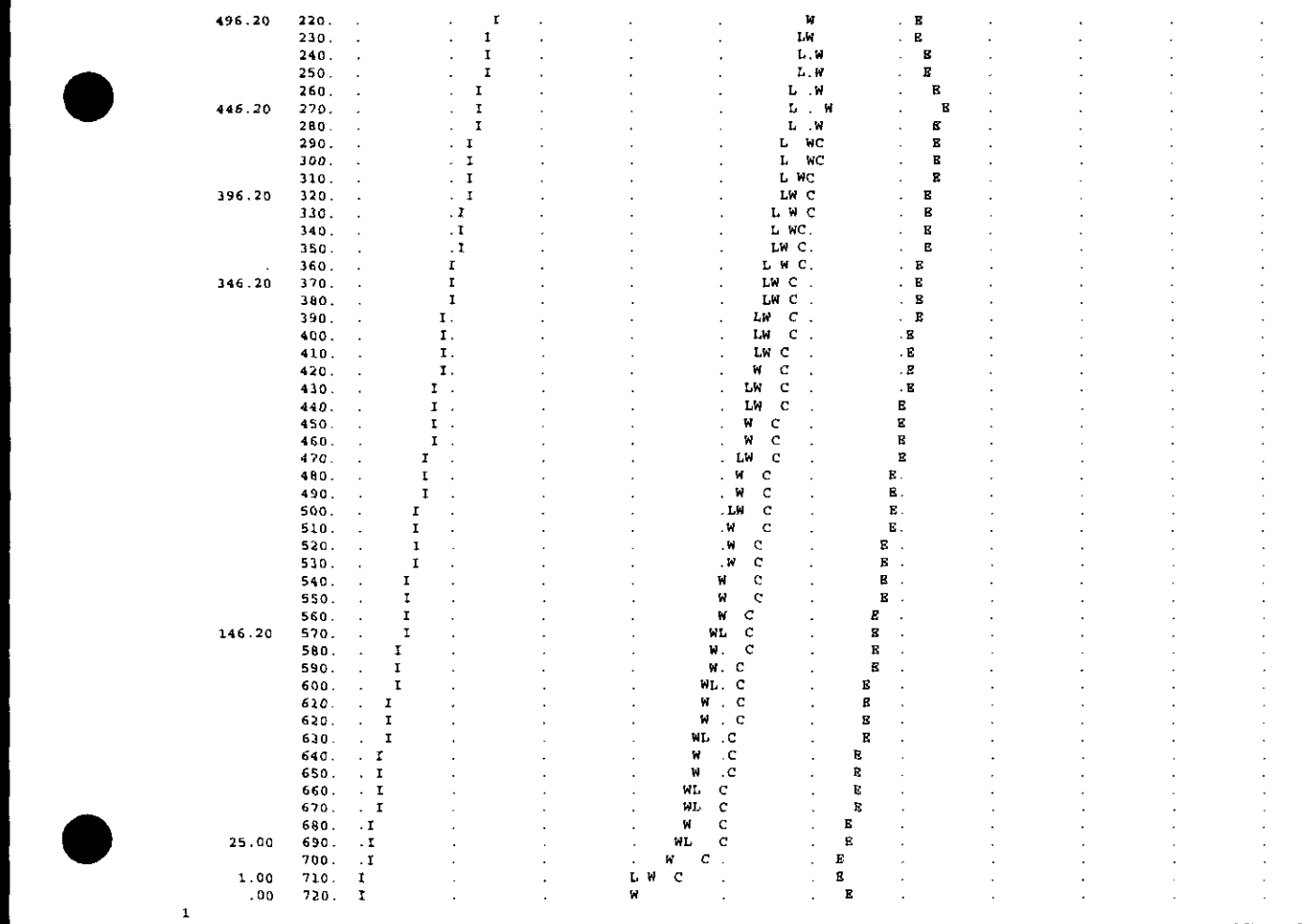
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .000      6.00   1900.70   1900.70       .00   1905.44      4.74       .01      1.50   1900.70
    2526.0        .0    2526.0        .0        .0     144.6        .0       2.4        .5   1900.70
       .01       .00     17.47       .00      .000      .014      .000      .000   1894.70   1000.00
   .010730        1.        1.        1.        20        16         0       .00     24.22   1025.01


1
 PROFILE FOR STREAM  N CHANNEL W/O DIVERSION


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1895.     1897.     1899.     1901.     1903.     1905.     1907.     1909.     1911.     1913.
    SECNO   CUMDIS

   707.60      0.  .         .         .I        .         .         .         .  W      .  L      .  E      .         .
               10.  .         .         I         .         .         .         .WC       L.        . E       .         .
               20.  .         .         I         .         .         .      W  C.     L  .         .E        .         .
               30.  .         .         I         .         .         .   W     C  . L     .         E.        .         .
               40.  .         .         I.        .         .         W  .   C     L.        .         .E        .         .
               50.  .         .         I.        .         .      W     . C  L     .        .         E         .         .
               60.  .         .         I.        .         .W        C L       .        .         E         .         .
   638.60      70.  .         .         I.        .      W  .         CL.       .        .         E         .         .
   637.60      80.  .         .         I.        .      W  .       C L.        .        .         E         .         .
               90.  .         .         I .       .      W  .       CL  .       .        .         .E        .         .
              100.  .         .         I .       .      W  .     C L   .       .        .         R         .         .
              110.  .         .         I .       .      W  .     C L   .       .        .      E  .         .         .
              120.  .         .         I .       .      W  .     CL    .       .        .   E     .         .         .
              130.  .         .         I .       .      W  .     CL    .       .        E      .  .         .         .
   571.50     140.  .         .         I .       .      W  .   C L     .       .        .   E     .         .         .
   570.50     150.  .         .         I .       .   W     .   C L     .       .        .   E     .         .         .
              160.  .         .      I    .       .      W  .     C L   .       .     E     .     .         .         .
   546.20     170.  .         .      I    .       .         .W      C .L      .     E     .     .         .         .
              180.  .         .      I    .       .         .   W   C .L      .     E     .     .         .         .
              190.  .         .   I       .       .         .      W  CL      .     E     .     .         .         .
              200.  .         .   I       .       .         .         W CL     .  E  .     .     .         .         .
              210.  .         .   I       .       .         .           W C    .  E  .     .     .         .         .
```



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THIS RUN EXECUTED 16APR98 08:13:40

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

N CHANNEL W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	707.600	.00	.00	.00	1898.80	1156.00	1907.00	1907.00	1910.89	92.58	15.83	73.04	120.14
*	707.600	.00	.00	.00	1898.80	1248.00	1907.40	1907.40	1911.49	93.41	16.22	76.92	129.13
	638.600	69.00	.00	.00	1898.40	1156.00	1901.98	1903.91	1908.66	166.08	20.73	55.76	89.70
	638.600	69.00	.00	.00	1898.40	1248.00	1902.17	1904.25	1909.18	168.35	21.25	58.73	96.19
	637.600	1.00	1908.40	1904.40	1898.40	1156.00	1901.98	1904.04	1908.63	165.21	20.69	55.87	89.94
	637.600	1.00	1908.40	1904.40	1898.40	1248.00	1902.17	1904.11	1909.16	167.46	21.21	58.85	96.44
	571.500	66.10	1908.00	1904.00	1898.00	1156.00	1902.03	1903.64	1907.29	120.65	18.40	62.83	105.24
	571.500	66.10	1908.00	1904.00	1898.00	1248.00	1902.23	1903.72	1907.78	123.46	18.91	66.00	112.32
	570.500	1.00	.00	.00	1898.00	1156.00	1901.74	1903.33	1907.18	88.06	18.72	61.76	123.19
	570.500	1.00	.00	.00	1898.00	1248.00	1901.93	1903.60	1907.68	88.89	19.23	64.89	132.37
	546.200	24.30	.00	.00	1897.90	1429.00	1902.33	1903.77	1906.87	96.78	17.10	83.58	145.25
	546.200	24.30	.00	.00	1897.90	1674.00	1902.84	1904.27	1907.34	85.30	17.02	98.33	181.25
*	496.200	50.00	.00	.00	1897.60	1702.00	1903.19	1904.05	1906.39	53.14	14.36	118.49	233.49
*	496.200	50.00	.00	.00	1897.60	2100.00	1904.73	1904.73	1907.02	28.77	12.13	173.06	392.49
*	446.200	50.00	.00	.00	1897.30	1975.00	1904.22	1904.22	1906.45	29.27	11.97	164.94	365.05
*	446.200	50.00	.00	.00	1897.30	2526.00	1905.00	1905.00	1907.62	29.19	12.98	194.58	467.51

	396.200	50.00	.00	.00	1897.00	1975.00	1903.61	1903.93	1906.18	35.49	12.86	153.57	331.53
	396.200	50.00	.00	.00	1897.00	2526.00	1904.40	1904.71	1907.35	35.14	13.80	183.00	426.10
	346.200	50.00	.00	.00	1896.70	1975.00	1903.13	1903.62	1905.93	39.85	13.42	147.12	312.88
	346.200	50.00	.00	.00	1896.70	2526.00	1903.92	1904.39	1907.10	39.17	14.31	176.56	403.60
	146.200	200.00	.00	.00	1895.60	1975.00	1901.78	1902.52	1904.95	47.11	14.28	138.28	287.76
	146.200	200.00	.00	.00	1895.60	2526.00	1902.57	1903.29	1906.13	46.53	15.15	166.71	370.33

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	25.000	121.20	.00	.00	1894.90	1975.00	1900.98	1901.83	1904.31	50.35	14.64	134.92	278.35
	25.000	121.20	.00	.00	1894.90	2526.00	1901.77	1902.61	1905.50	49.54	15.51	162.87	358.89
	1.000	24.00	.00	.00	1894.70	1975.00	1899.80	1900.66	1903.83	59.39	16.11	122.58	256.27
	1.000	24.00	.00	.00	1894.70	2526.00	1901.18	1901.74	1905.22	50.21	16.15	156.42	356.47
*	.000	1.00	1905.70	1900.70	1894.70	1975.00	1899.81	1900.70	1903.82	58.98	16.07	122.89	257.16
*	.000	1.00	1905.70	1900.70	1894.70	2526.00	1900.70	1900.70	1905.44	107.30	17.47	144.60	243.86

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N CHANNEL W/O DIVERSION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	707.600	1156.00	1907.00	.00	.00	-.50	9.51	.00
*	707.600	1248.00	1907.40	.41	.00	-1.20	9.51	.00
	638.600	1156.00	1901.98	.00	-5.01	.00	15.60	69.00
	638.600	1248.00	1902.17	.19	-5.23	.00	15.61	69.00
	637.600	1156.00	1901.98	.00	.00	.00	15.60	1.00
	637.600	1248.00	1902.17	.19	.00	.00	15.61	1.00
	571.500	1156.00	1902.03	.00	.05	.00	15.61	66.10
	571.500	1248.00	1902.23	.20	.06	.00	15.61	66.10
	570.500	1156.00	1901.74	.00	-.29	.00	16.50	1.00
	570.500	1248.00	1901.93	.19	-.30	.00	16.50	1.00
	546.200	1429.00	1902.33	.00	.59	.00	27.72	24.30
	546.200	1674.00	1902.84	.51	.91	.00	29.78	24.30
*	496.200	1702.00	1903.19	.00	.86	.00	32.37	50.00
*	496.200	2100.00	1904.73	1.54	1.89	.00	38.00	50.00
*	446.200	1975.00	1904.22	.00	1.03	.00	37.68	50.00
*	446.200	2526.00	1905.00	.78	.27	.00	38.00	50.00
	396.200	1975.00	1903.61	.00	-.61	.00	36.45	50.00
	396.200	2526.00	1904.40	.78	-.60	.00	38.00	50.00
	346.200	1975.00	1903.13	.00	-.49	.00	35.73	50.00
	346.200	2526.00	1903.92	.80	-.47	.00	38.00	50.00
	146.200	1975.00	1901.78	.00	-1.34	.00	34.73	200.00
	146.200	2526.00	1902.57	.79	-1.36	.00	37.86	200.00
	25.000	1975.00	1900.98	.00	-.80	.00	34.34	121.20
	25.000	2526.00	1901.77	.78	-.80	.00	37.46	121.20
	1.000	1975.00	1899.80	.00	-1.19	.00	24.18	24.00
	1.000	2526.00	1901.18	1.38	-.59	.00	25.01	24.00
*	.000	1975.00	1899.81	.00	.01	.00	24.18	1.00
*	.000	2526.00	1900.70	.89	-.48	.00	24.22	1.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 707.600 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 707.600 PROFILE= 2 CRITICAL DEPTH ASSUMED

WARNING SECNO= 496.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 496.200 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 496.200 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 496.200 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 446.200 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 446.200 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 446.200 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 446.200 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 446.200 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=    446.200  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

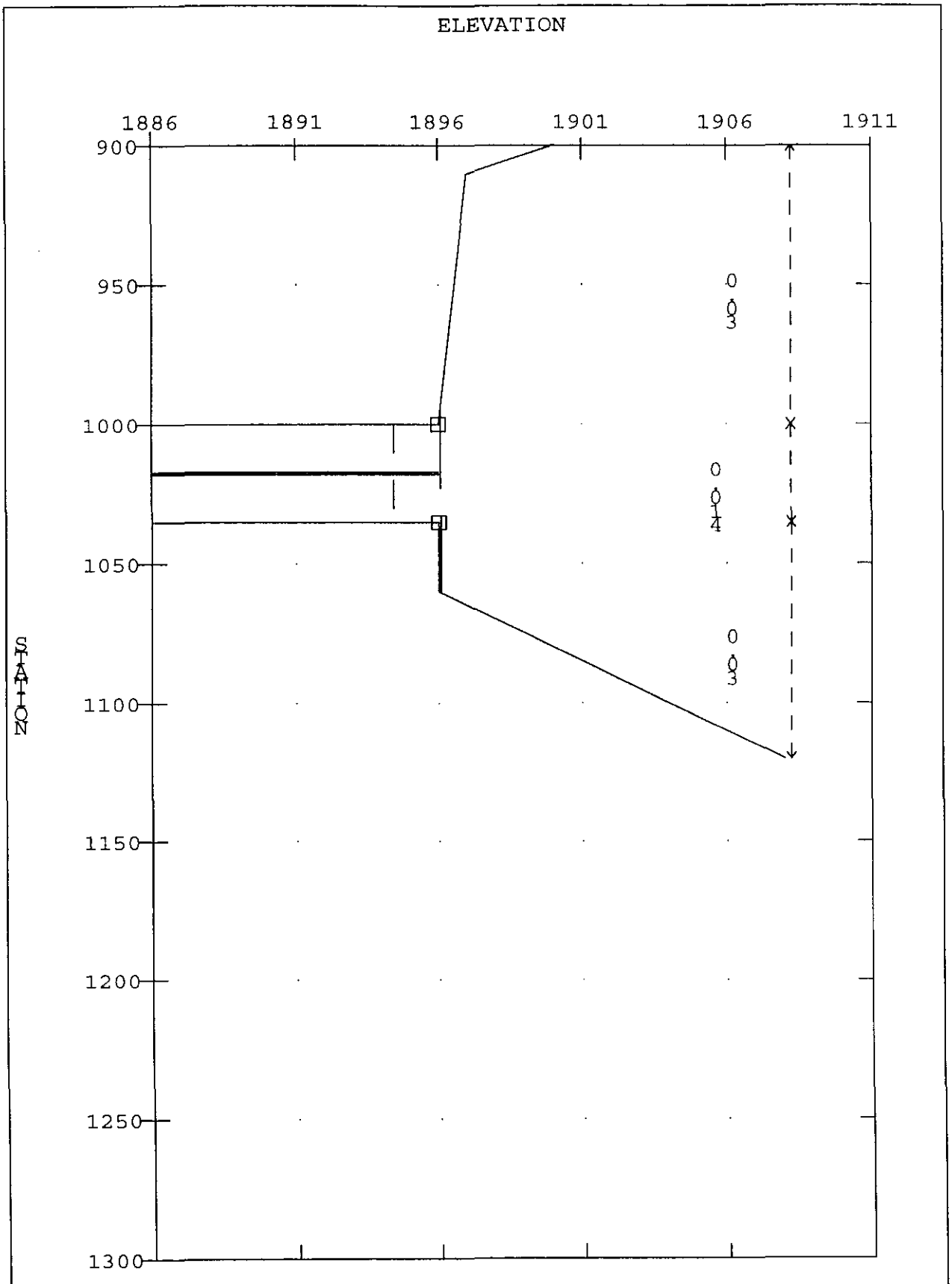
CAUTION SECNO=       .000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
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UPPER LAS VEGAS WASH
without Diversion

Cross Section Label Key

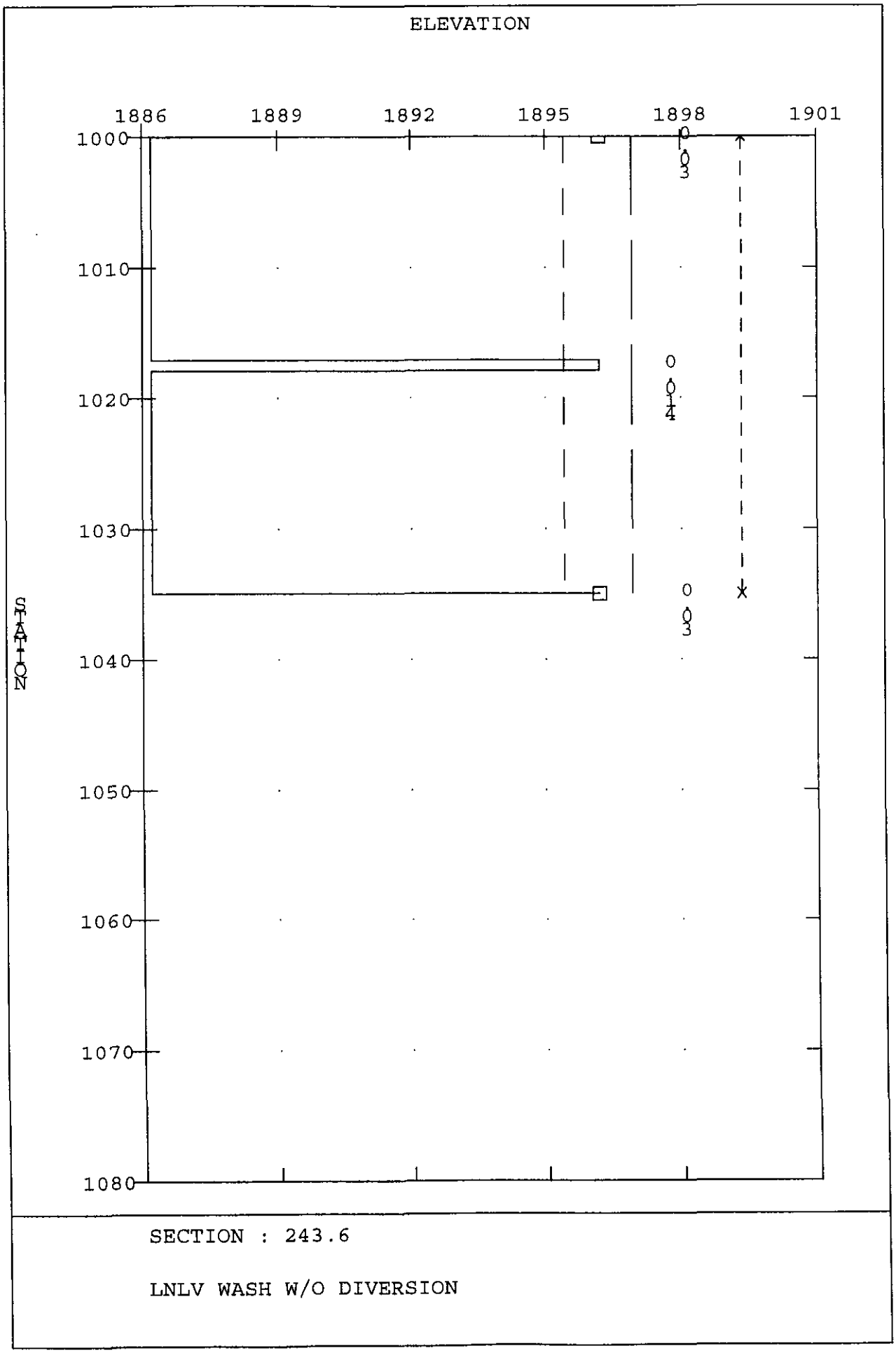
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243.6	B	12202	AB	32044	BB	62524	CB
244.6	--	13094	AC	33671	BC	63598	CC
450	--	14167	AD	35645	BD	65055	CD
544	C	14368	AE	36822	BE	66061	CE
600	--	15114	AF	38410	BF	66660	CF
700	--	15667	AG	39519	BG	66814	CG
1200	D	16546	AH	40616	BH	68187	CH
1700	E	17058	AI	42138	BI	69560	CI
2000	--	17612	AJ	43231	BJ	71045	CJ
2200	F	18436	AK	44345	BK	72532	CK
3724	G	18462	--	45725	BL	73765	CL
3823	--	18472	--	46746	BM	74997	CM
4020	--	18619	--	48046	BN		
4060	H	18710	AL	49654	BO		
4115	--	19020	AM	50964	BP		
4188	--	19215	AN	52020	BQ		
4189	--	19802	AO	53183	BR		
4246	I	20595	AP	54519	BS		
4247	--	21291	AQ	55570	BT		
4360	J	22138	AR	55870	BU		
4831	K	22230	AS	56010	BV		
4920	--	24530	AT	56230	BW		
5005	--	25616	AU	56420	BX		
5105	L	26383	AV	56487	BY		
5200	--	26845	AW	59059	BZ		
5500	M	28095	AX				
5852	--	29413	AY				
5973	N	31235	AZ				
6092	O						
6370	P						
6828	Q						
7265	R						
7730	S						
8323	T						
8794	U						
8860	--						
9120	V						
9237	W						
9429	X						
10155	Y						
10926	Z						

Cross Section Plots
KGSBWO2



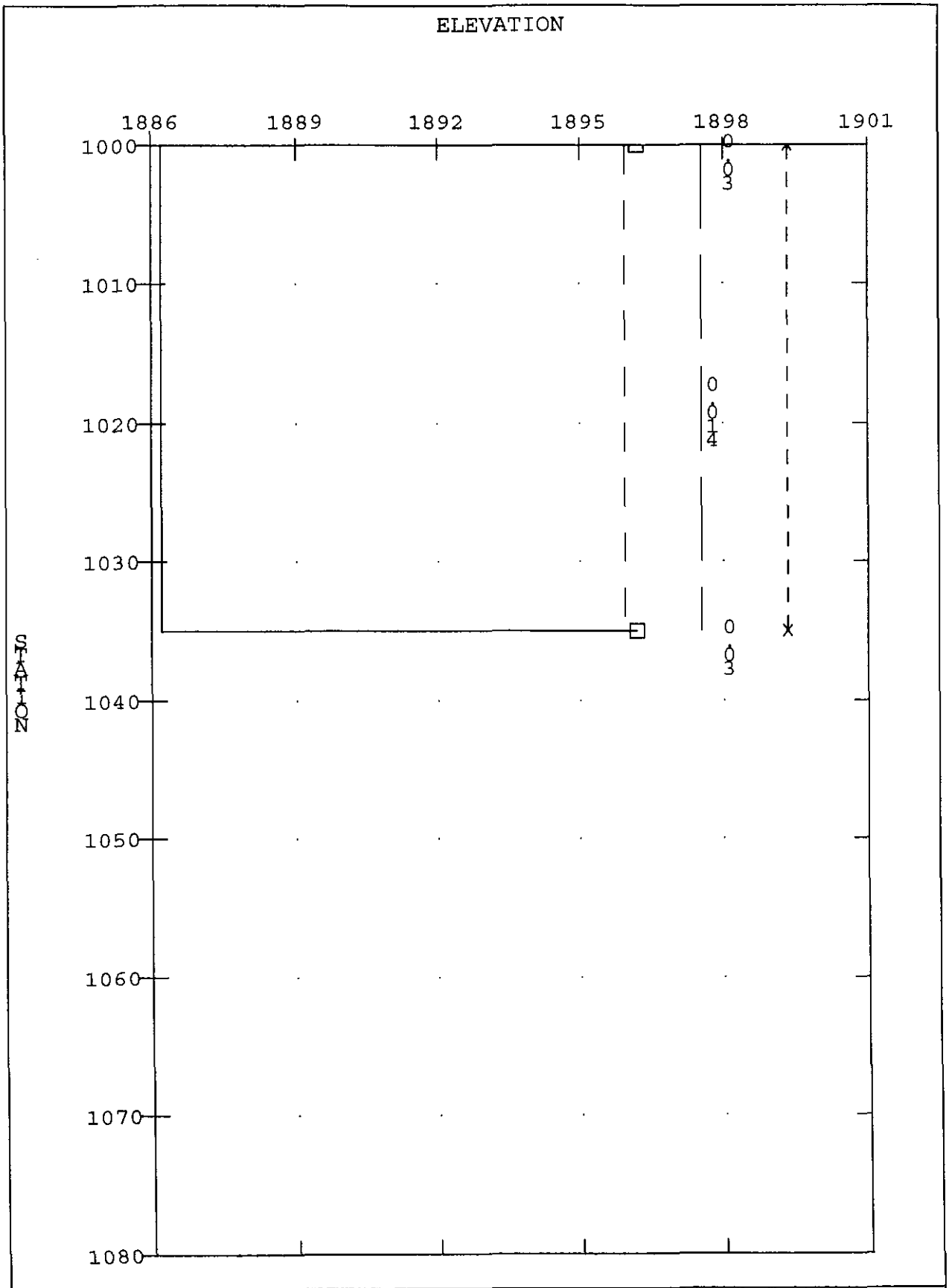
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LNLV WASH W/O DIVERSION



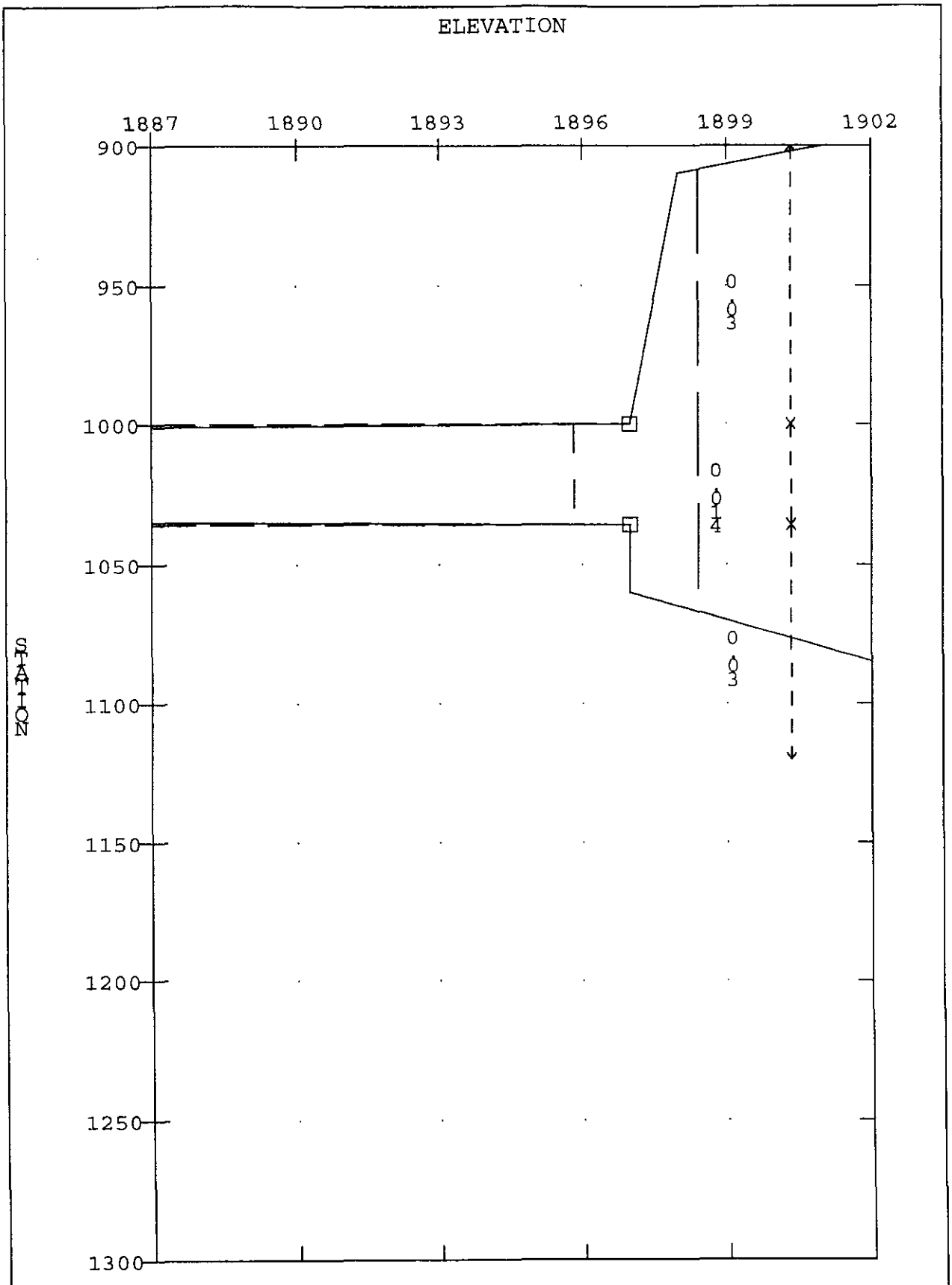
SECTION : 243.6

LNLV WASH W/O DIVERSION



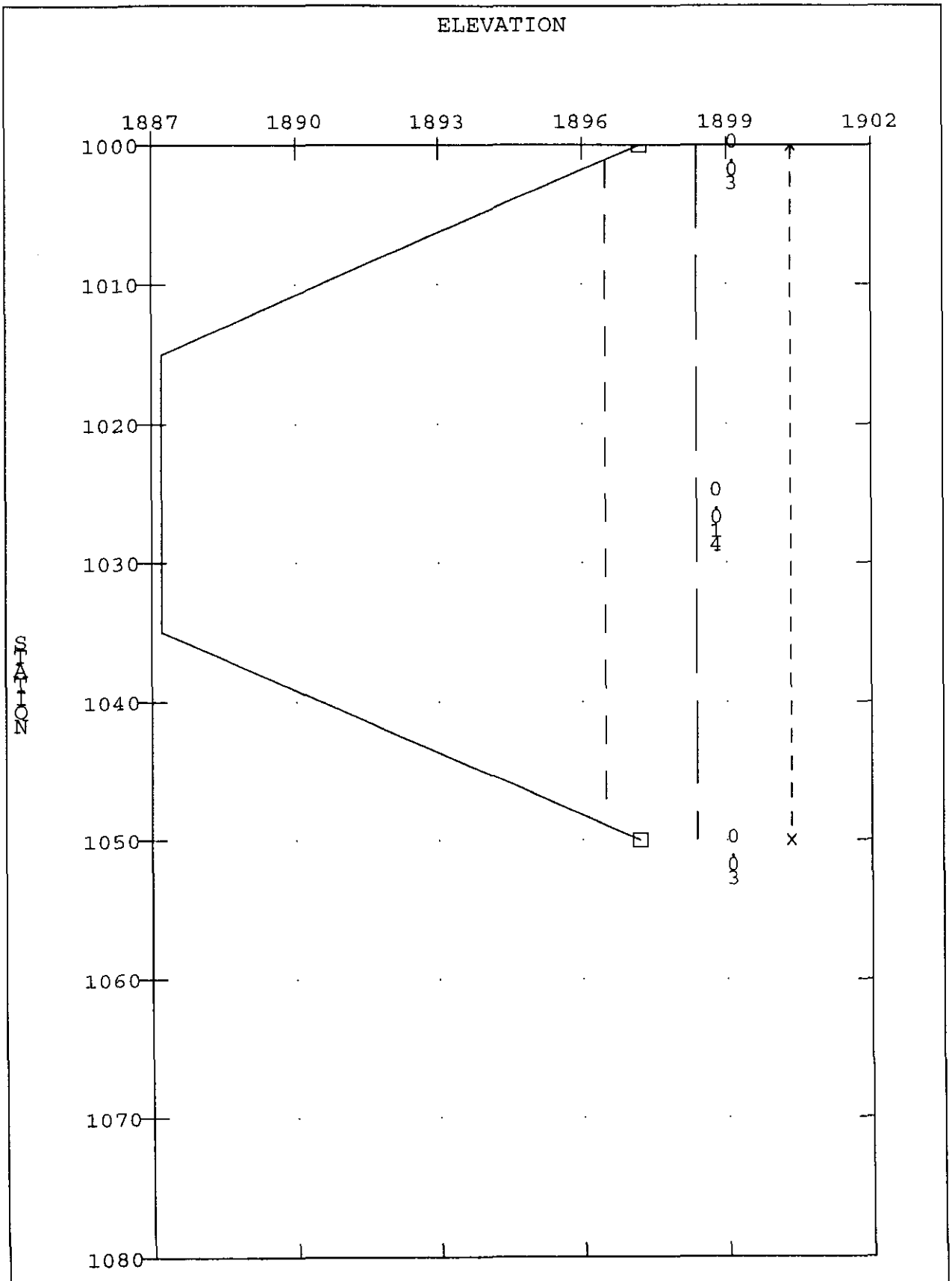
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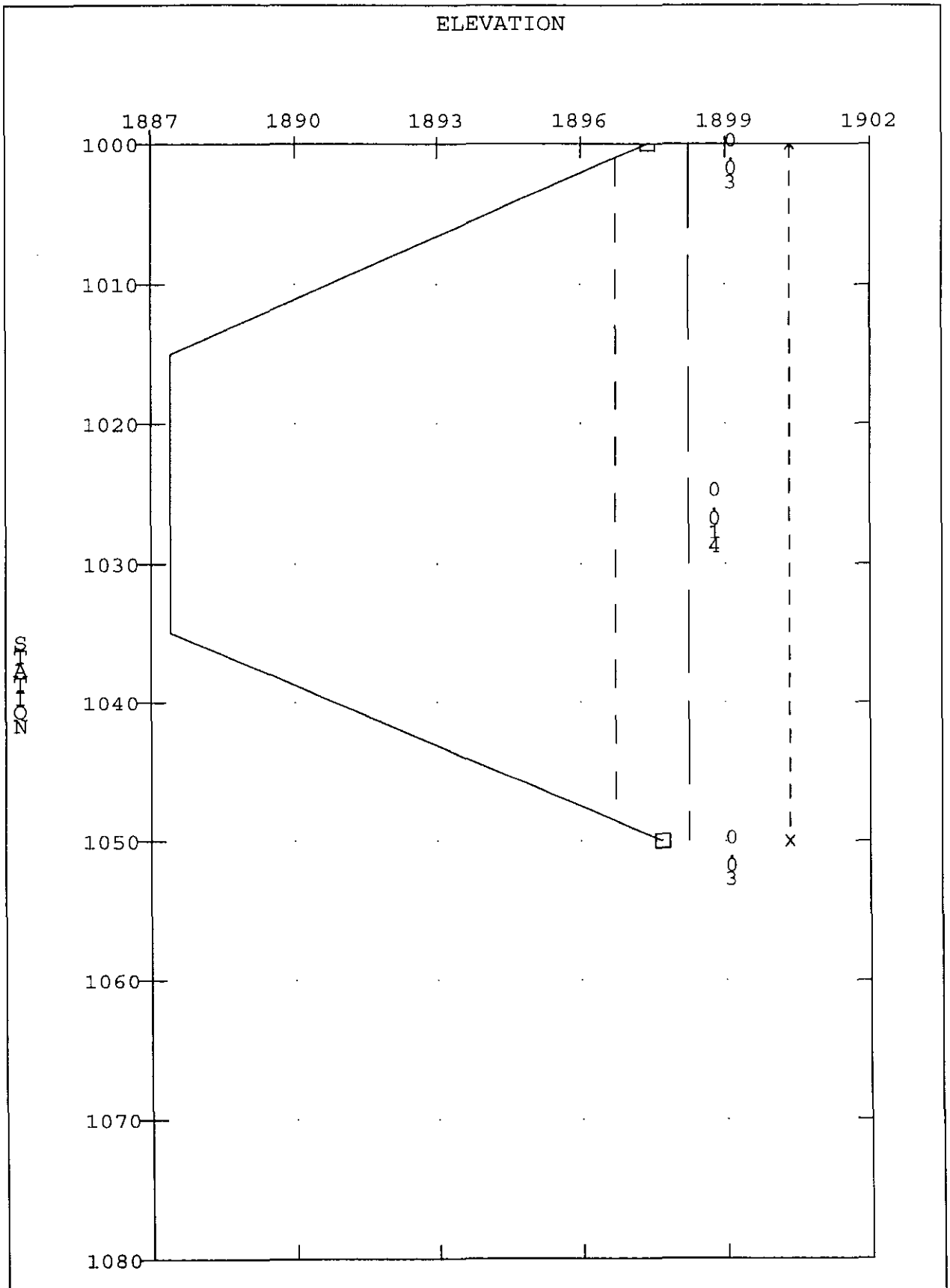
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LNLV WASH W/O DIVERSION



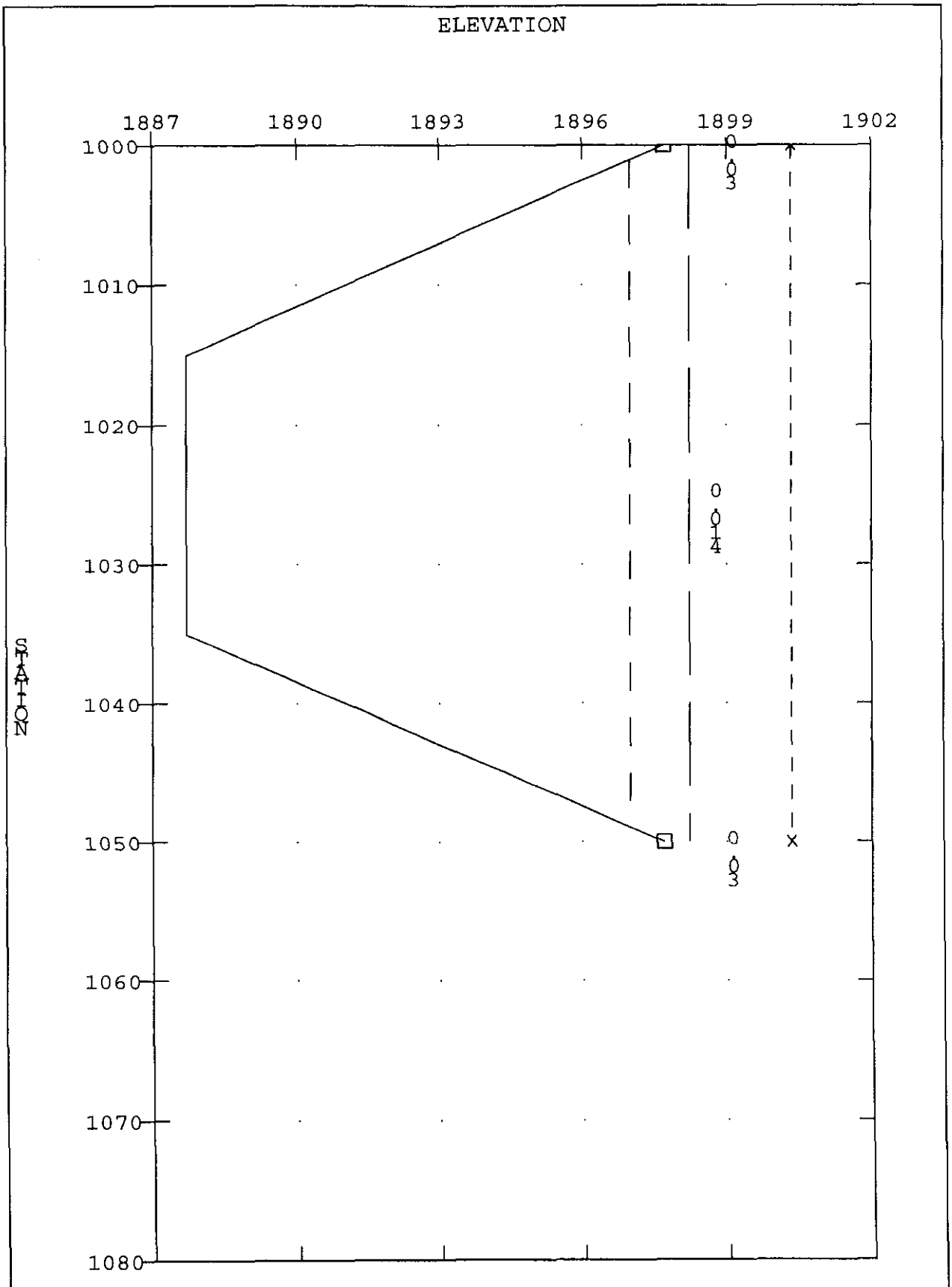
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LNLV WASH W/O DIVERSION



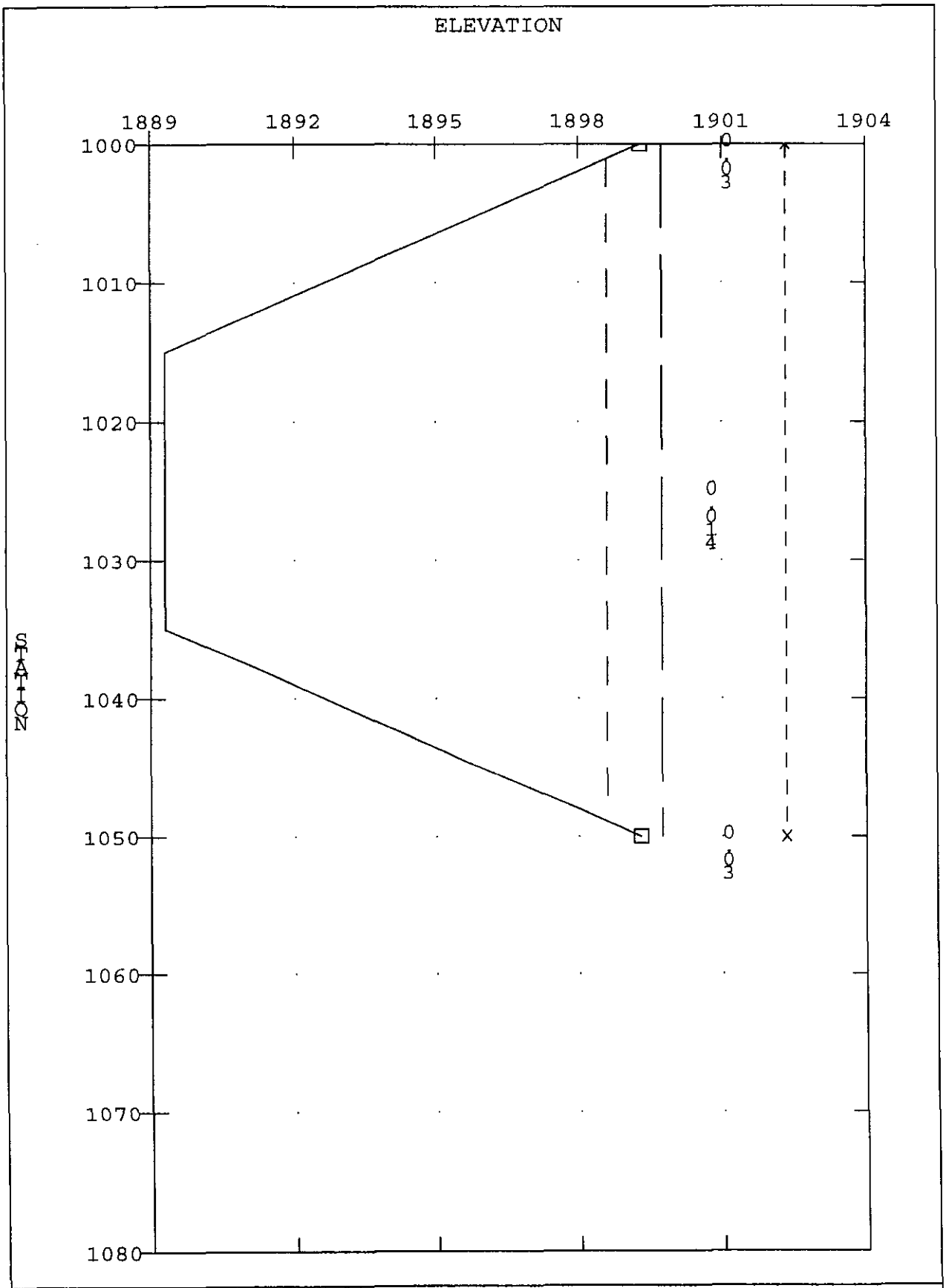
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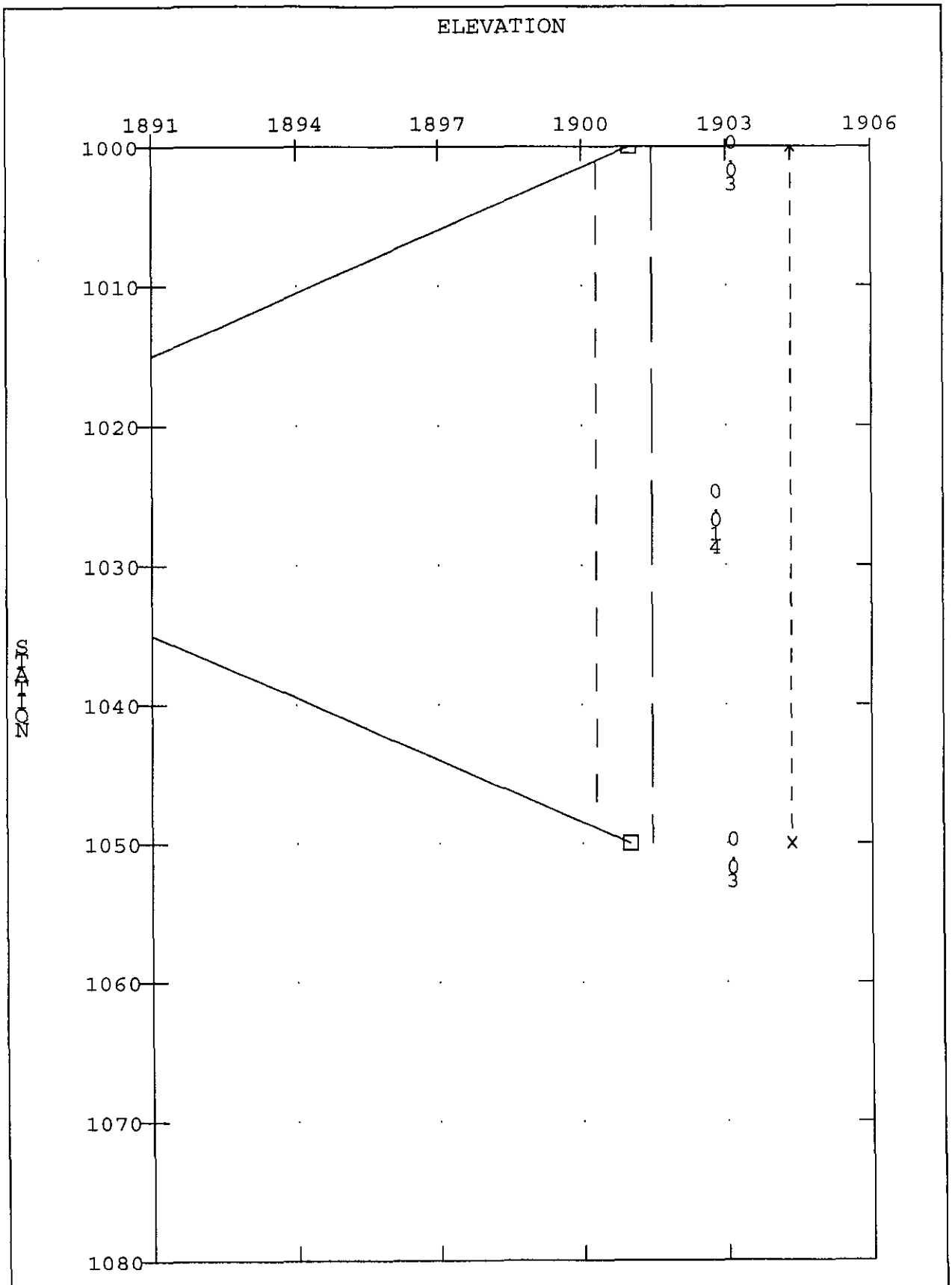
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LNLV WASH W/O DIVERSION



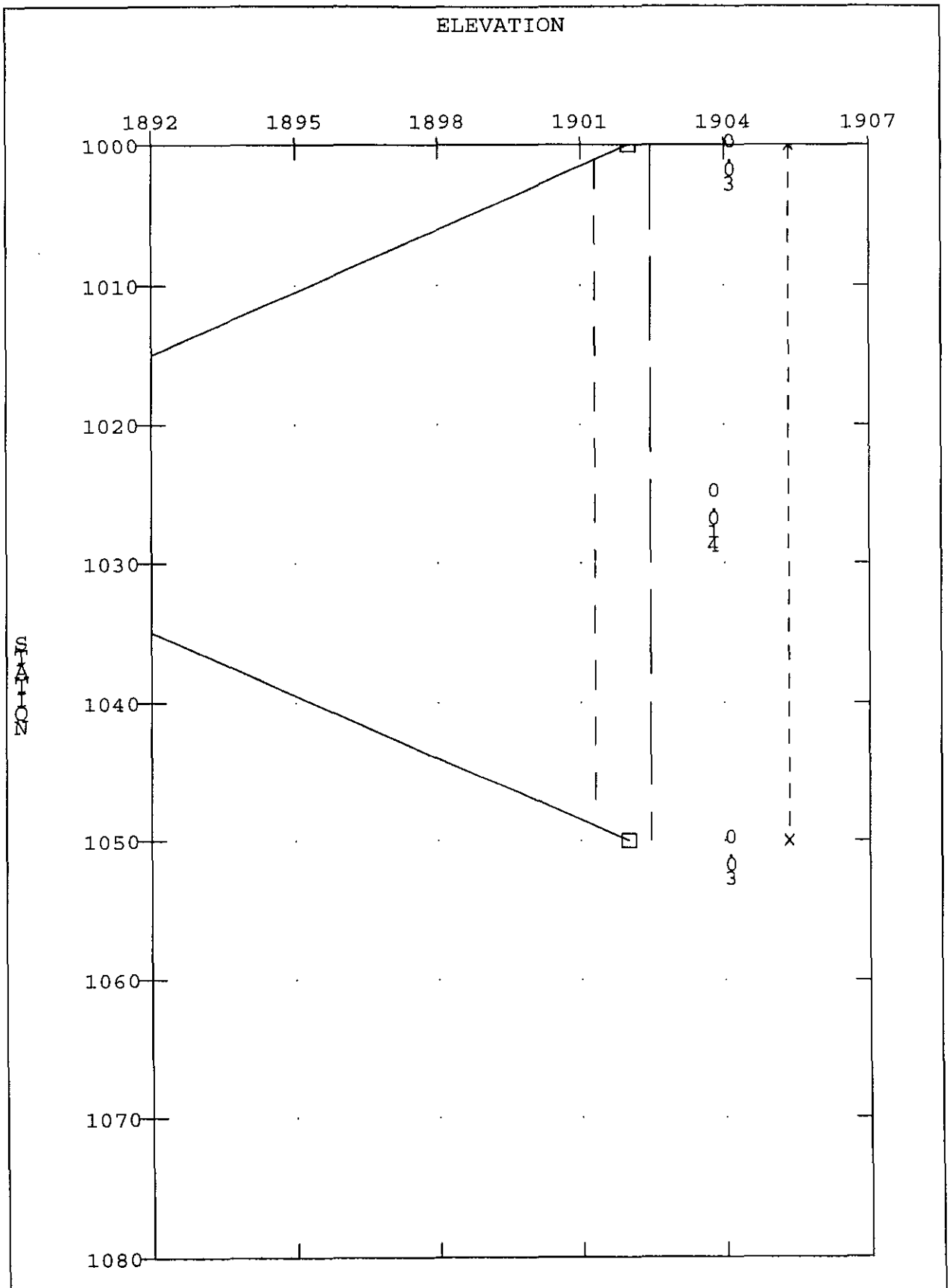
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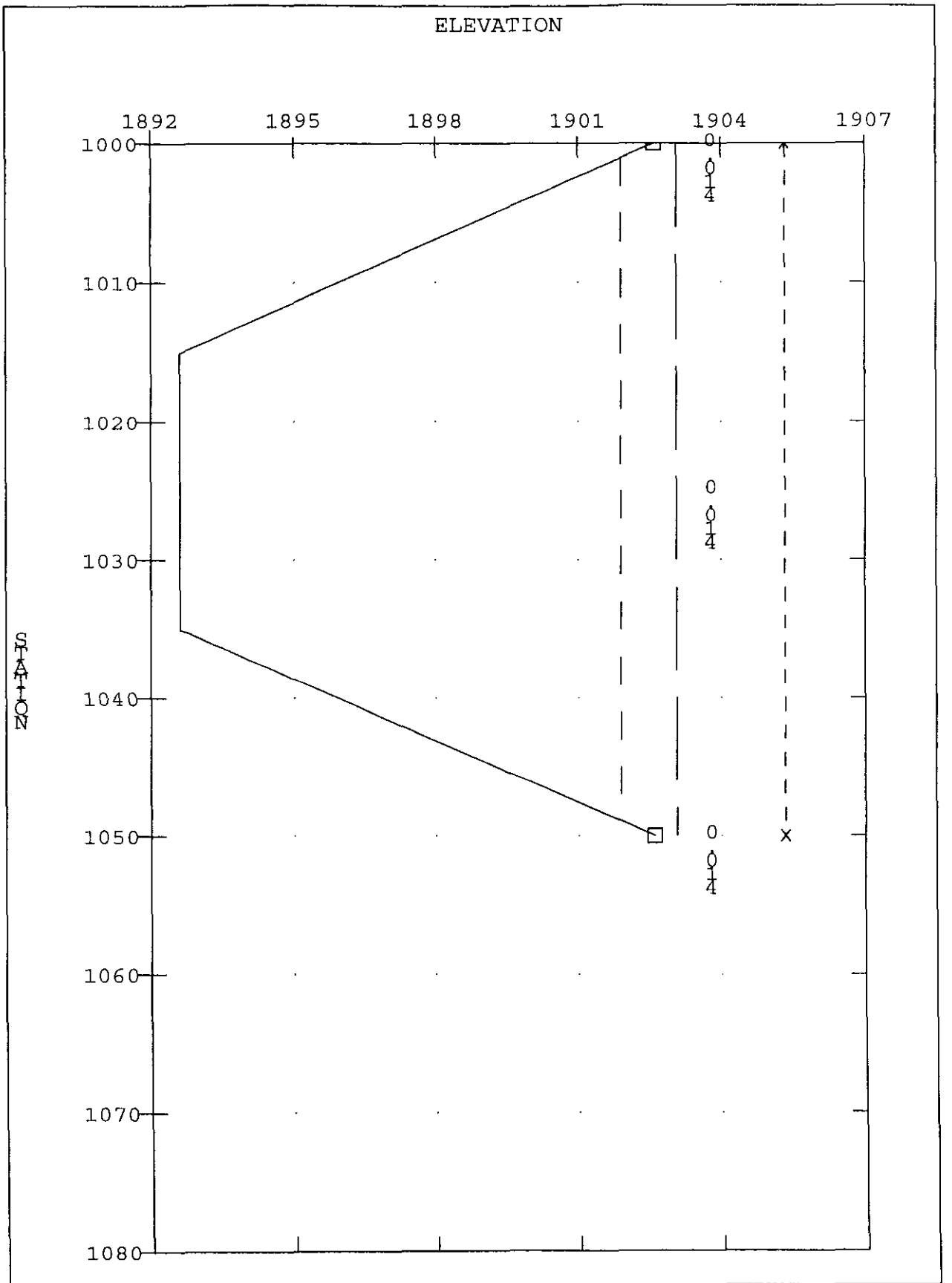
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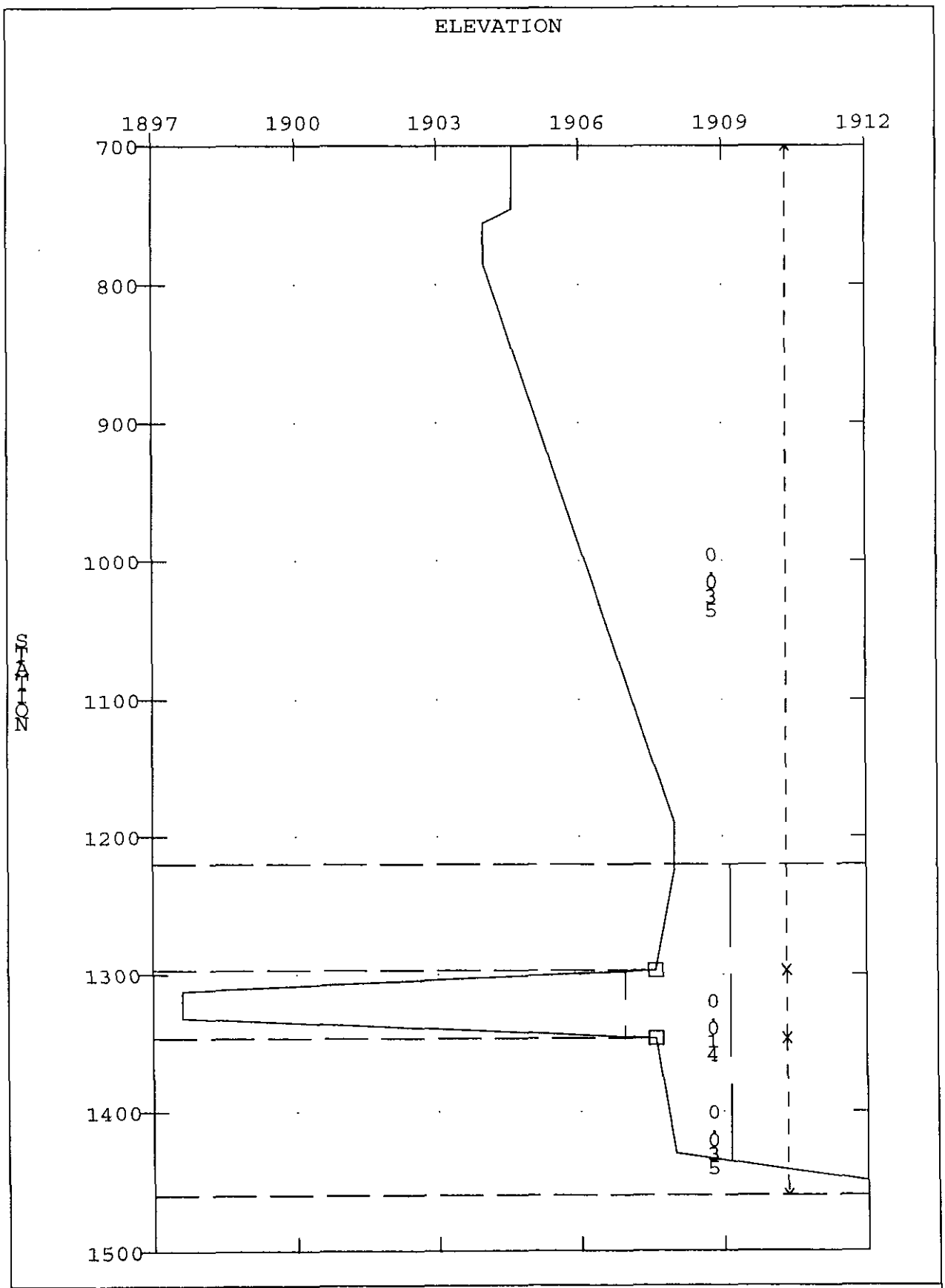
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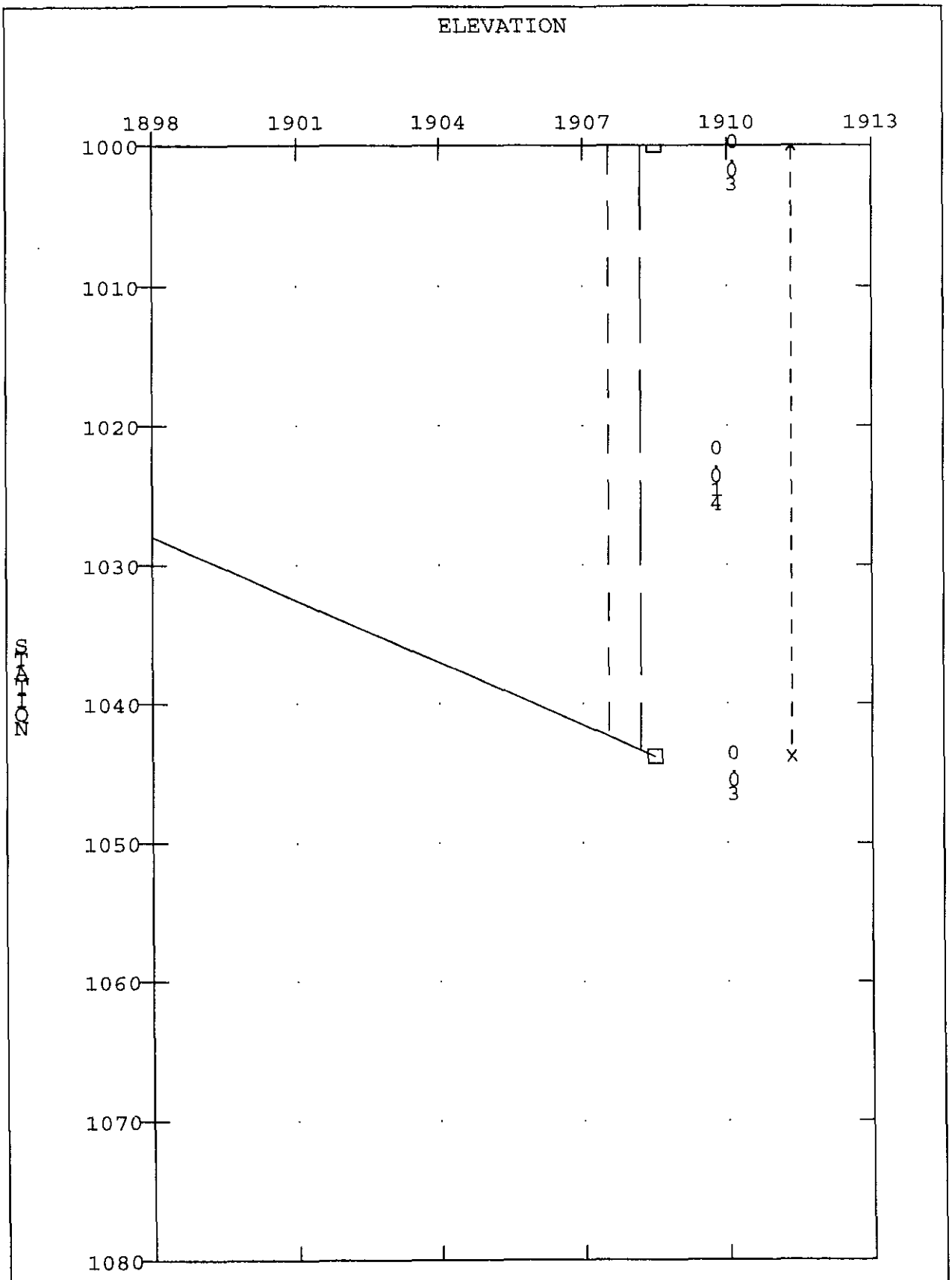
SECTION : 2200

LNLV WASH W/O DIVERSION



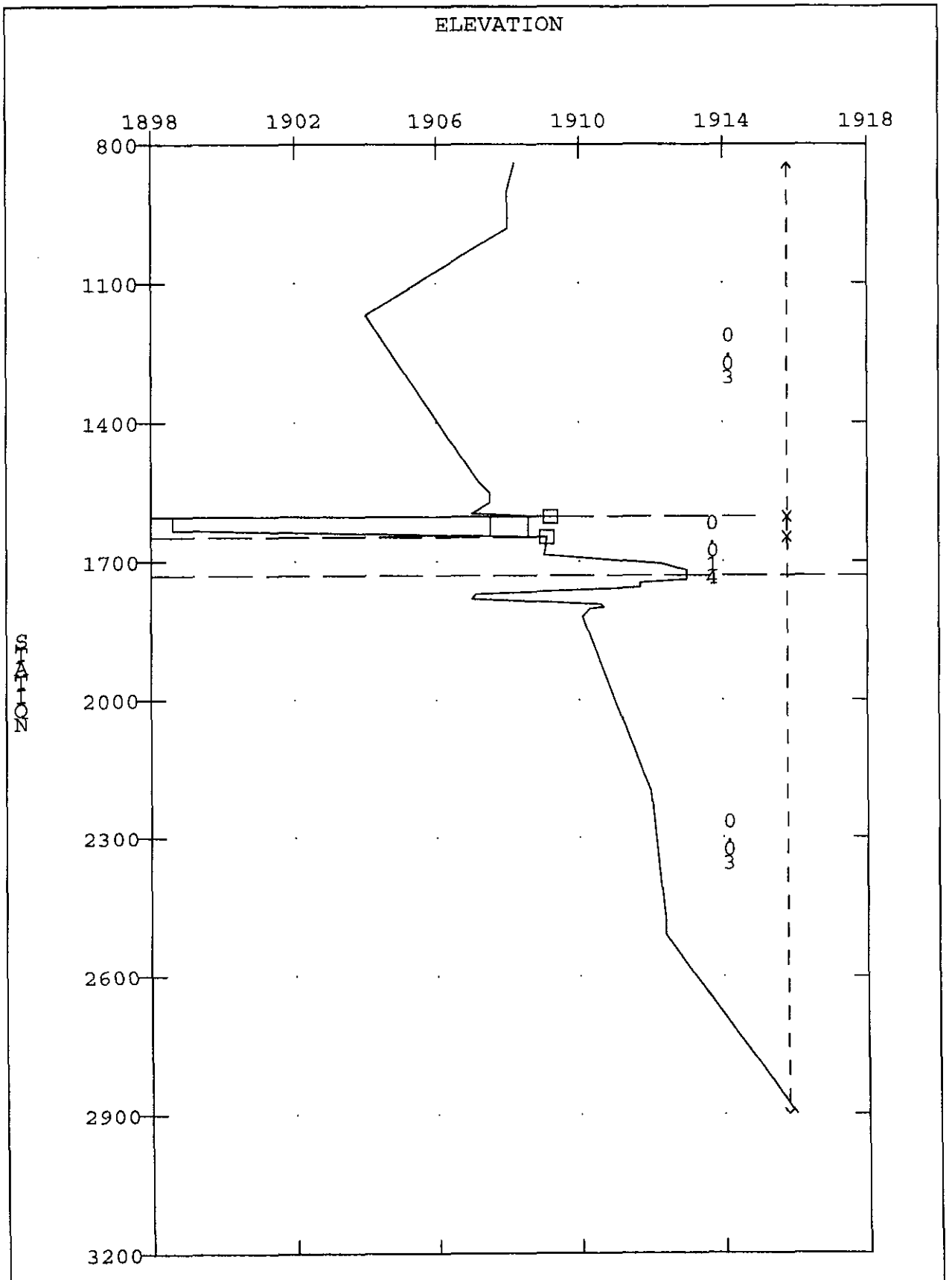
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LNLV WASH W/O DIVERSION



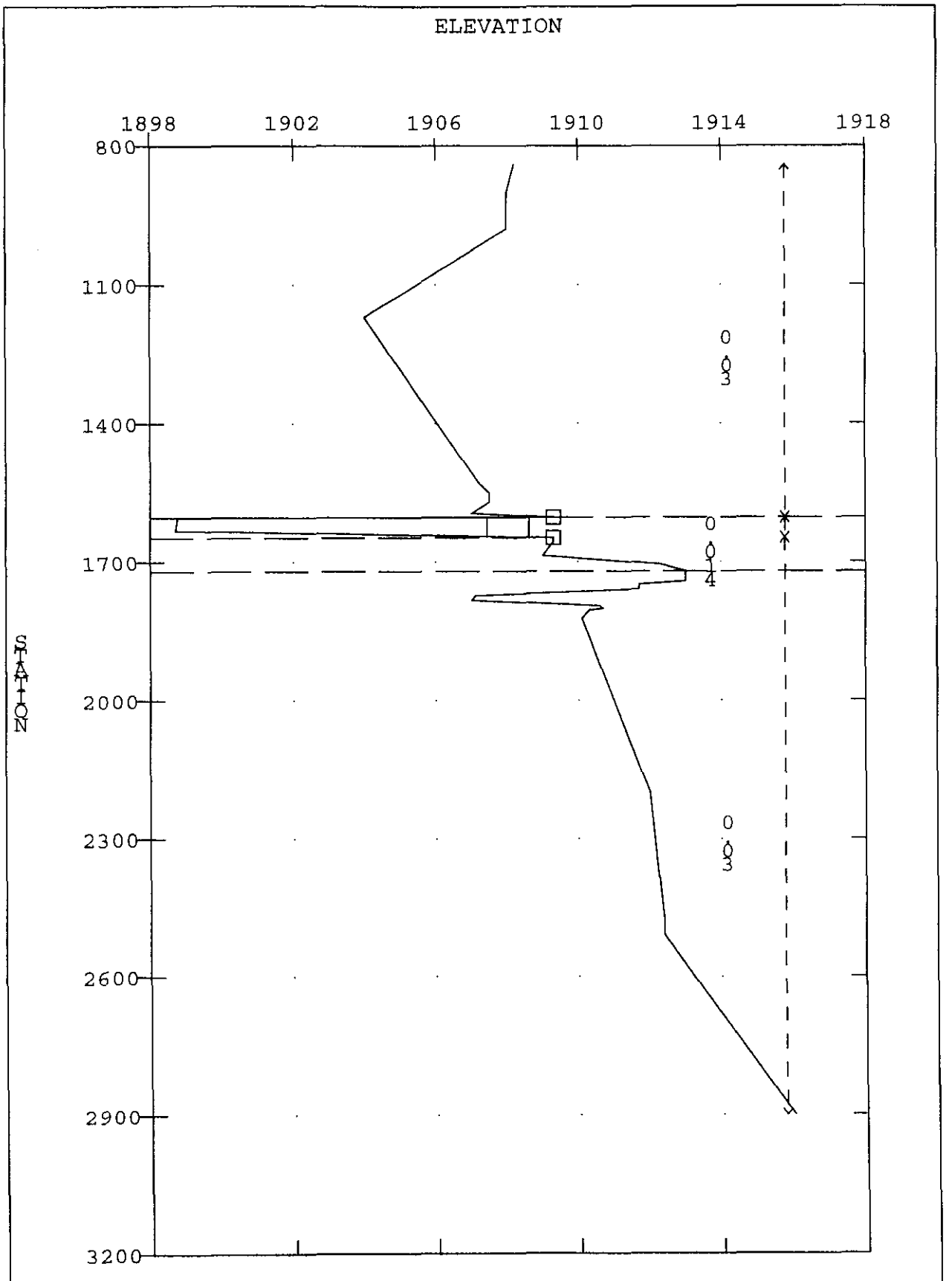
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LNLV WASH W/O DIVERSION



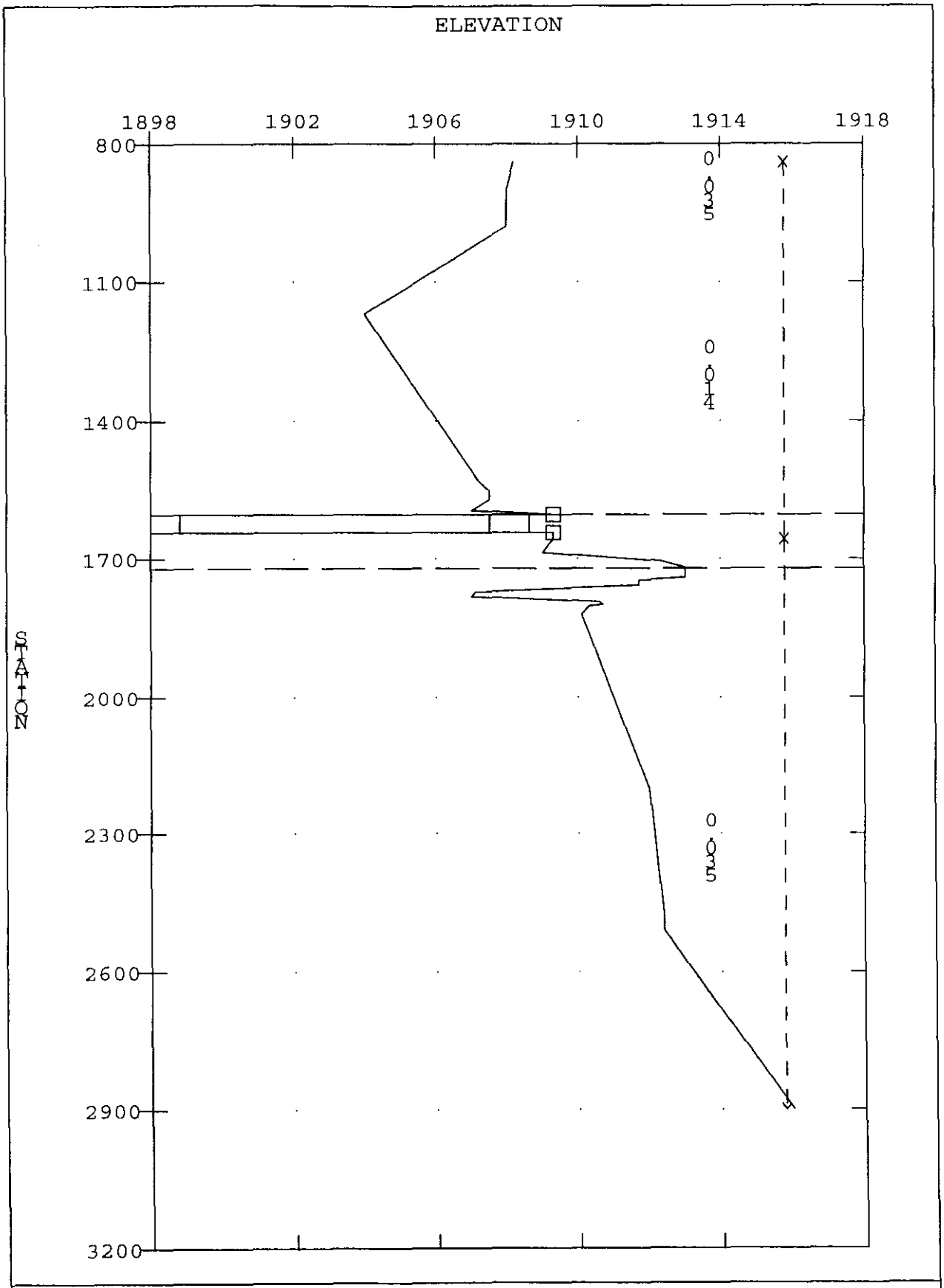
SECTION : 4020

LNLV WASH W/O DIVERSION



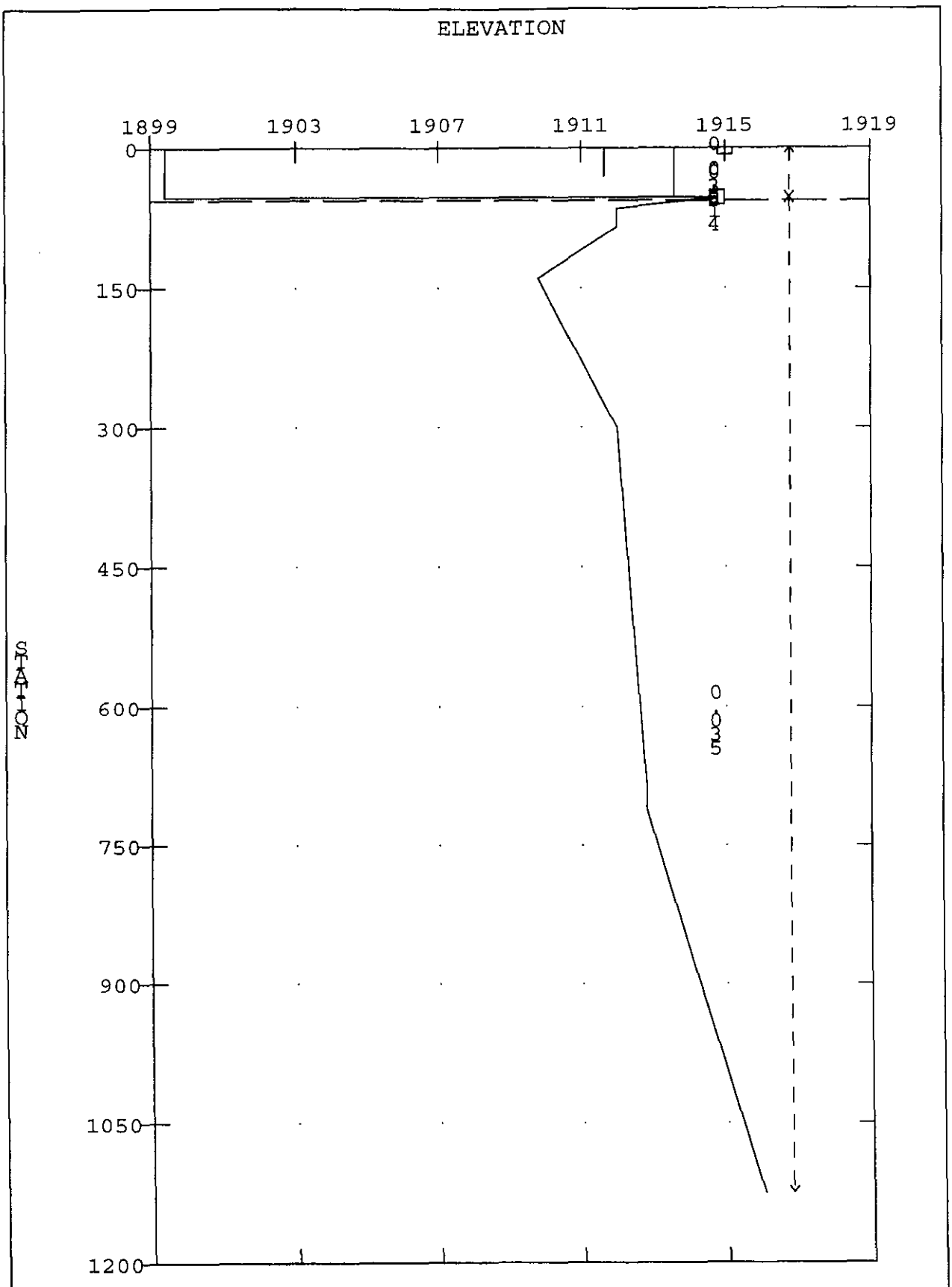
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LNLV WASH W/O DIVERSION



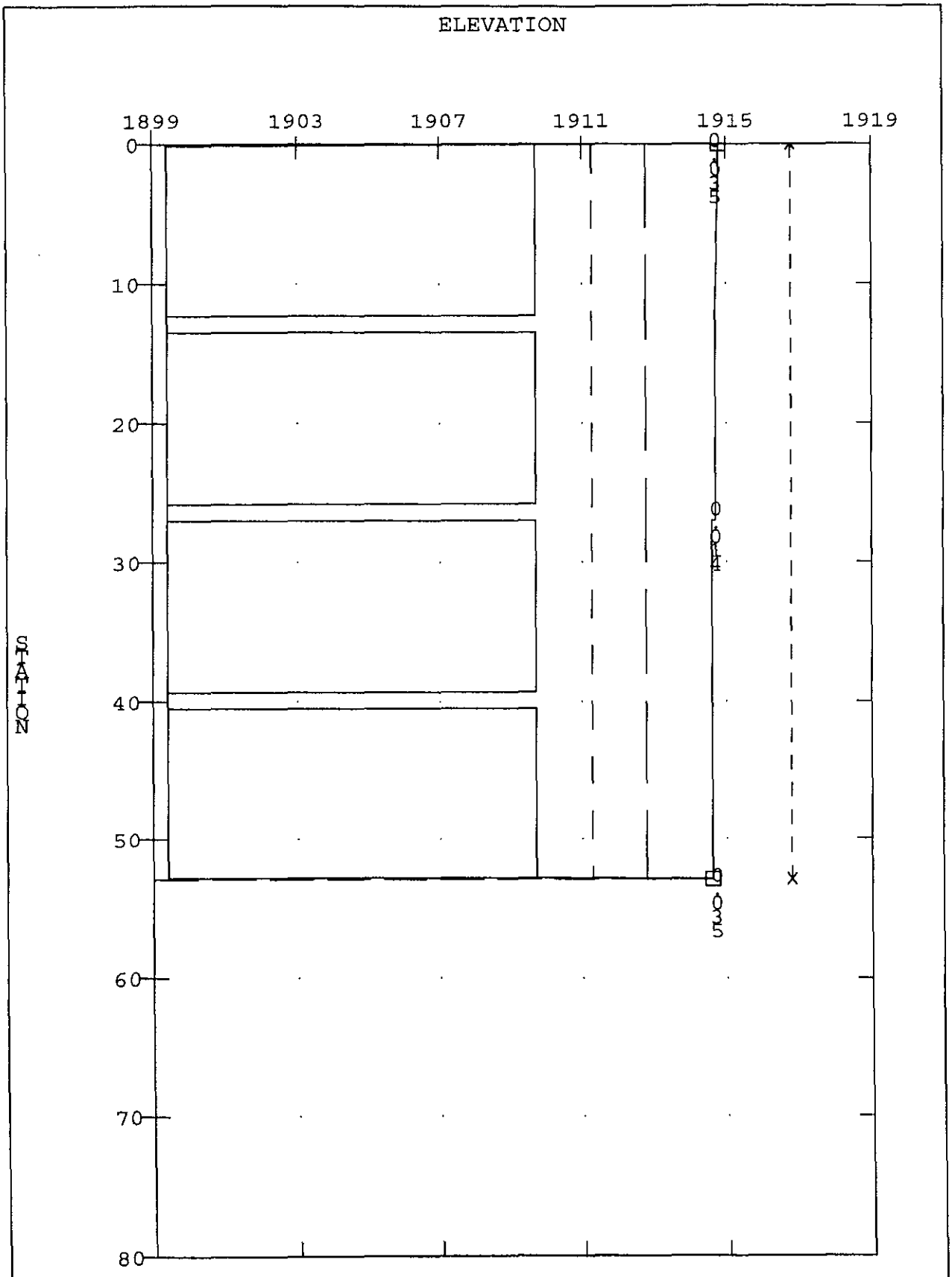
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LNLV WASH W/O DIVERSION



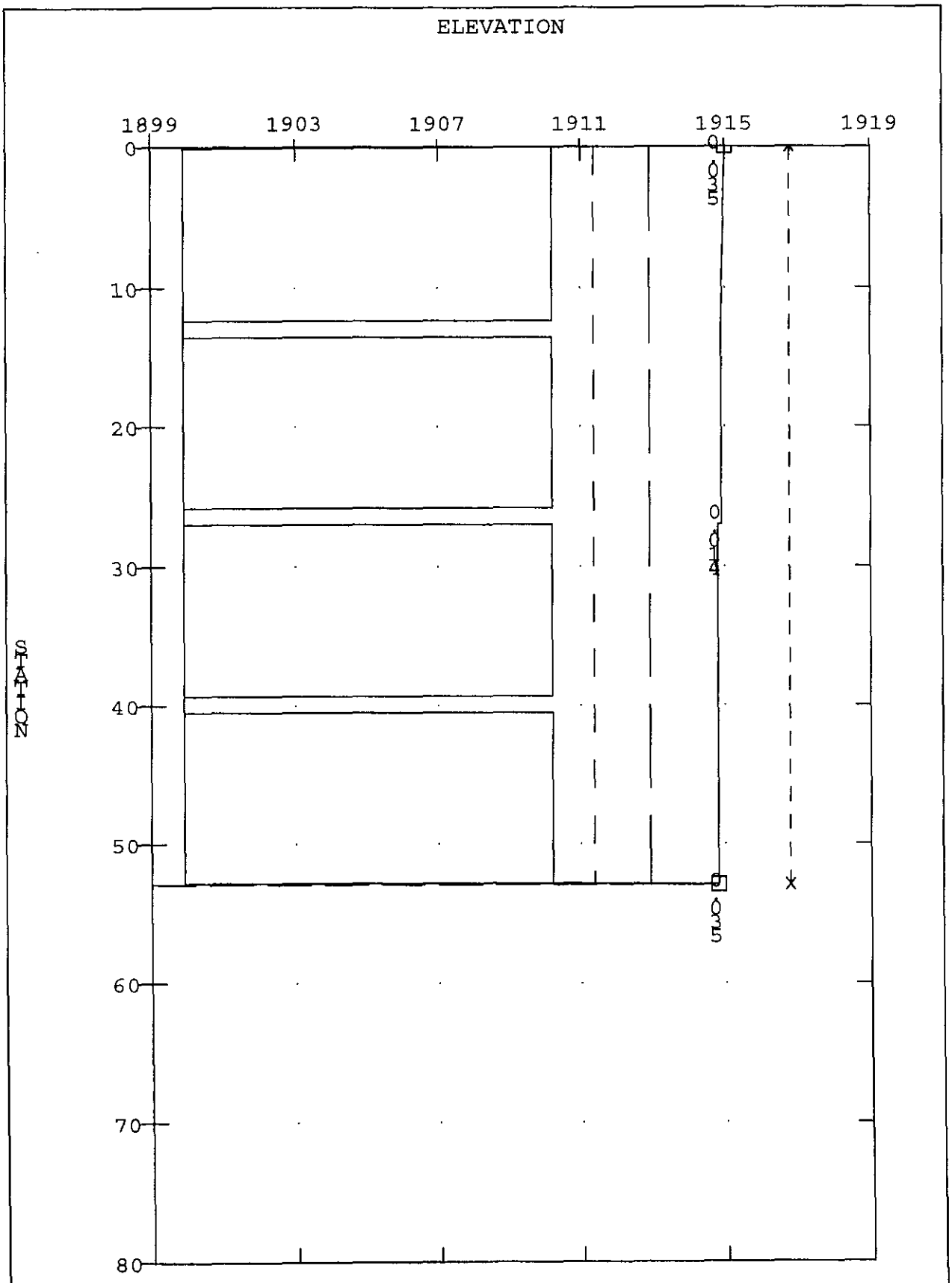
SECTION : 4188

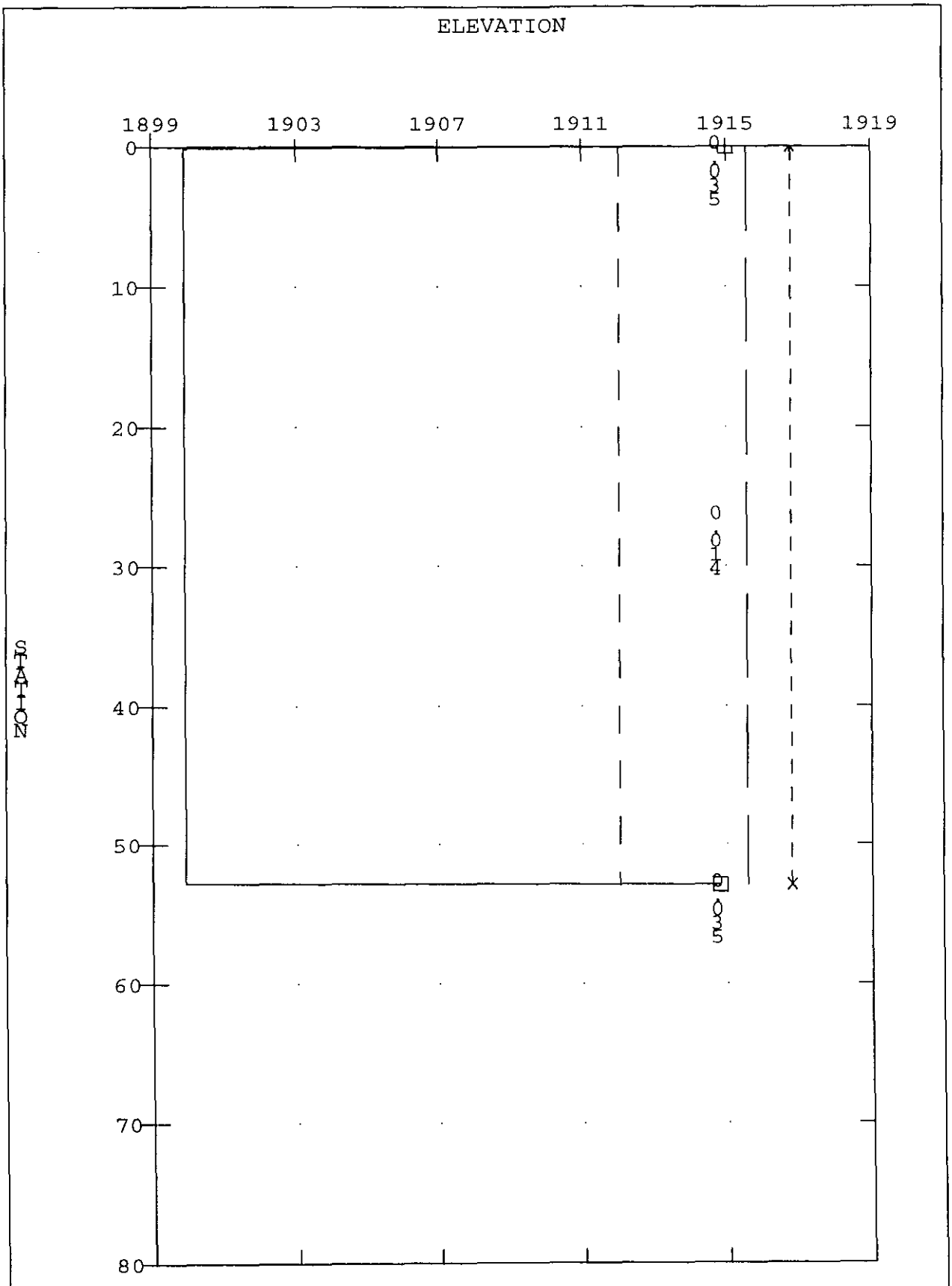
LNLV WASH W/O DIVERSION



SECTION : 4189

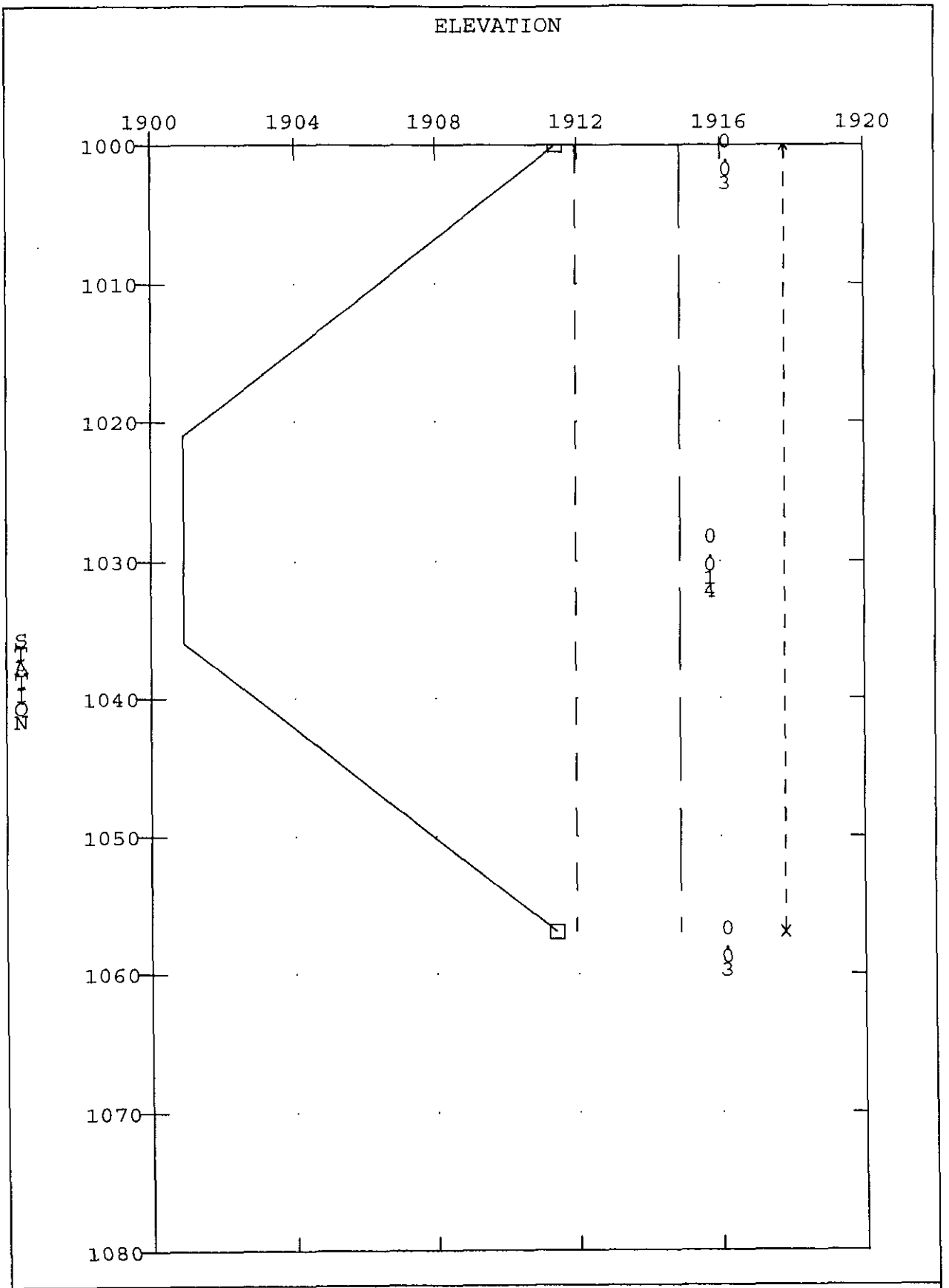
LNLV WASH W/O DIVERSION


ELEVATION
1899
1903
1907
1911
1915
1919
0
10
20
30
40
50
60
70
80
STATION
SECTION : 4246
LNLV WASH W/O DIVERSION



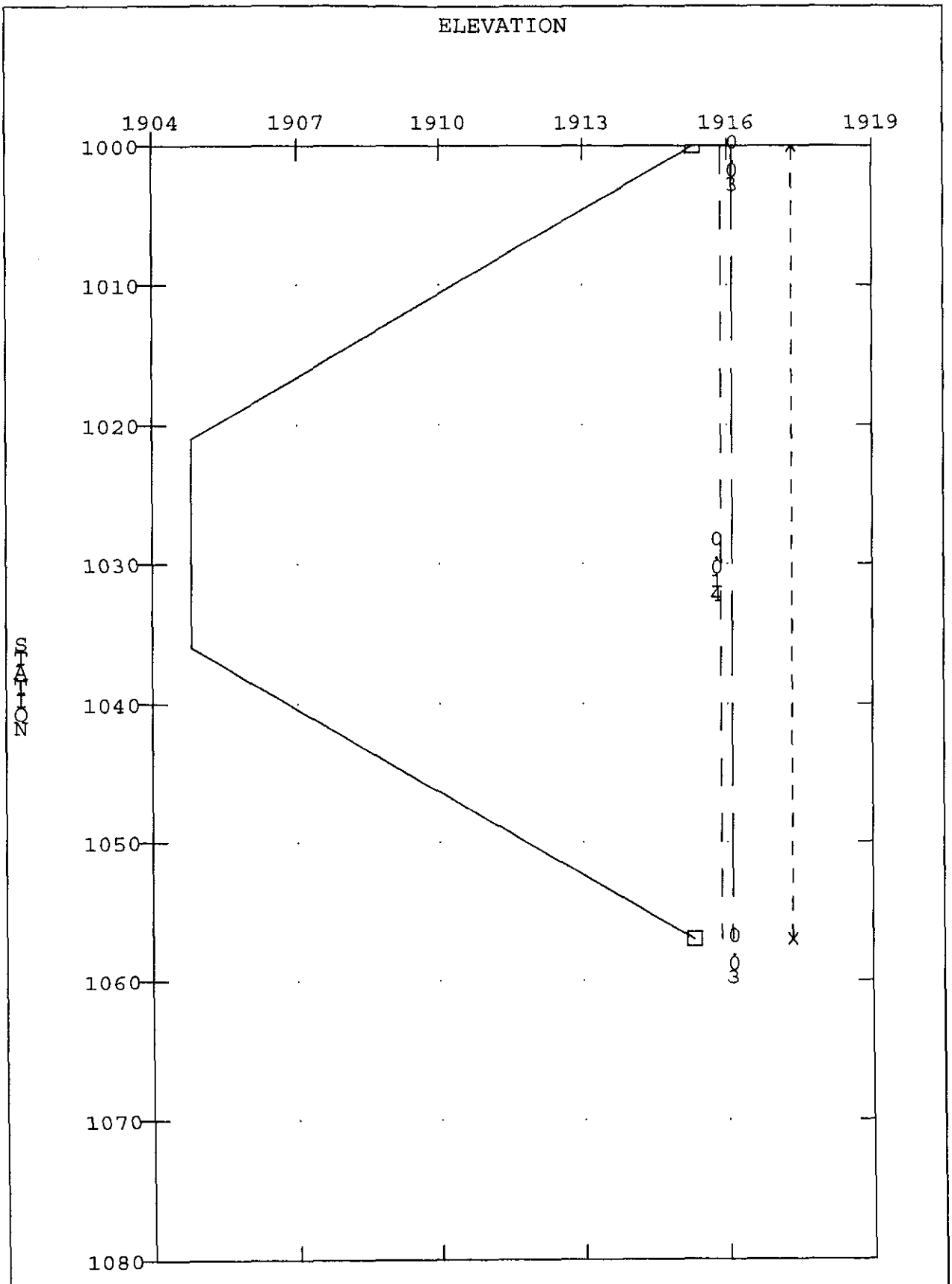
SECTION : 4247

LNLV WASH W/O DIVERSION



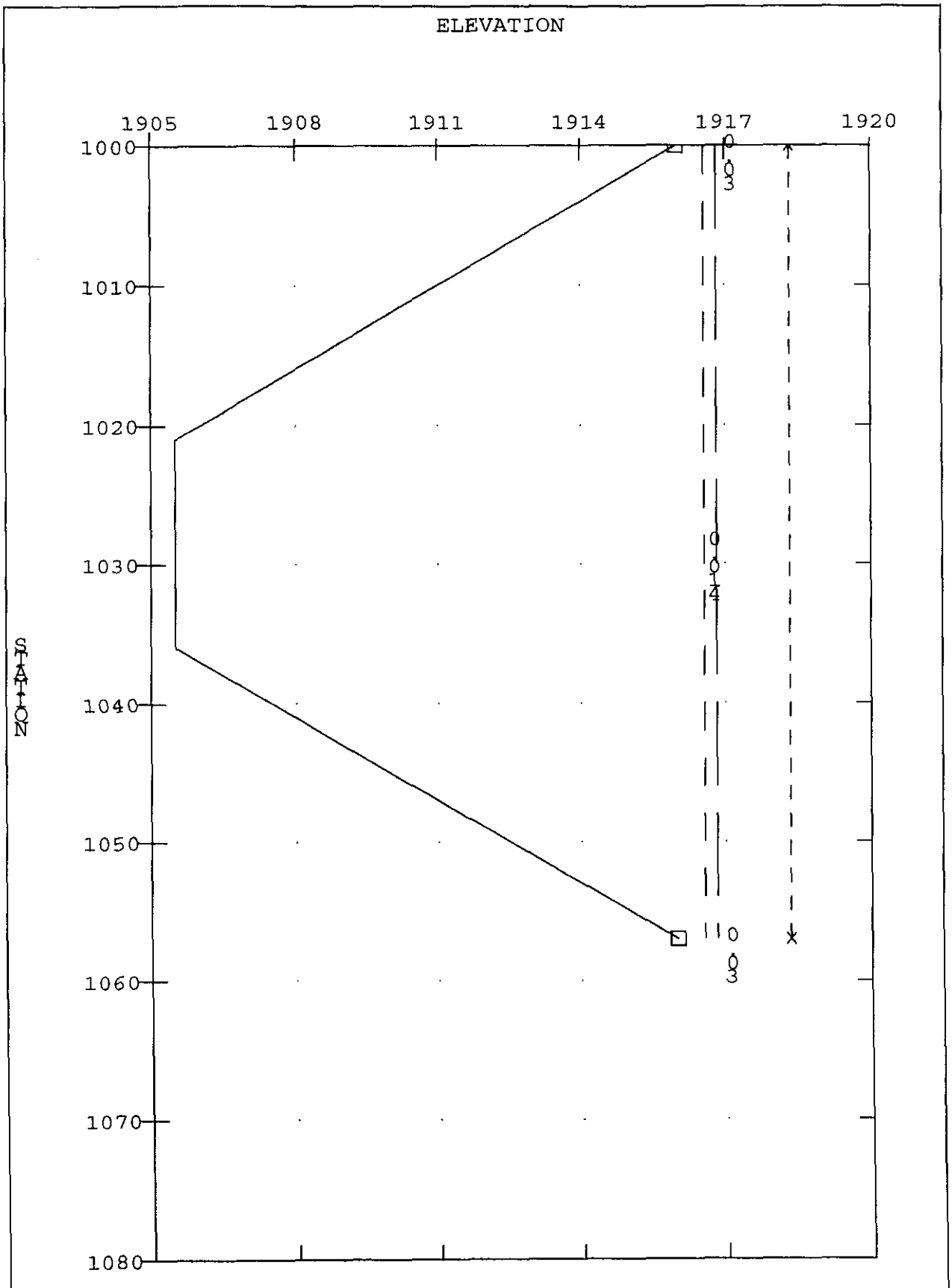
SECTION : 4360

LNLV WASH W/O DIVERSION



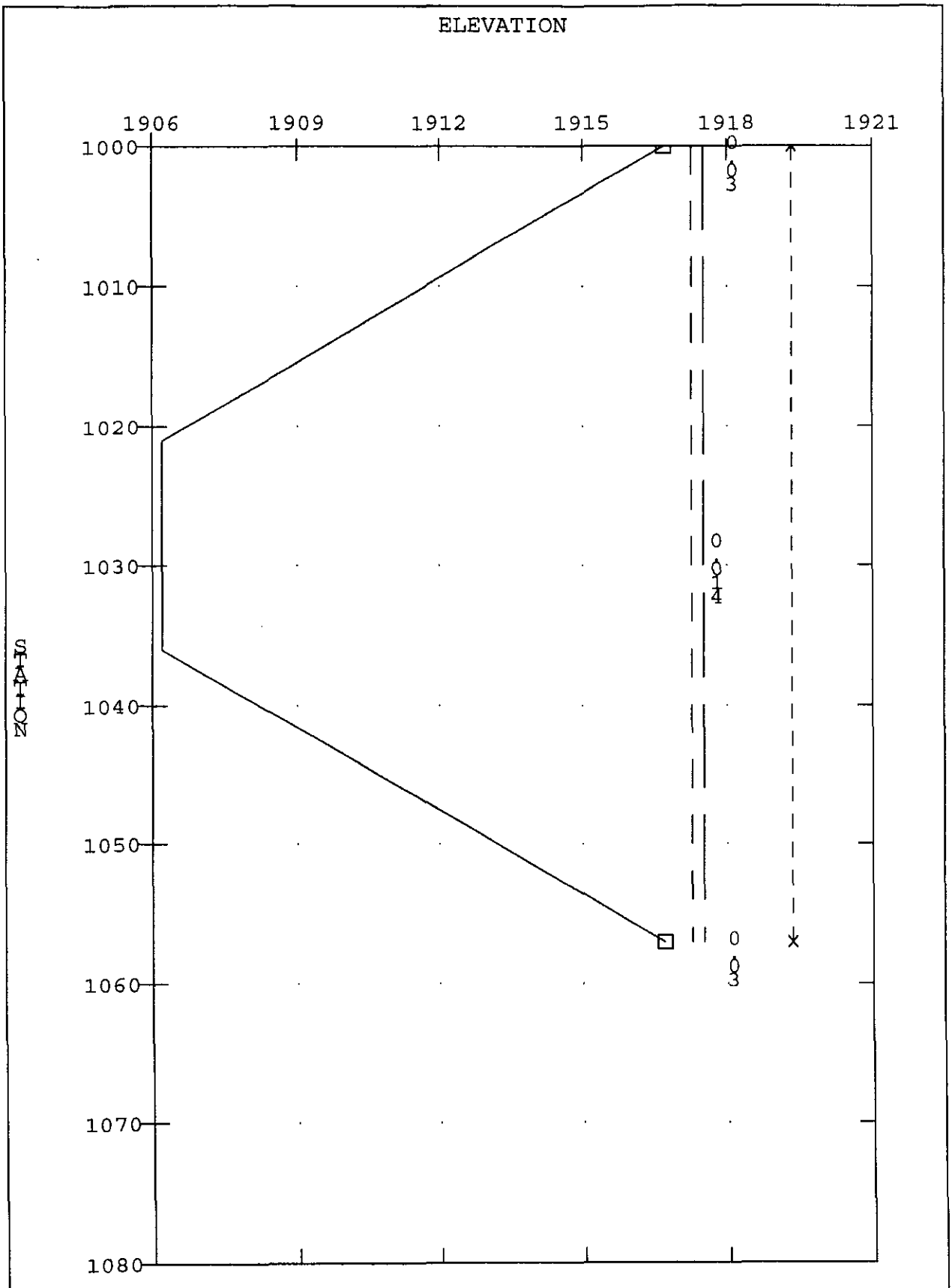
SECTION : 4831

LNLV WASH W/O DIVERSION



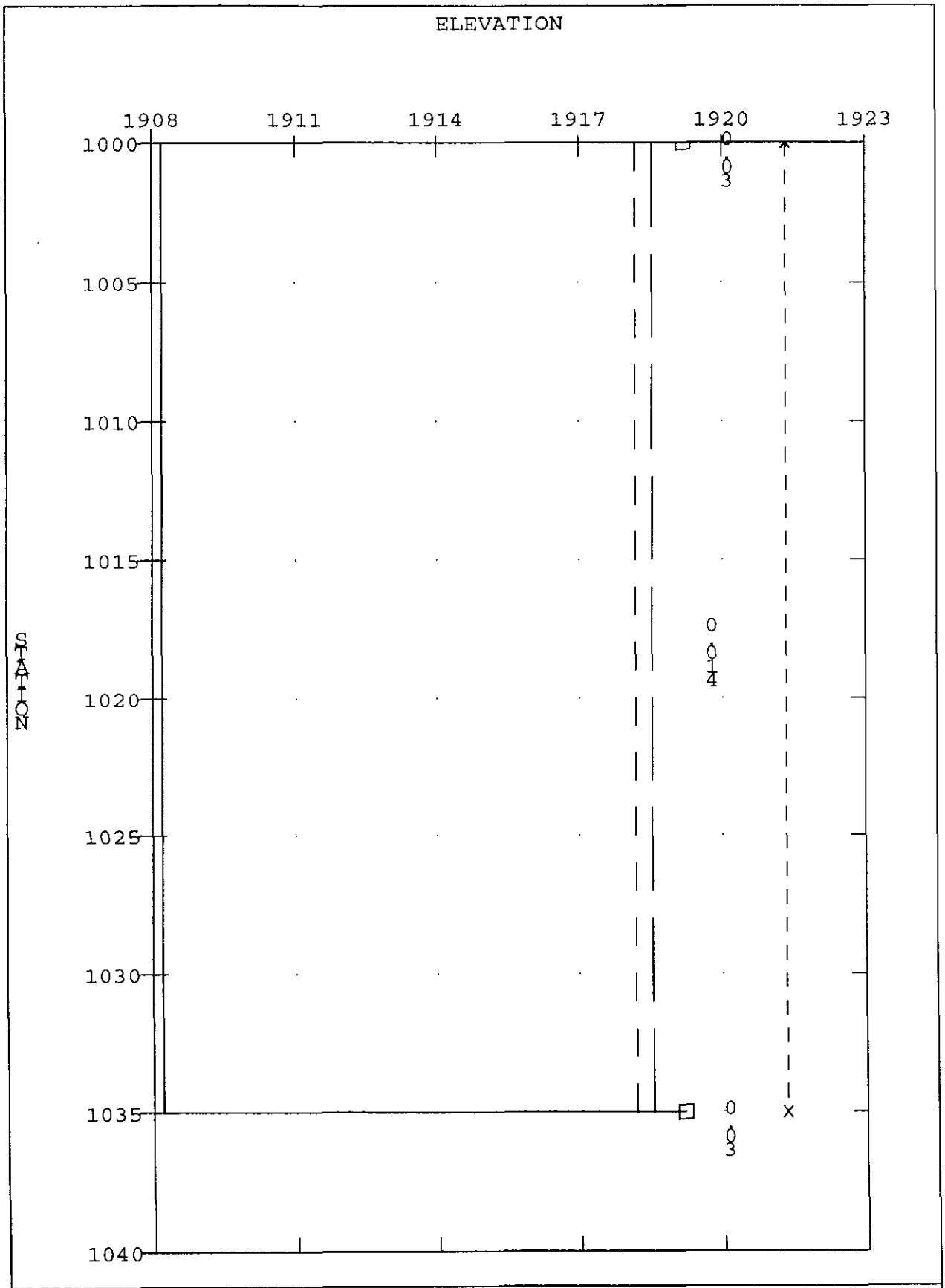
SECTION : 4920

LNLV WASH W/O DIVERSION



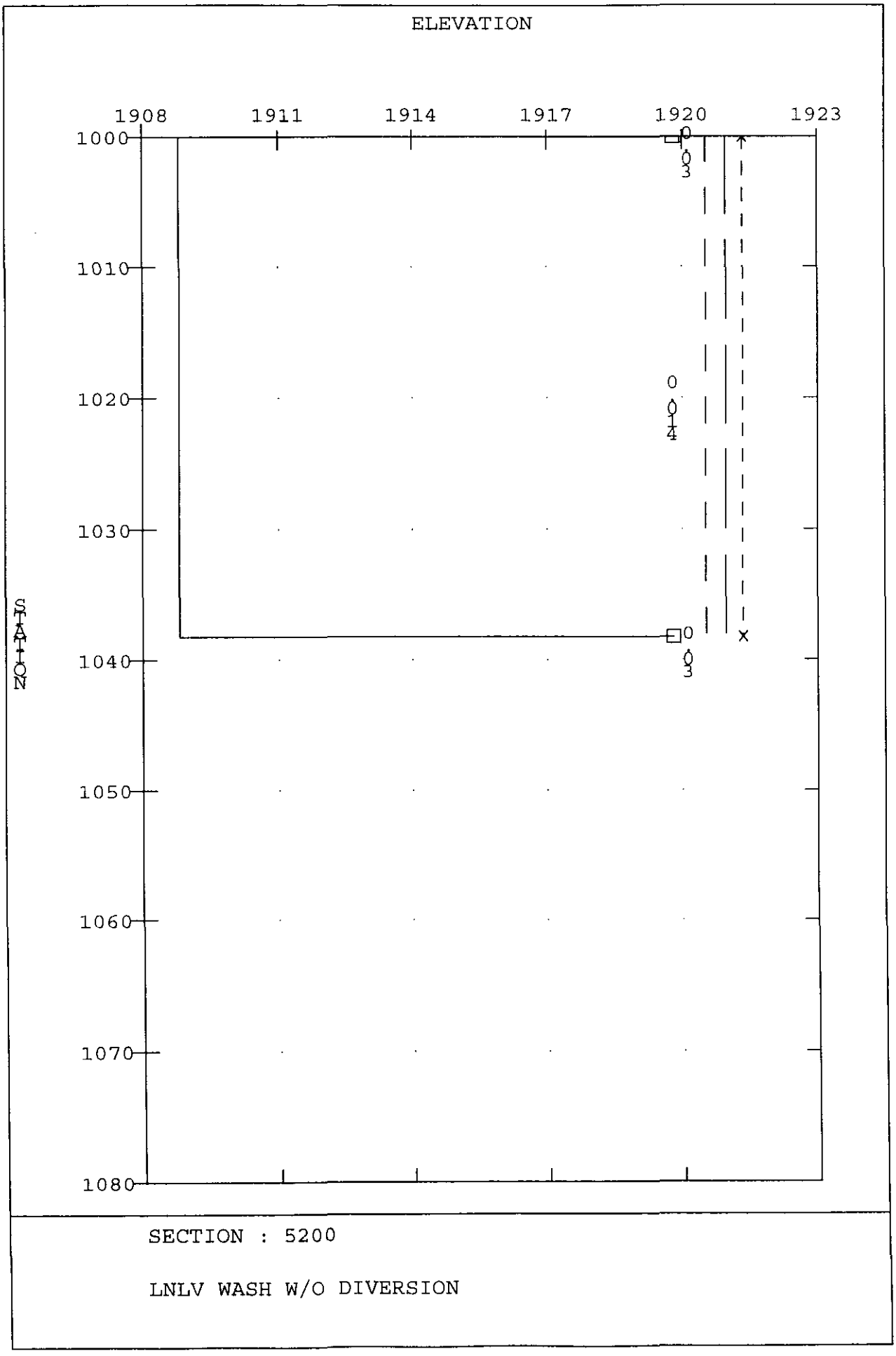
SECTION : 5005

LNLV WASH W/O DIVERSION



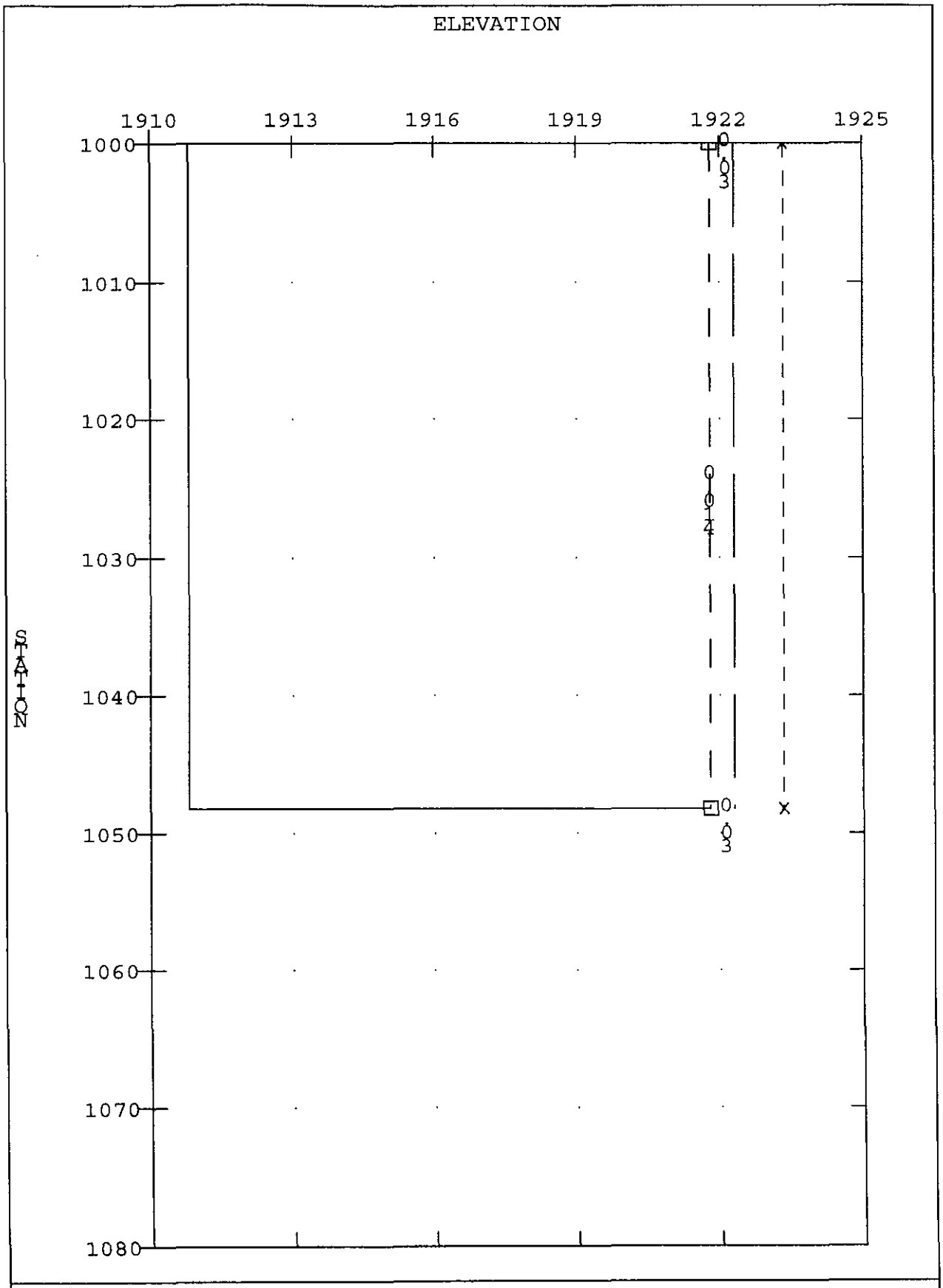
SECTION : 5105

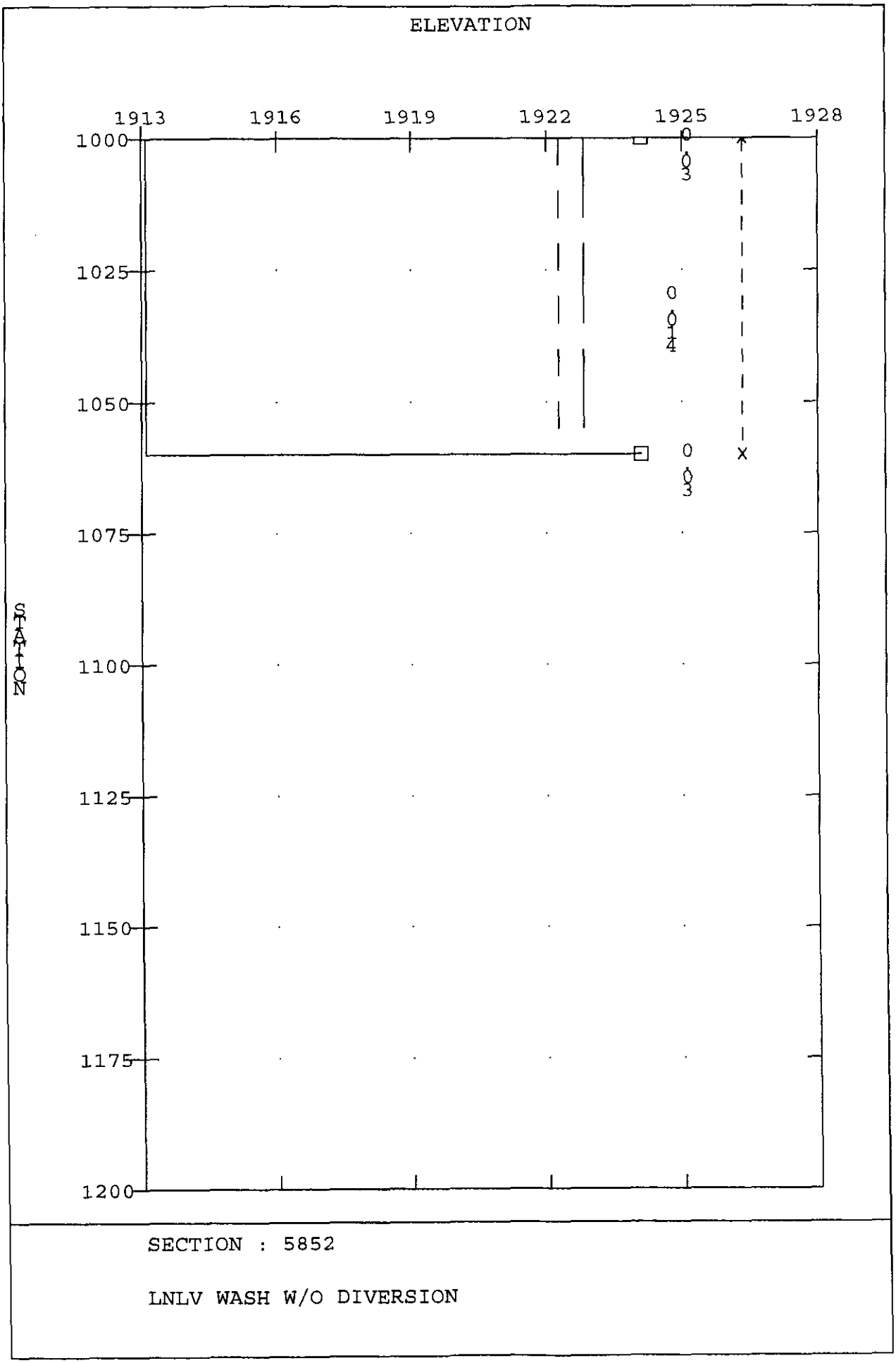
LNLV WASH W/O DIVERSION



SECTION : 5200

LNLV WASH W/O DIVERSION

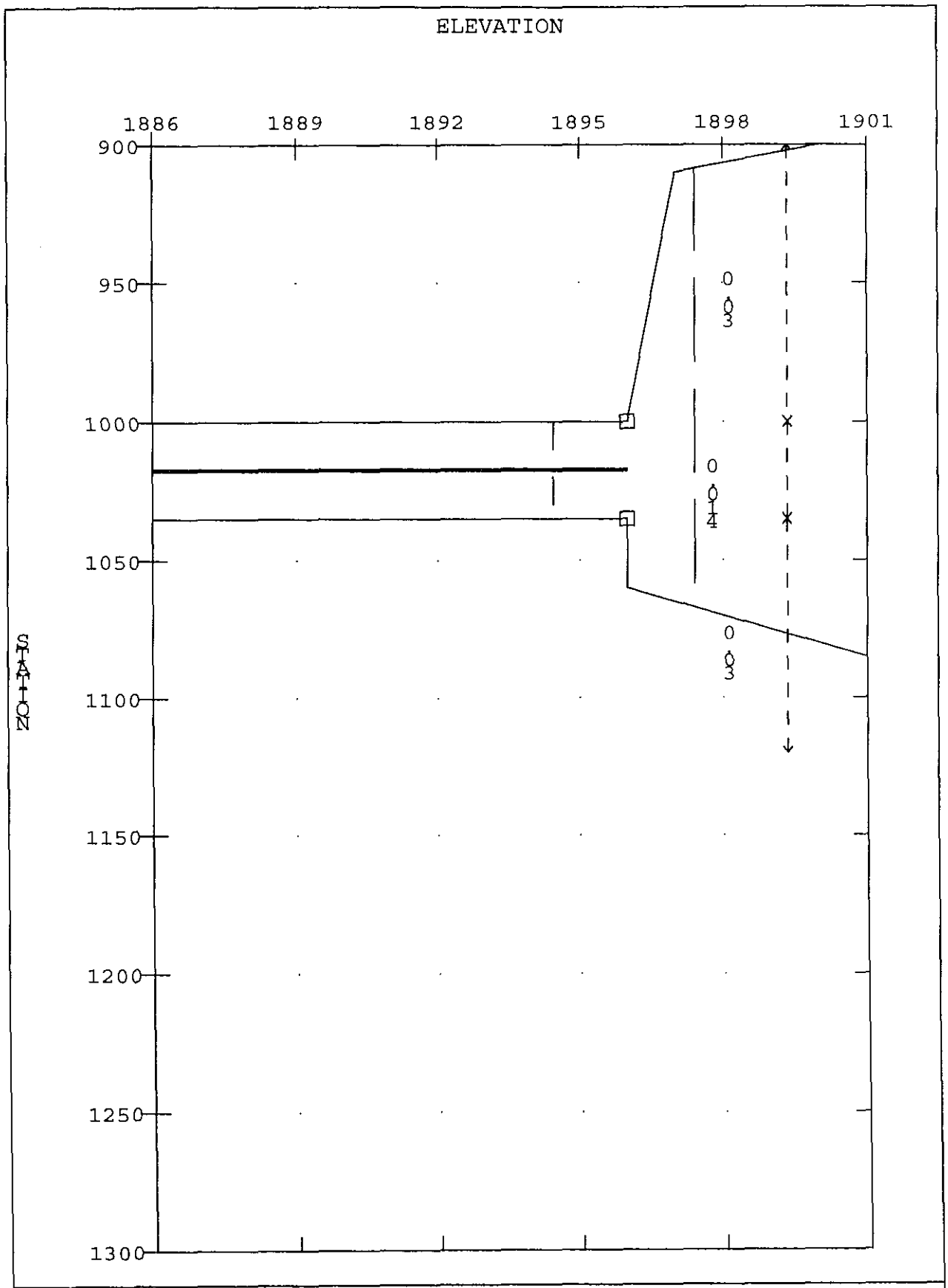

ELEVATION
1910
1913
1916
1919
1922
1925
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 5500
LNLV WASH W/O DIVERSION



SECTION : 5852

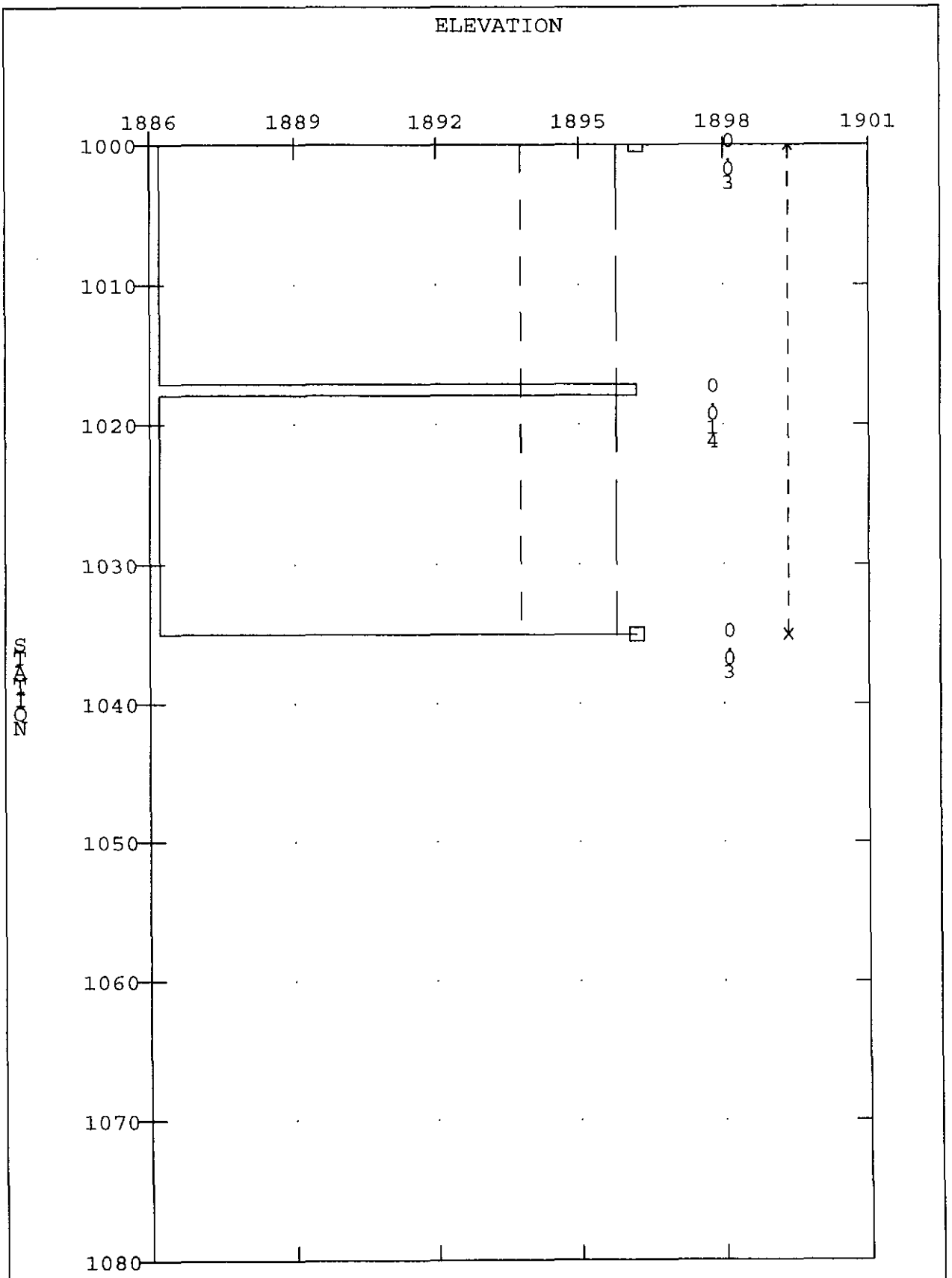
LNLV WASH W/O DIVERSION

Cross Section Plots
KGSCWO2



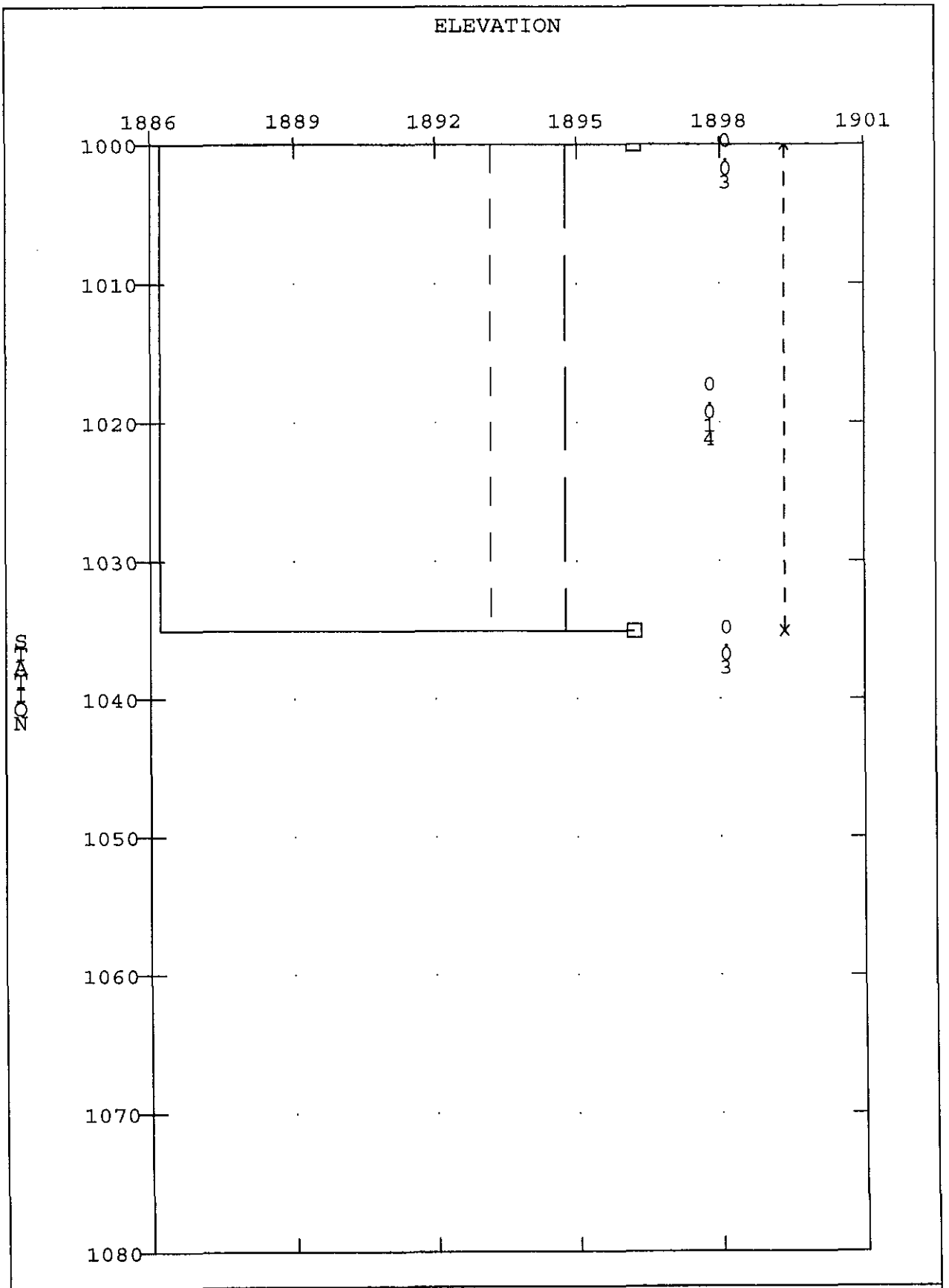
SECTION : 150

LNLV WASH W/O DIVERSION



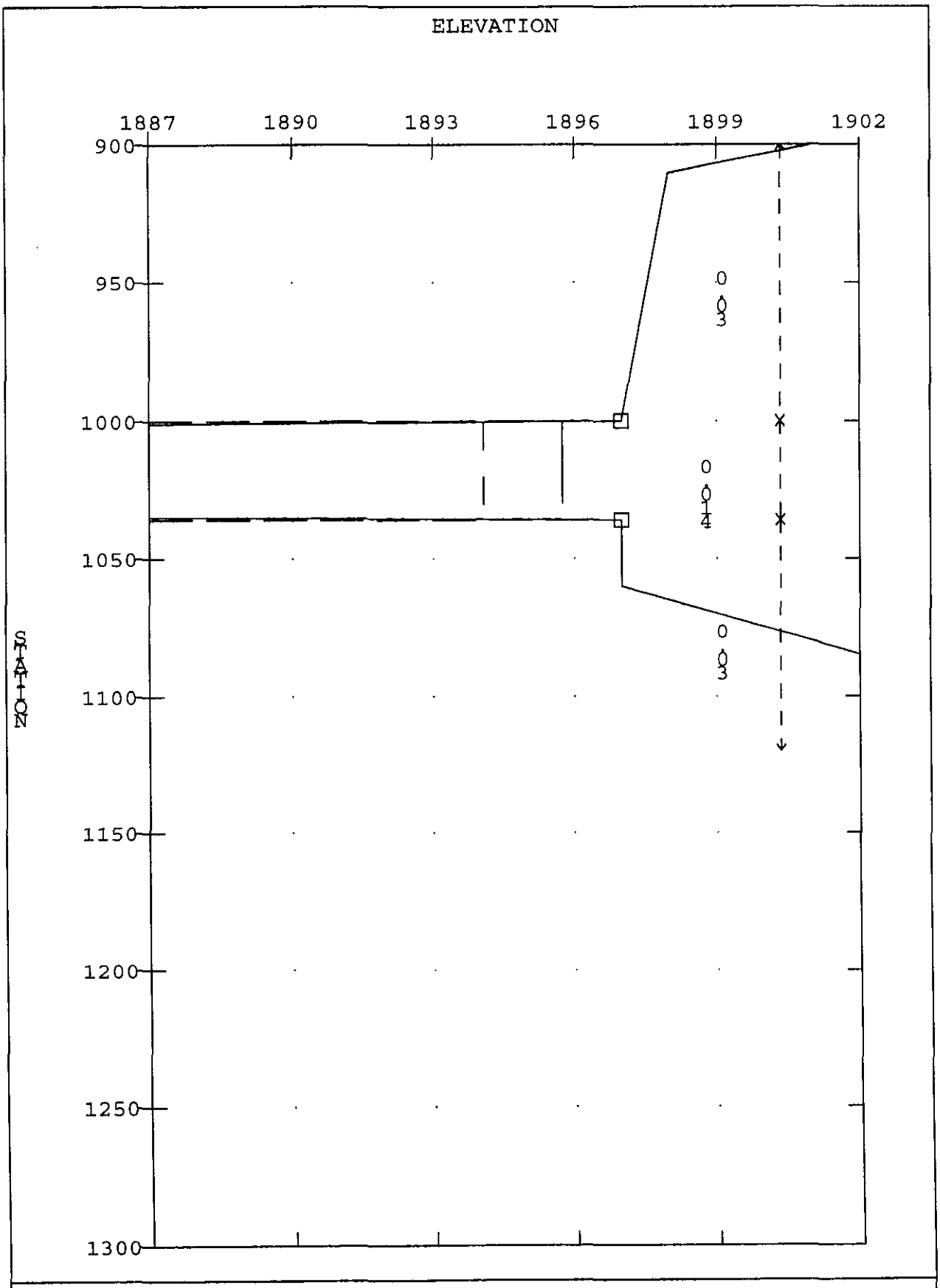
SECTION : 243.6

LNLV WASH W/O DIVERSION



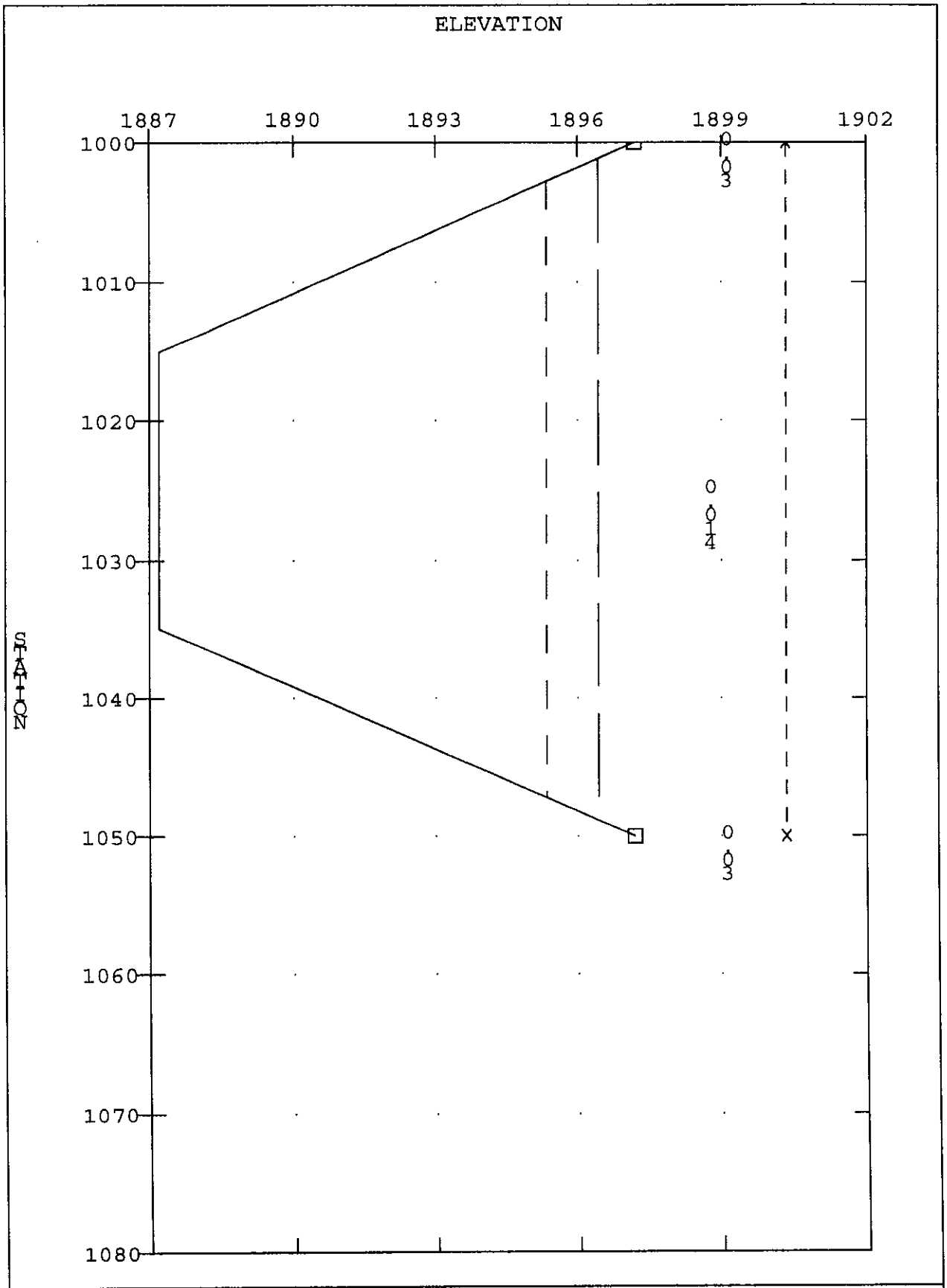
SECTION : 244.6

LNLV WASH W/O DIVERSION



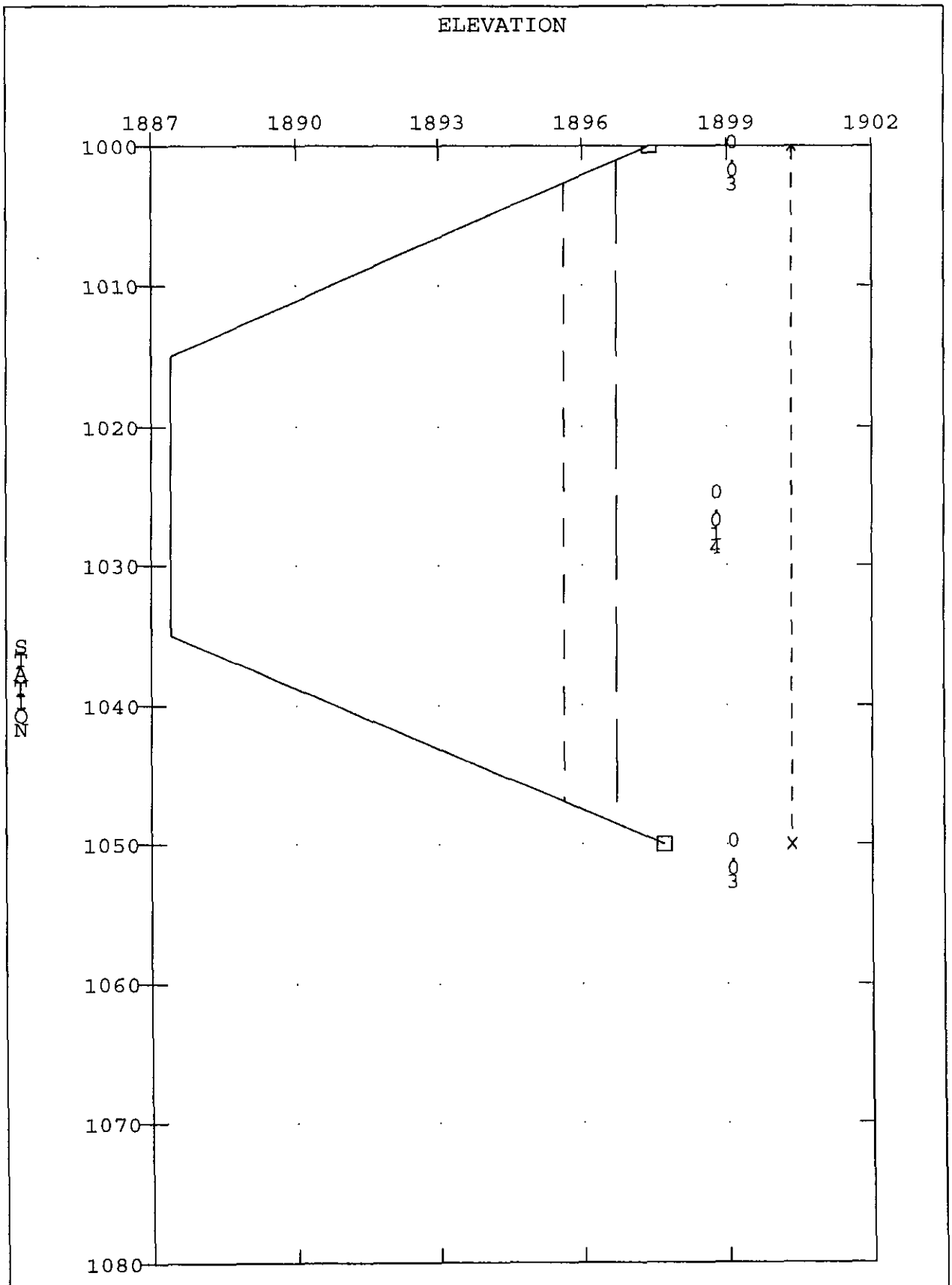
SECTION : 450

LNLV WASH W/O DIVERSION



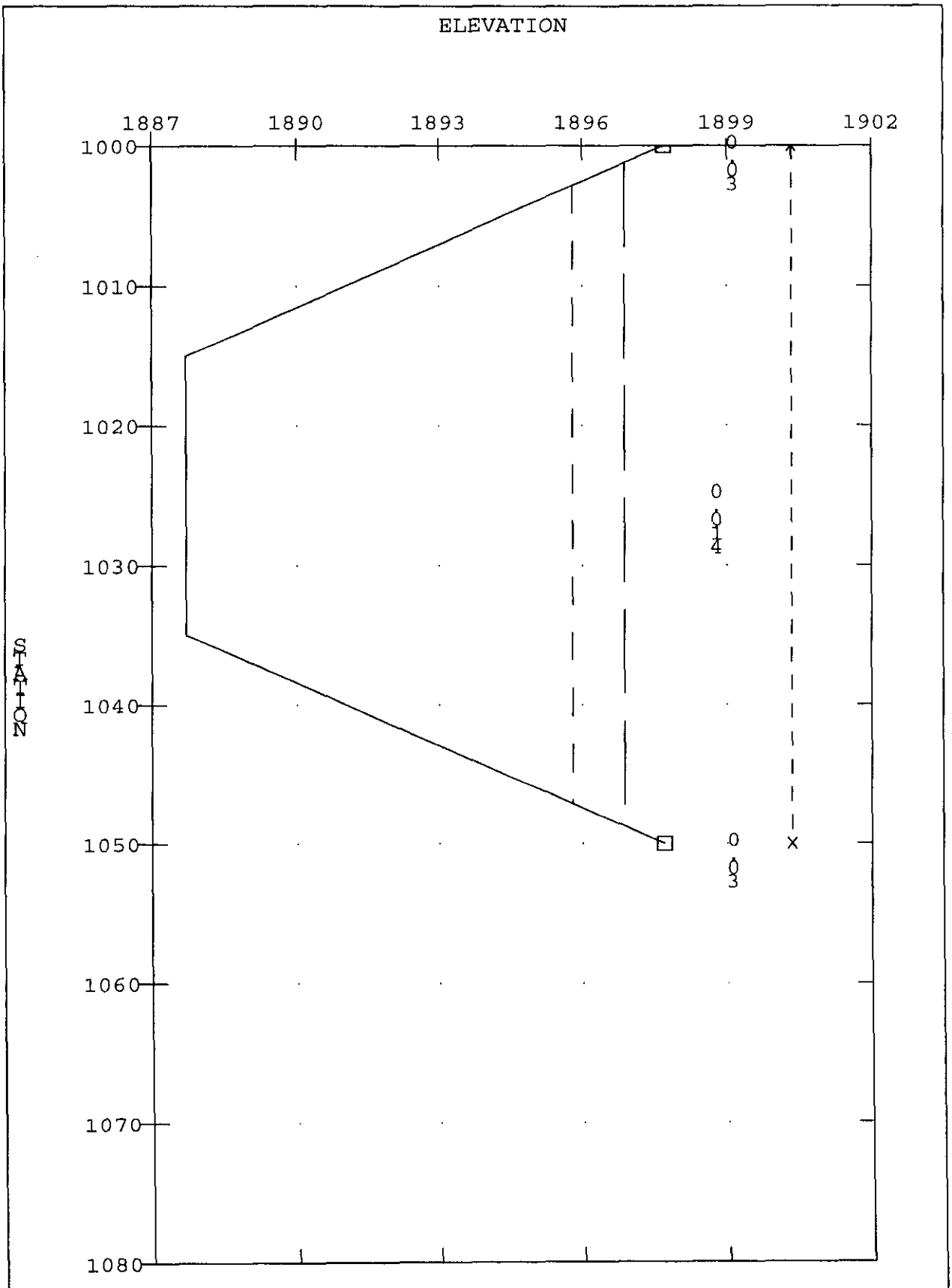
SECTION : 544

LNLV WASH W/O DIVERSION



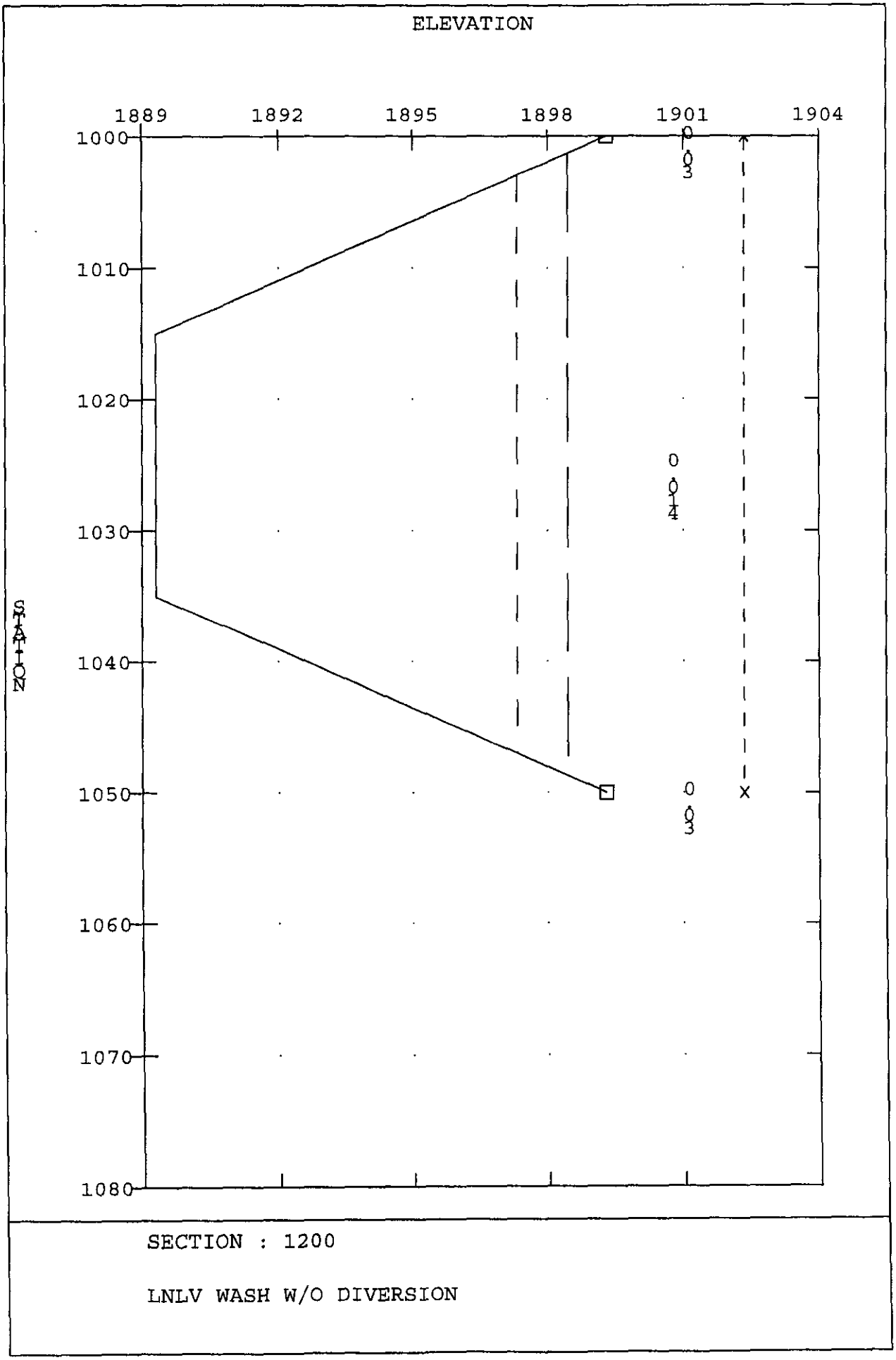
SECTION : 600

LNLV WASH W/O DIVERSION



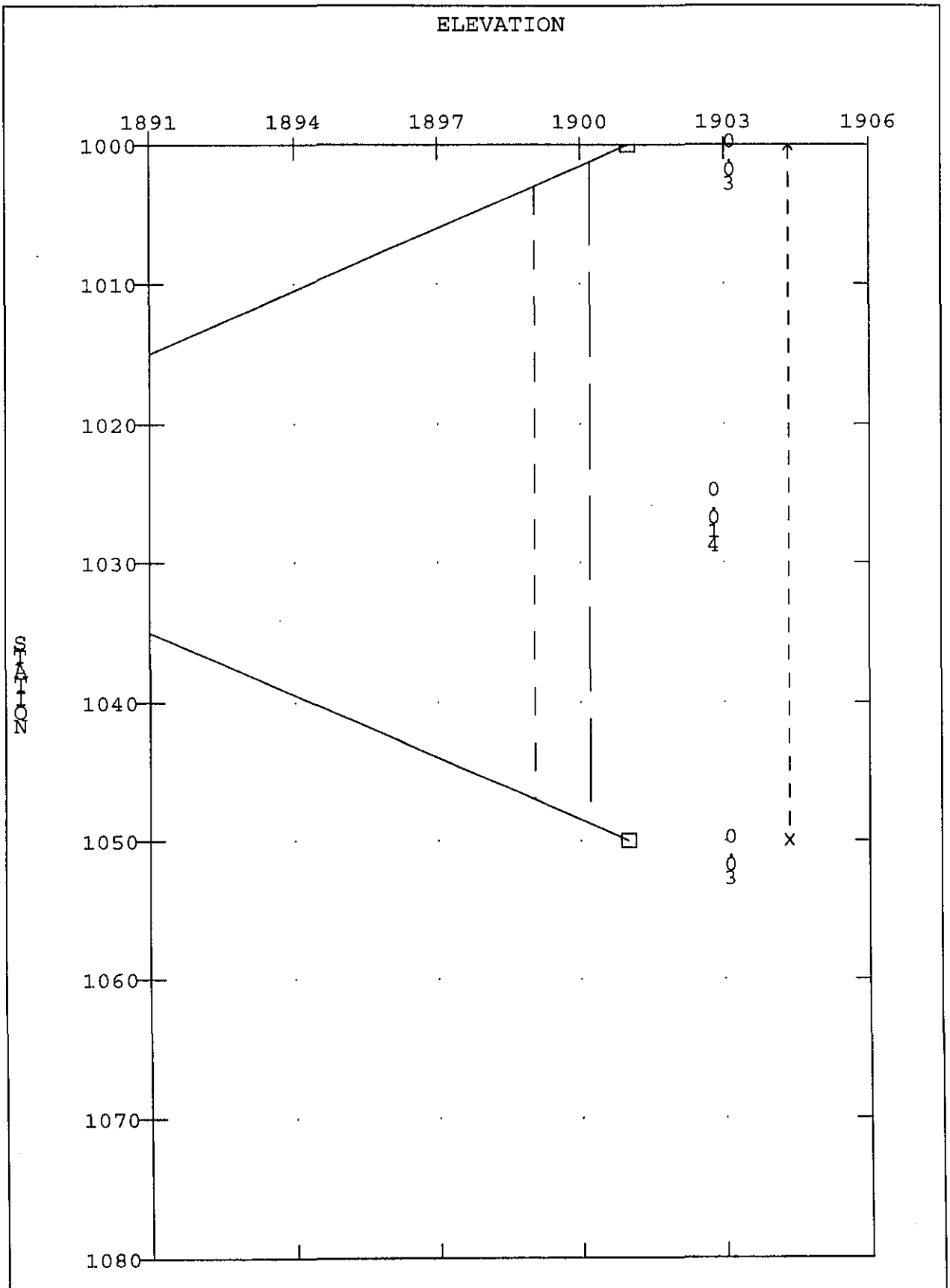
SECTION : 700

LNLV WASH W/O DIVERSION



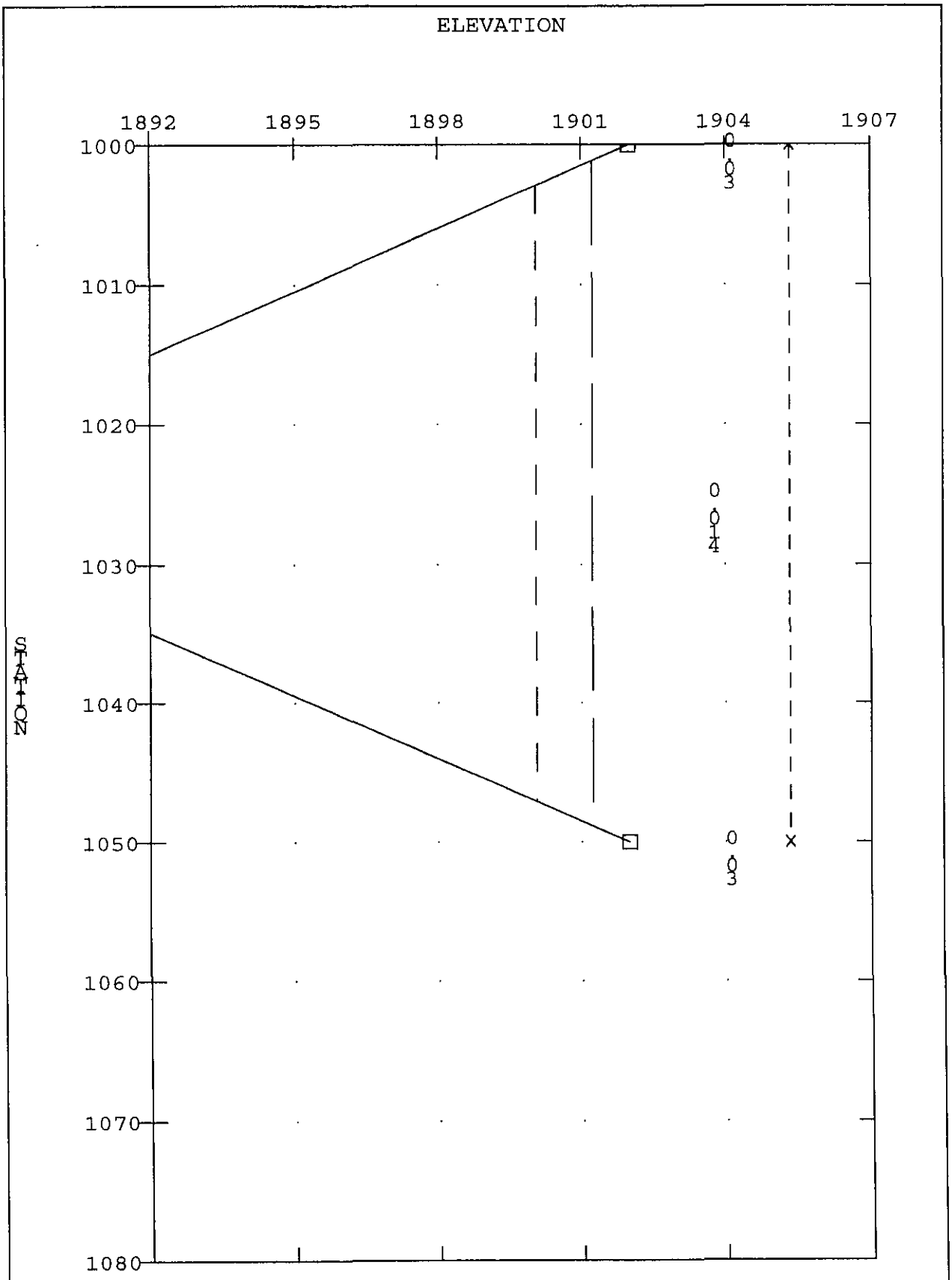
SECTION : 1200

LNLV WASH W/O DIVERSION



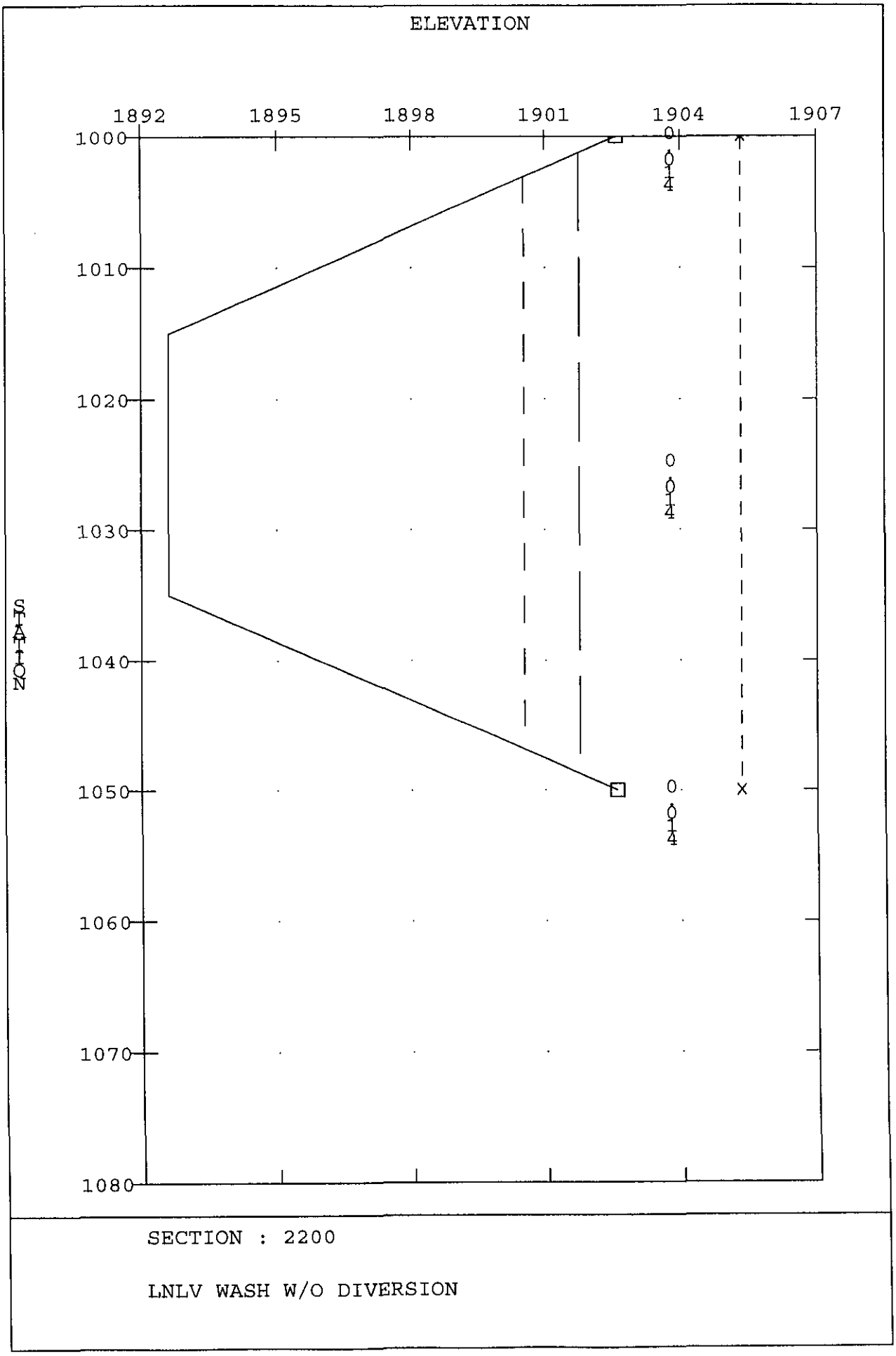
SECTION : 1700

LNLV WASH W/O DIVERSION



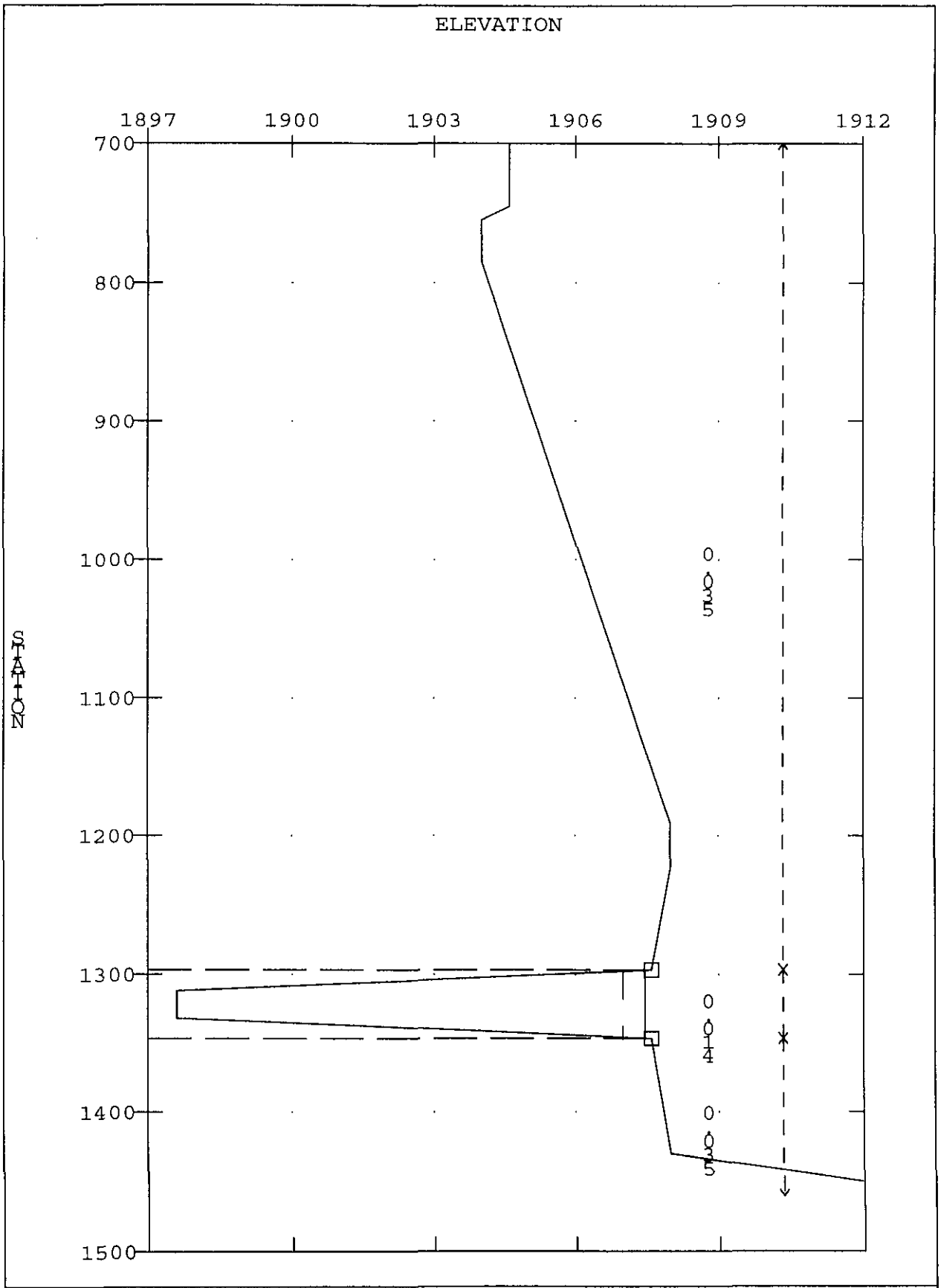
SECTION : 2000

LNLV WASH W/O DIVERSION



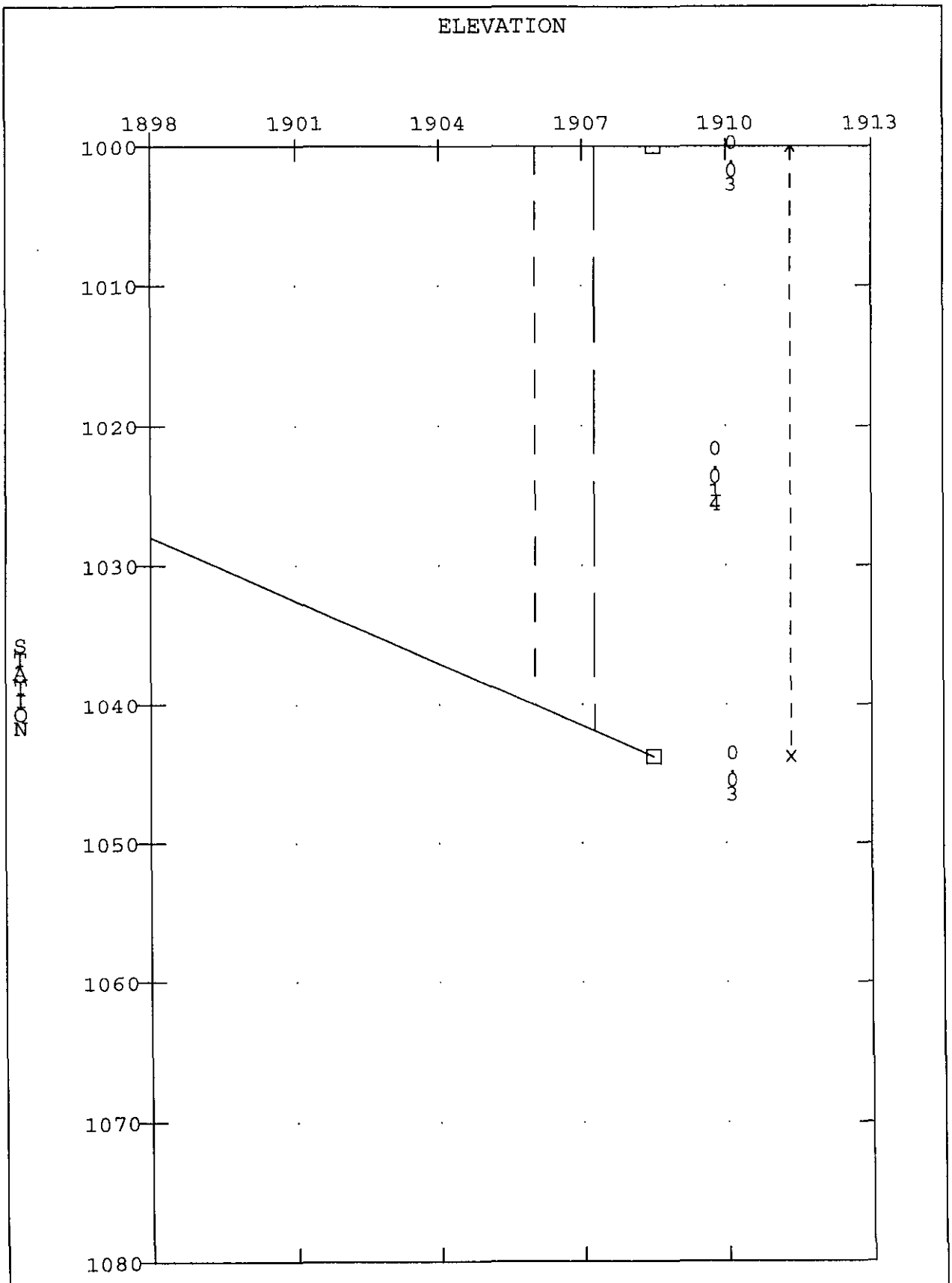
SECTION : 2200

LNLV WASH W/O DIVERSION



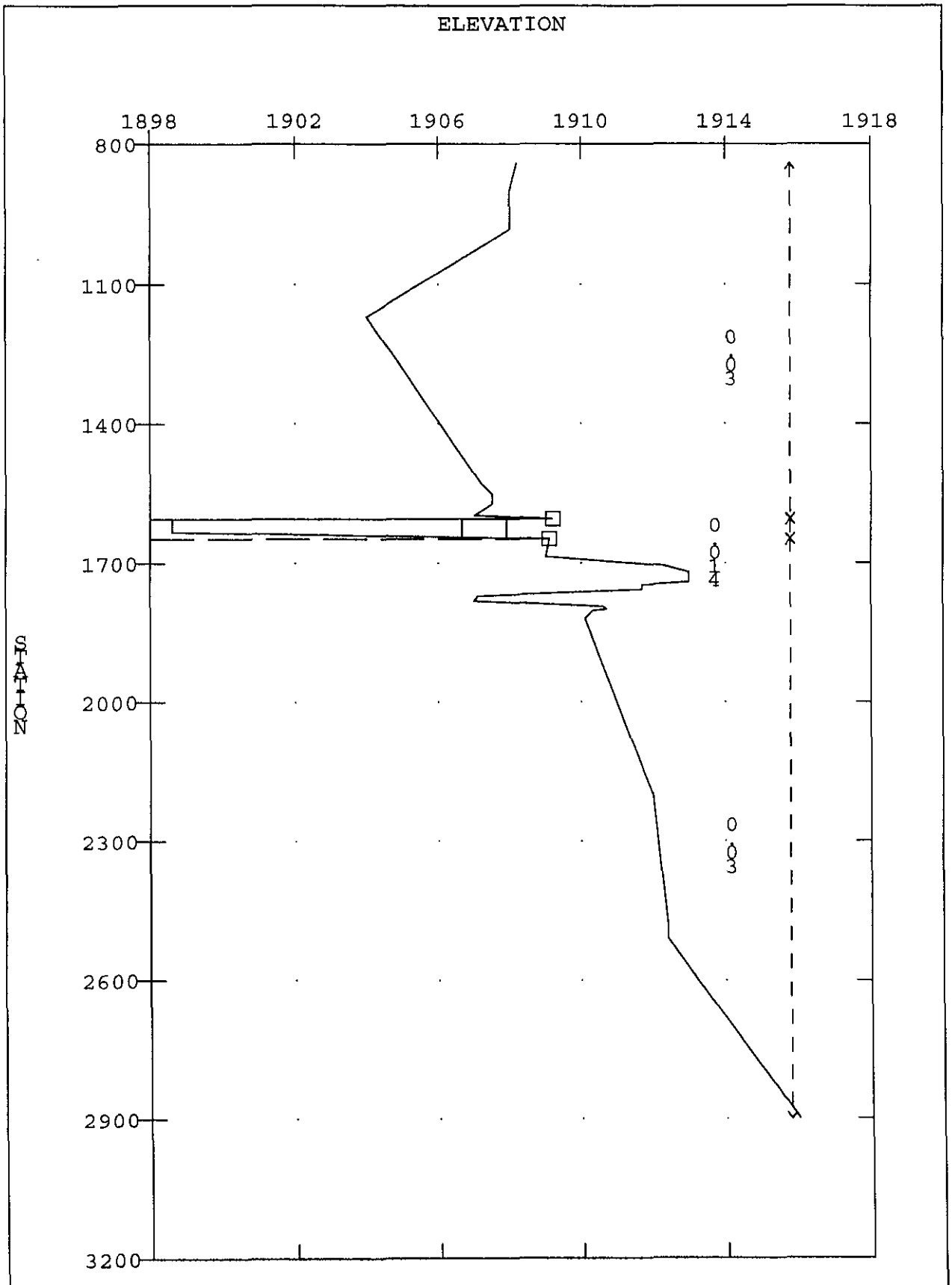
SECTION : 3724

LNLV WASH W/O DIVERSION



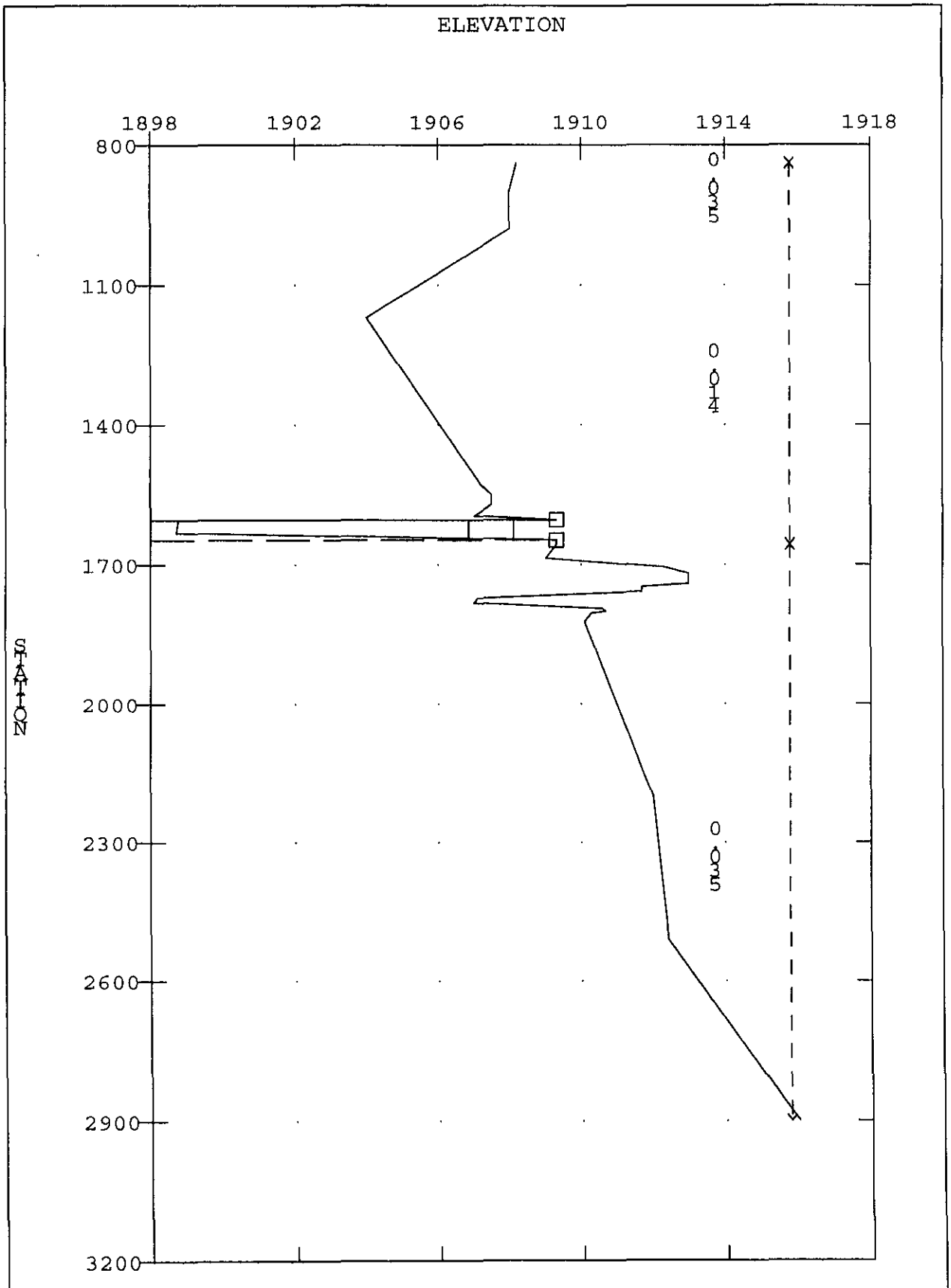
SECTION : 3823

LNLV WASH W/O DIVERSION



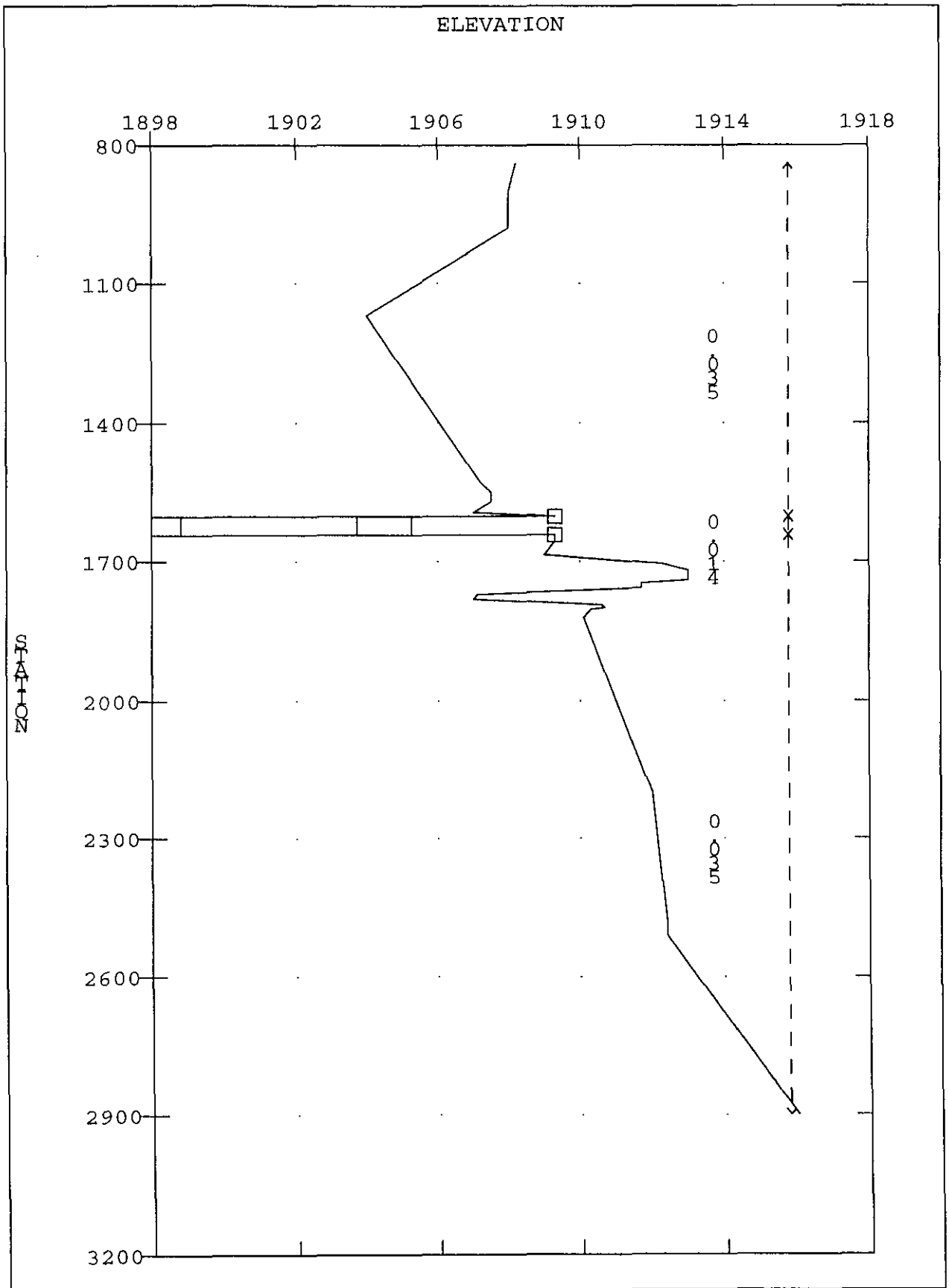
SECTION : 4020

LNLV WASH W/O DIVERSION



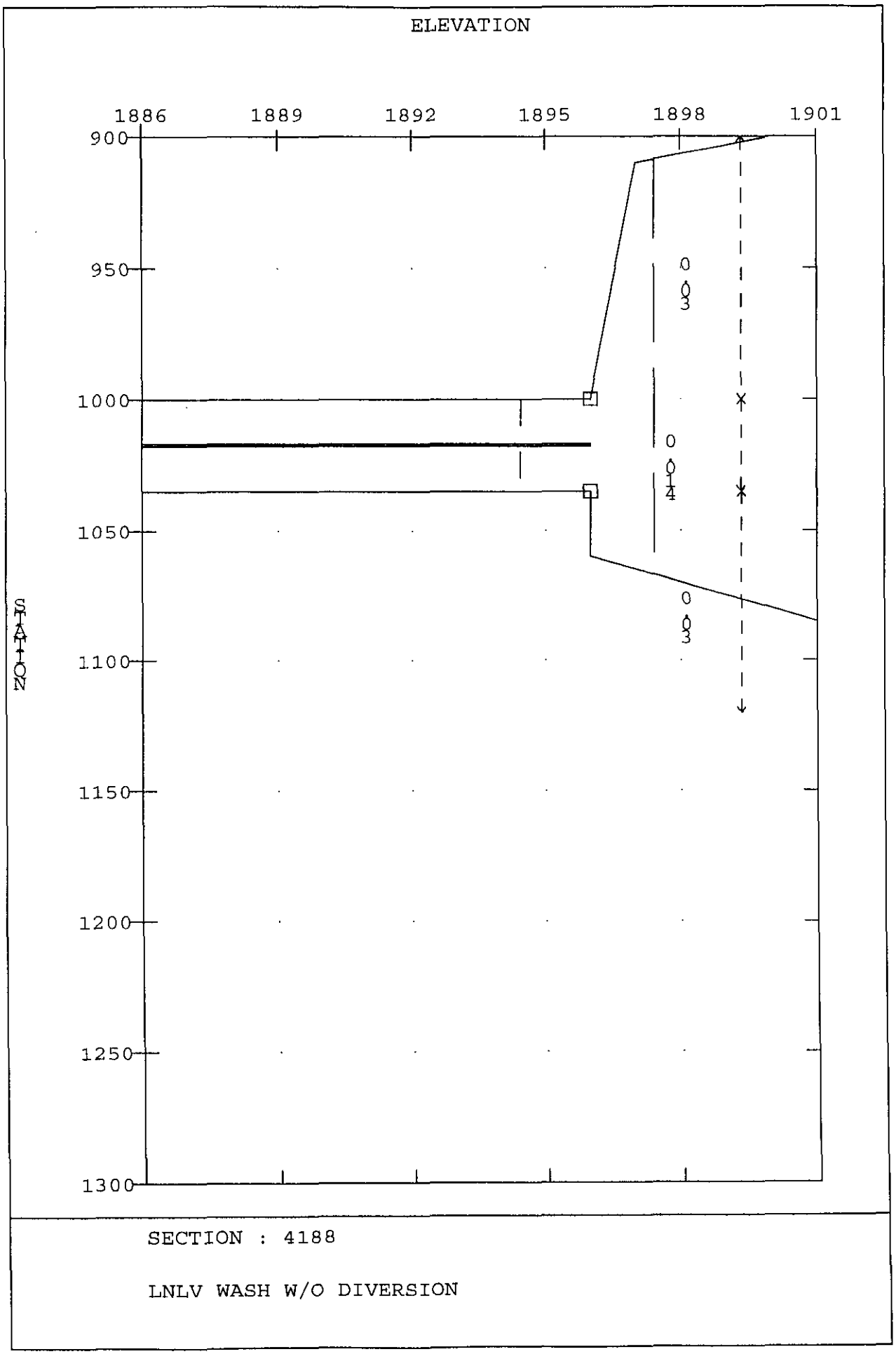
SECTION : 4060

LNLV WASH W/O DIVERSION



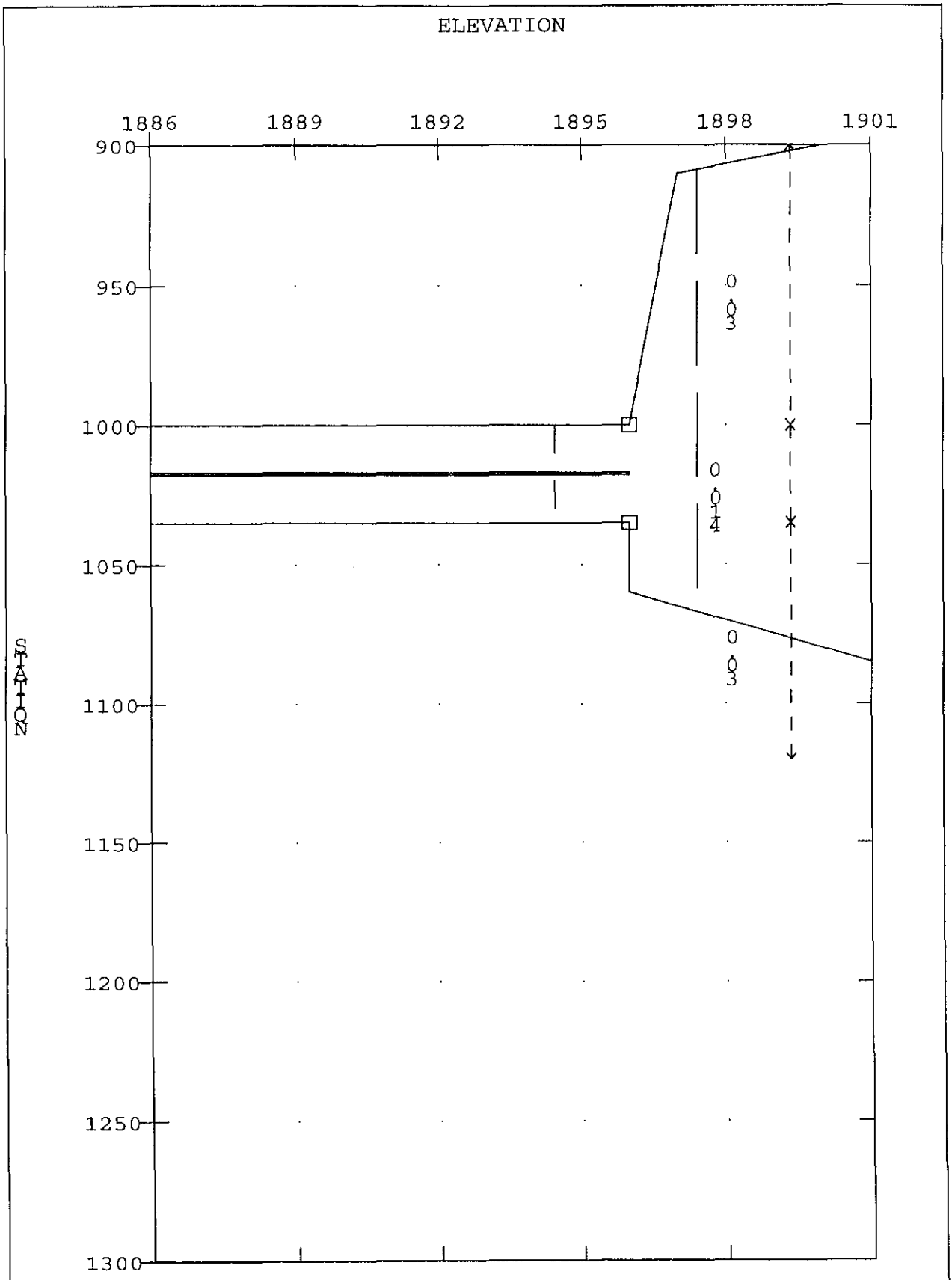
SECTION : 4115

LNLV WASH W/O DIVERSION



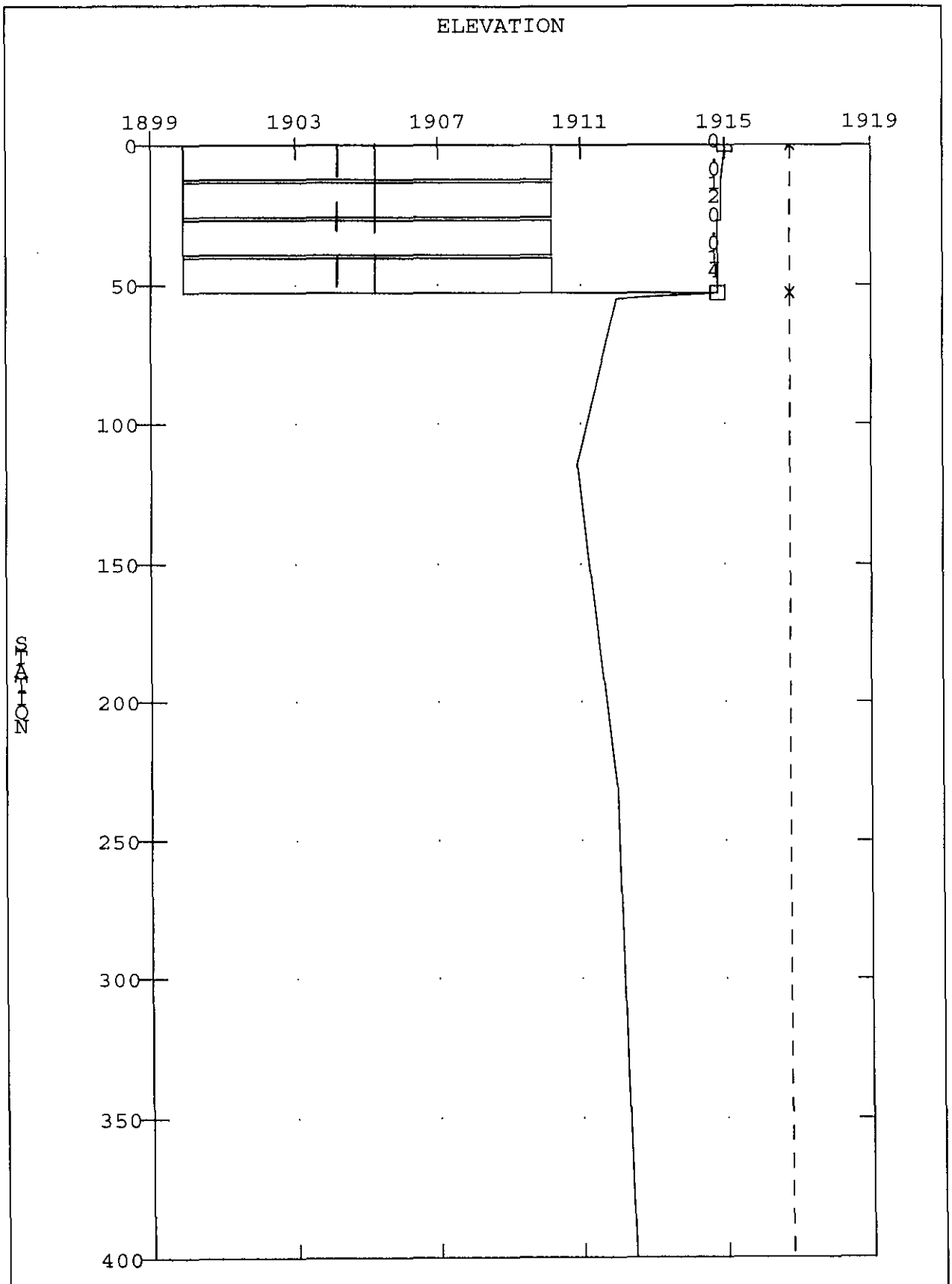
SECTION : 4188

LNLV WASH W/O DIVERSION



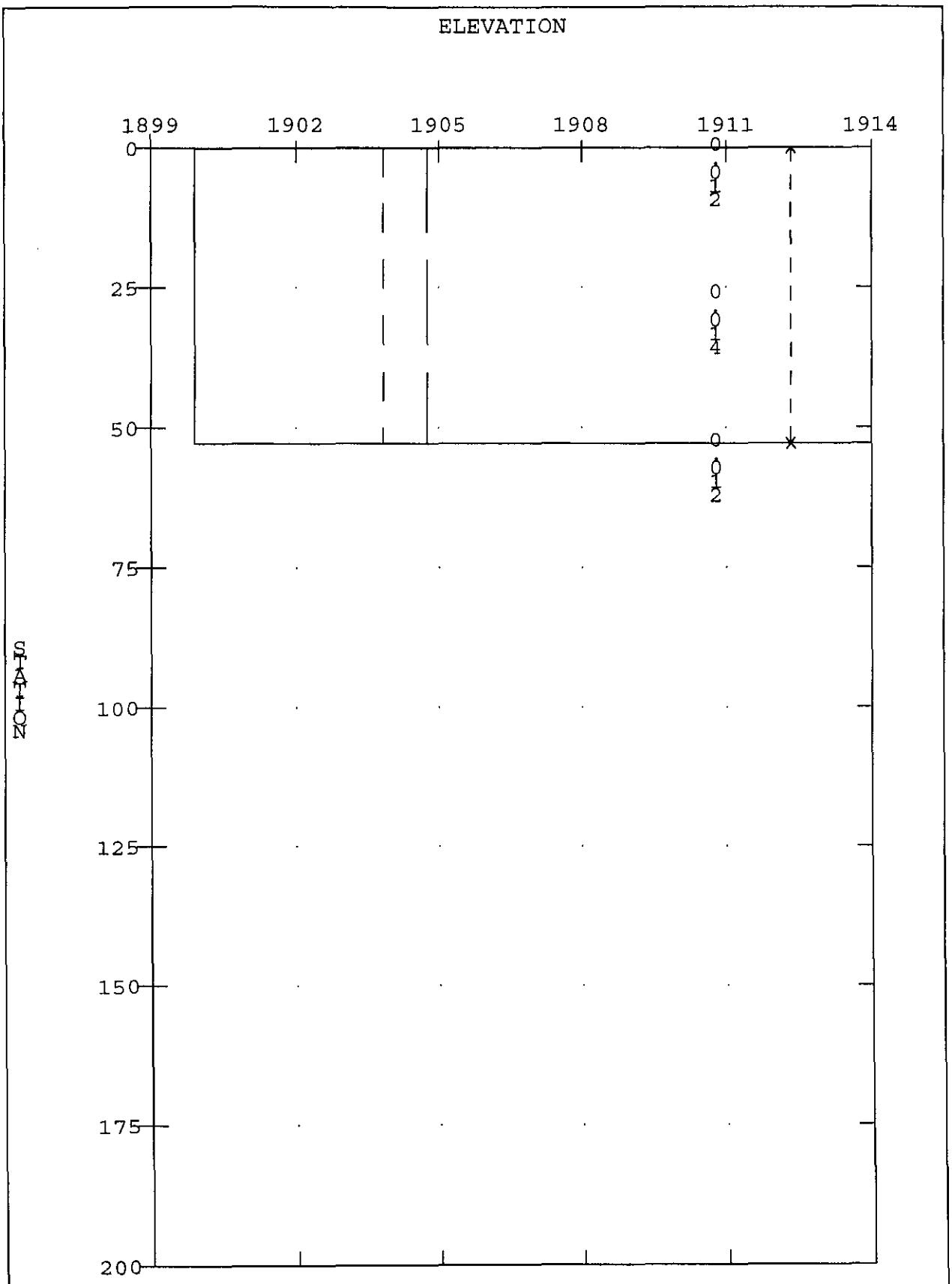
SECTION : 4189

LNLV WASH W/O DIVERSION



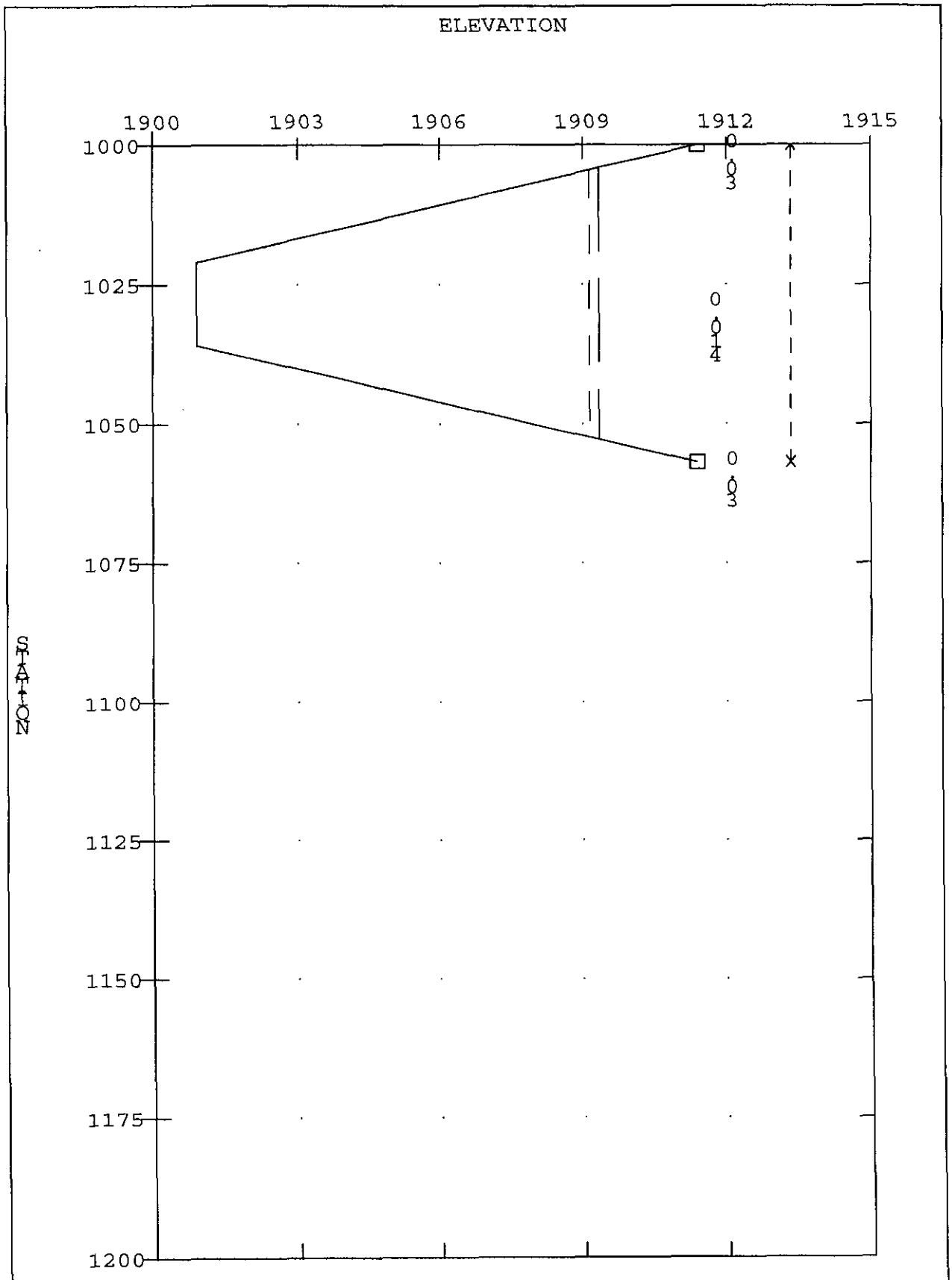
SECTION : 4246

LNLV WASH W/O DIVERSION



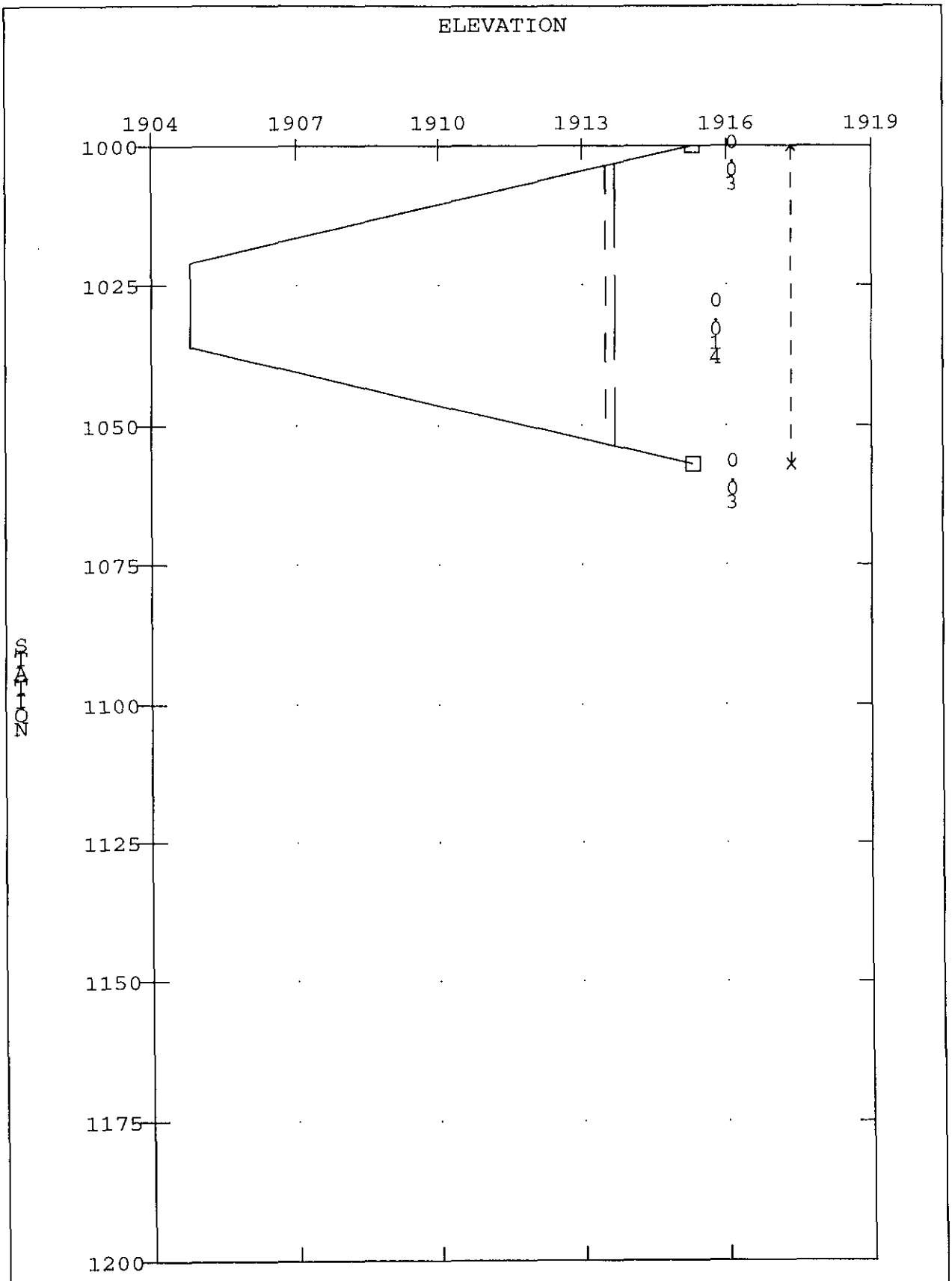
SECTION : 4247

LNLV WASH W/O DIVERSION



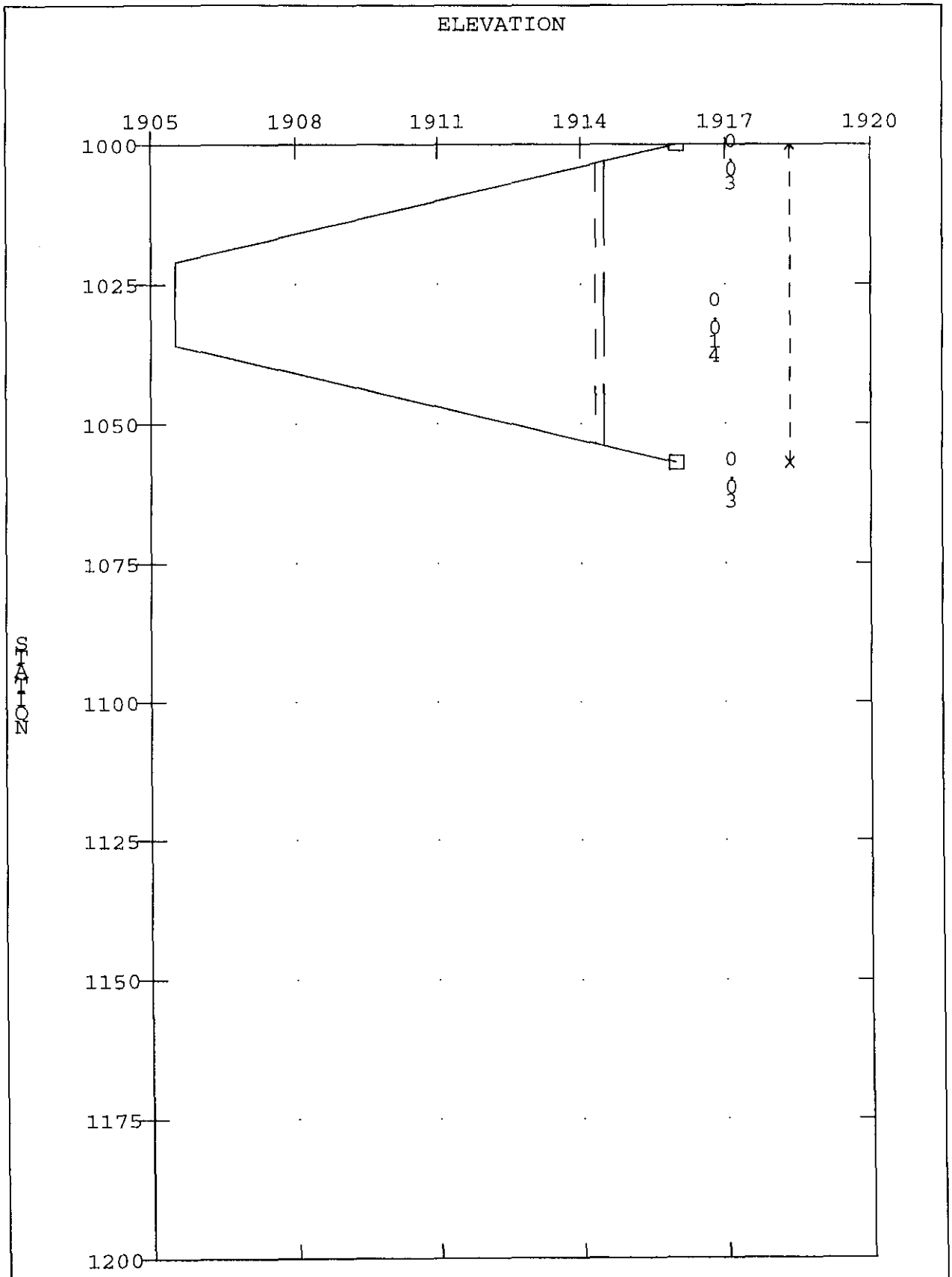
SECTION : 4360

LNLV WASH W/O DIVERSION



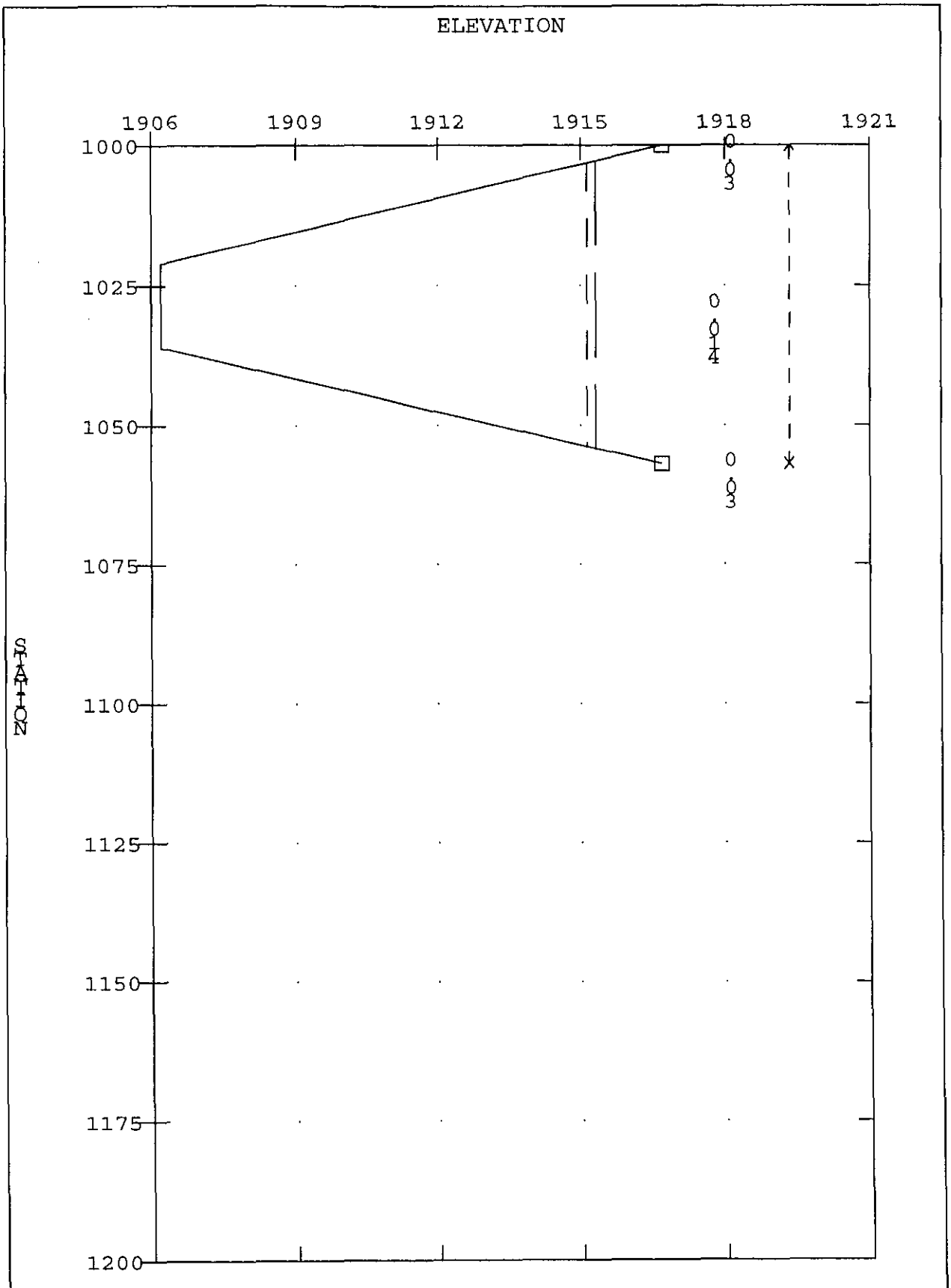
SECTION : 4831

LNLV WASH W/O DIVERSION



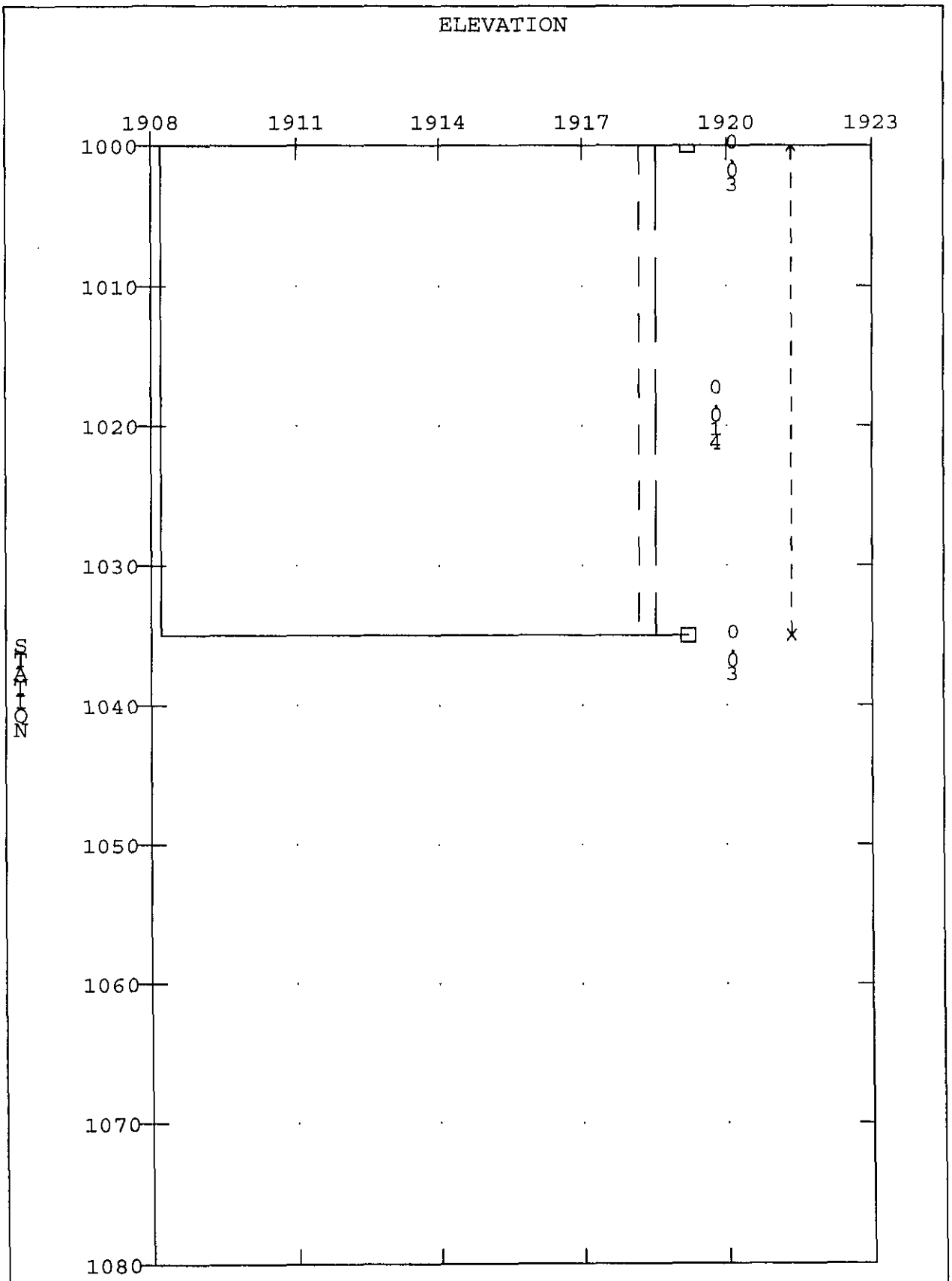
SECTION : 4920

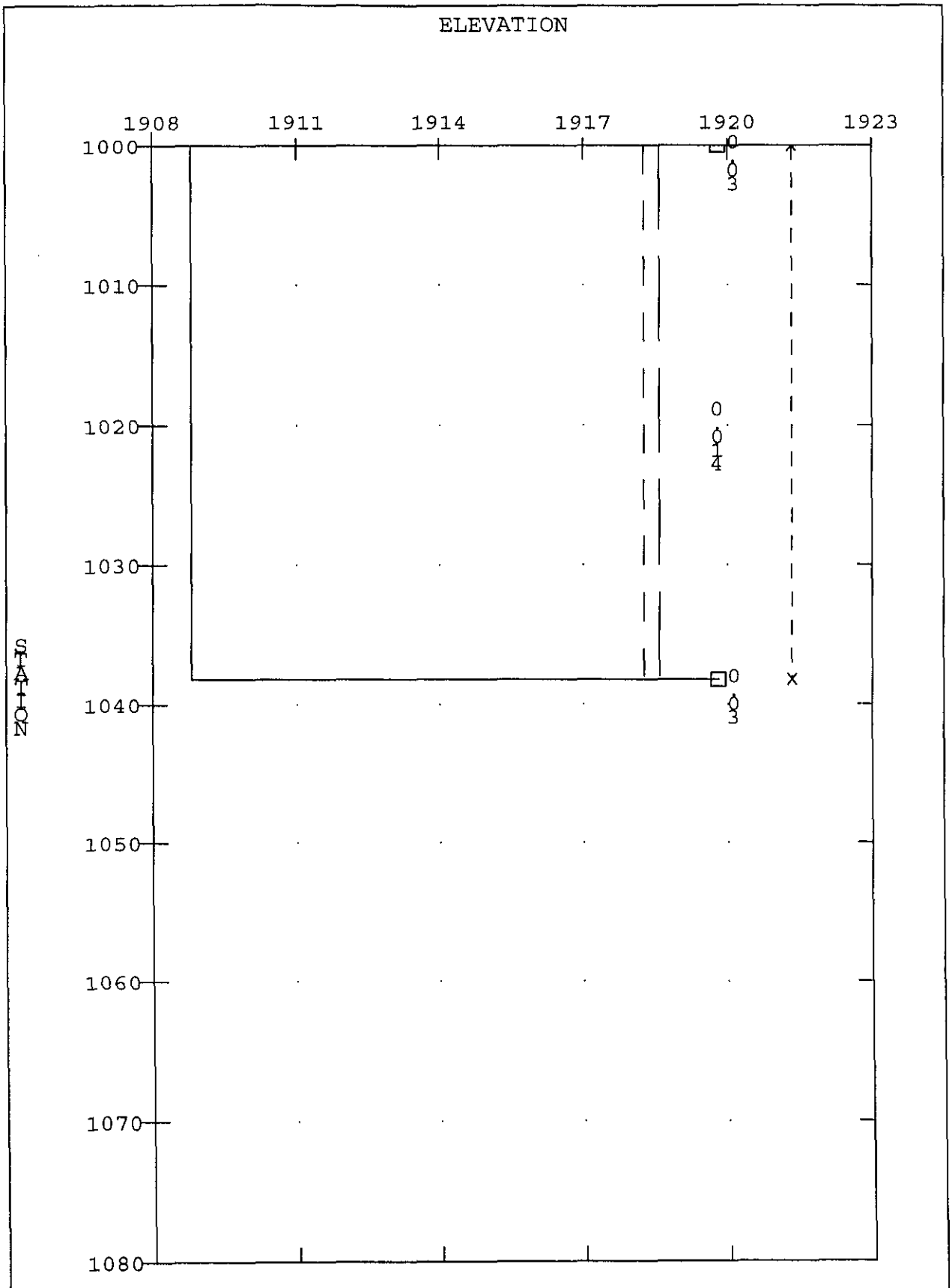
LNLV WASH W/O DIVERSION



SECTION : 5005

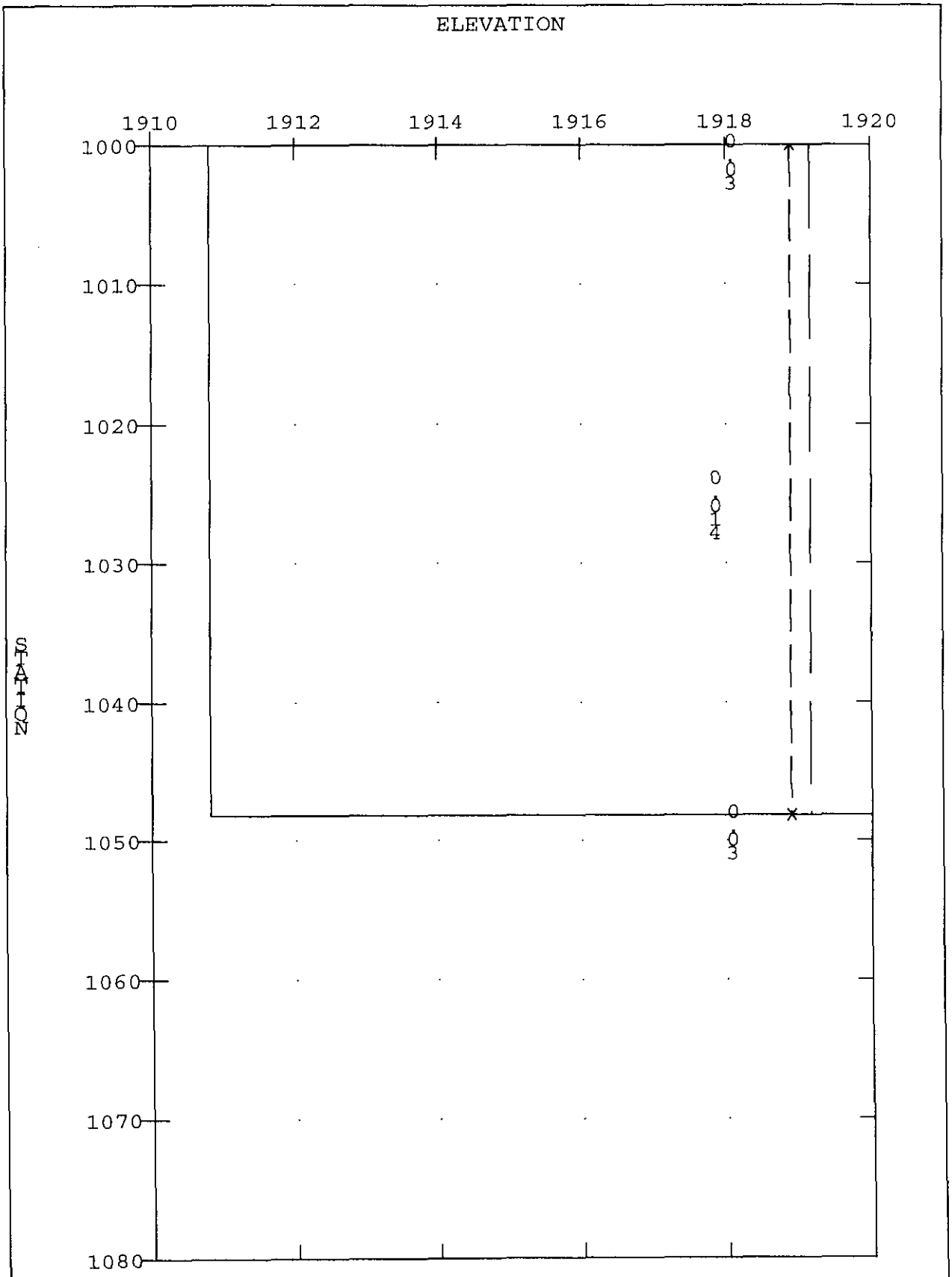
LNLV WASH W/O DIVERSION


ELEVATION
1908
1911
1914
1917
1920
1923
1000
1010
1020
1030
1040
1050
1060
1070
1080
STATION
SECTION : 5105
LNLV WASH W/O DIVERSION



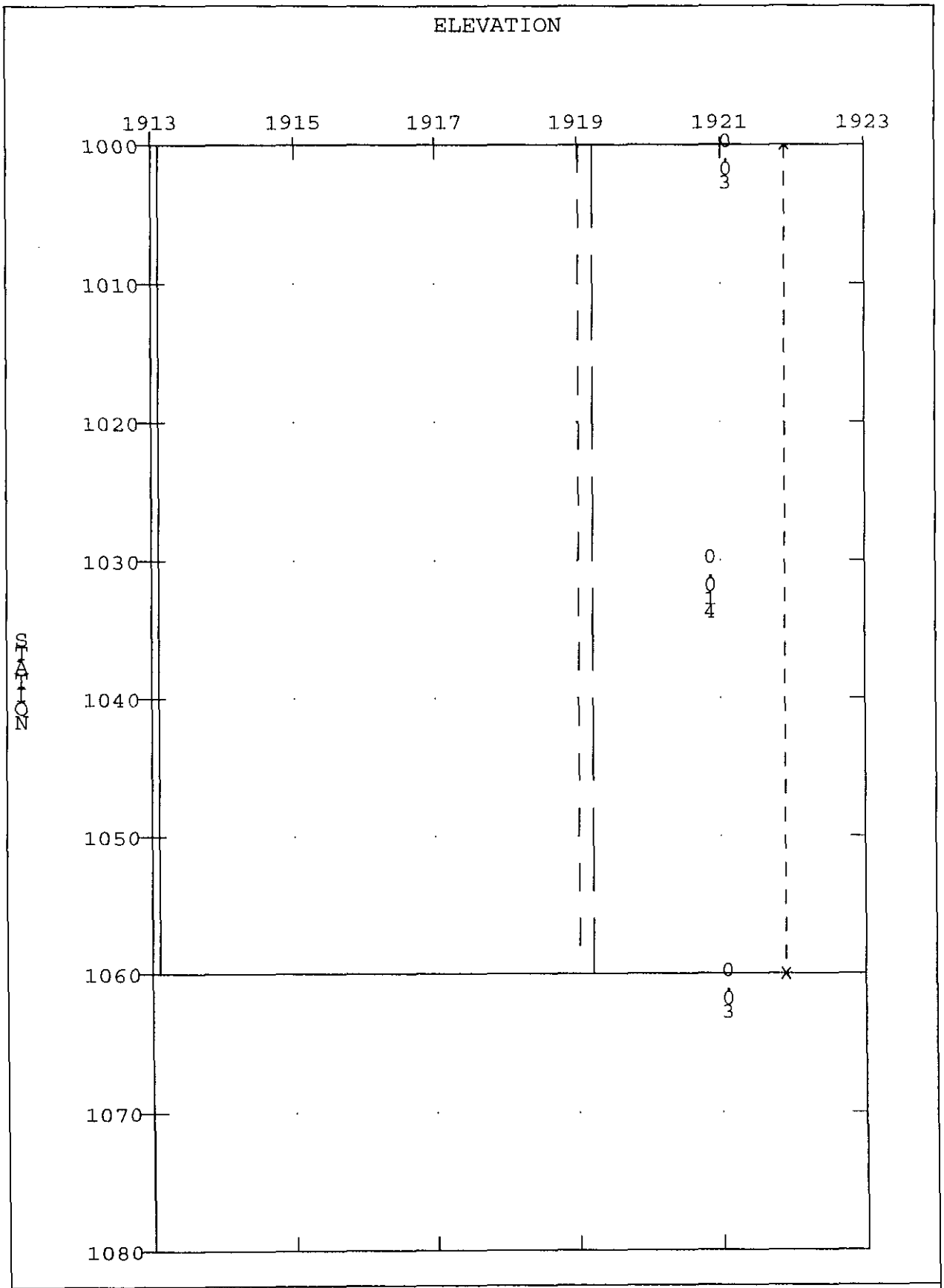
SECTION : 5200

LNLV WASH W/O DIVERSION



SECTION : 5500

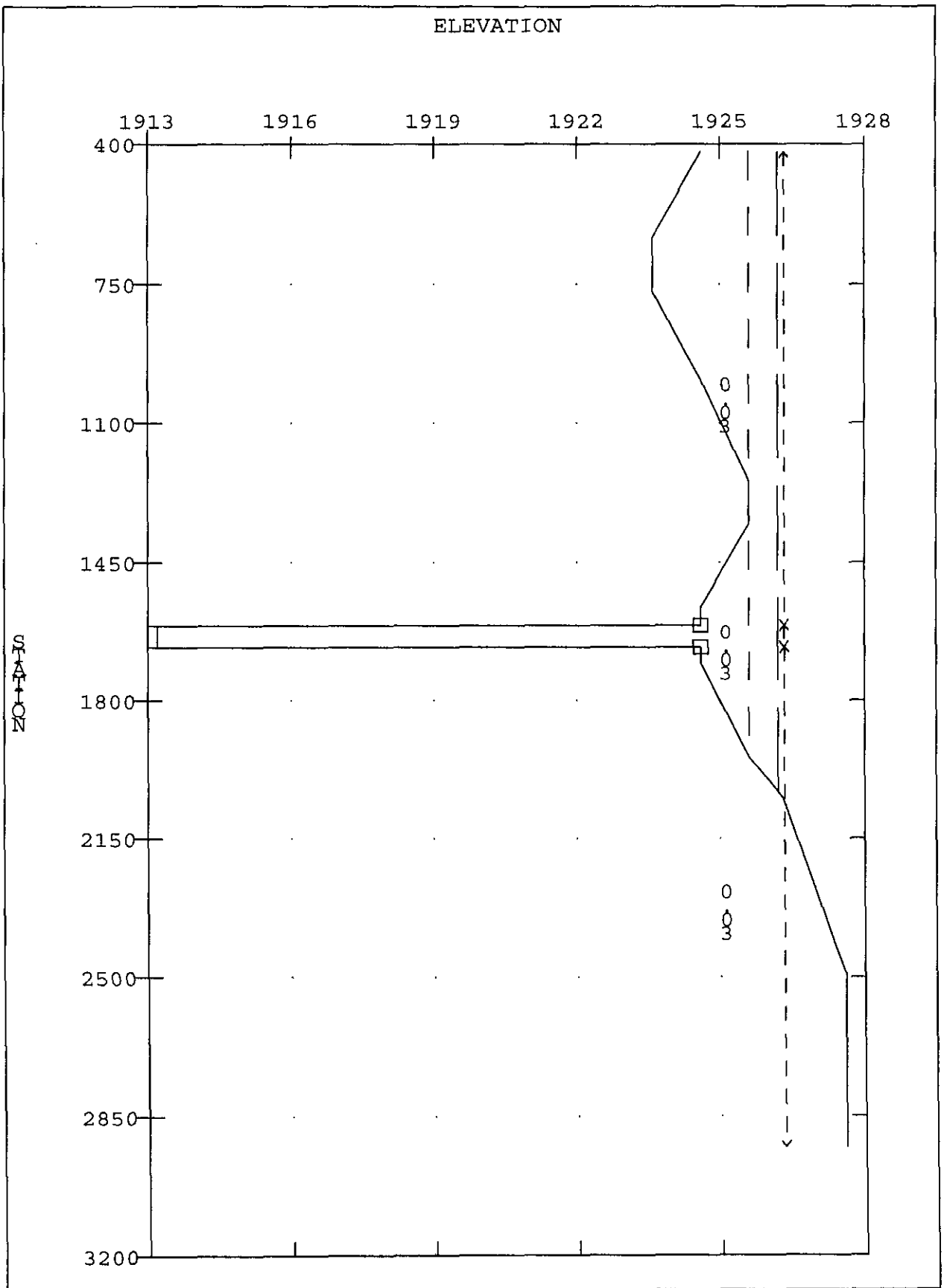
LNLV WASH W/O DIVERSION



SECTION : 5852

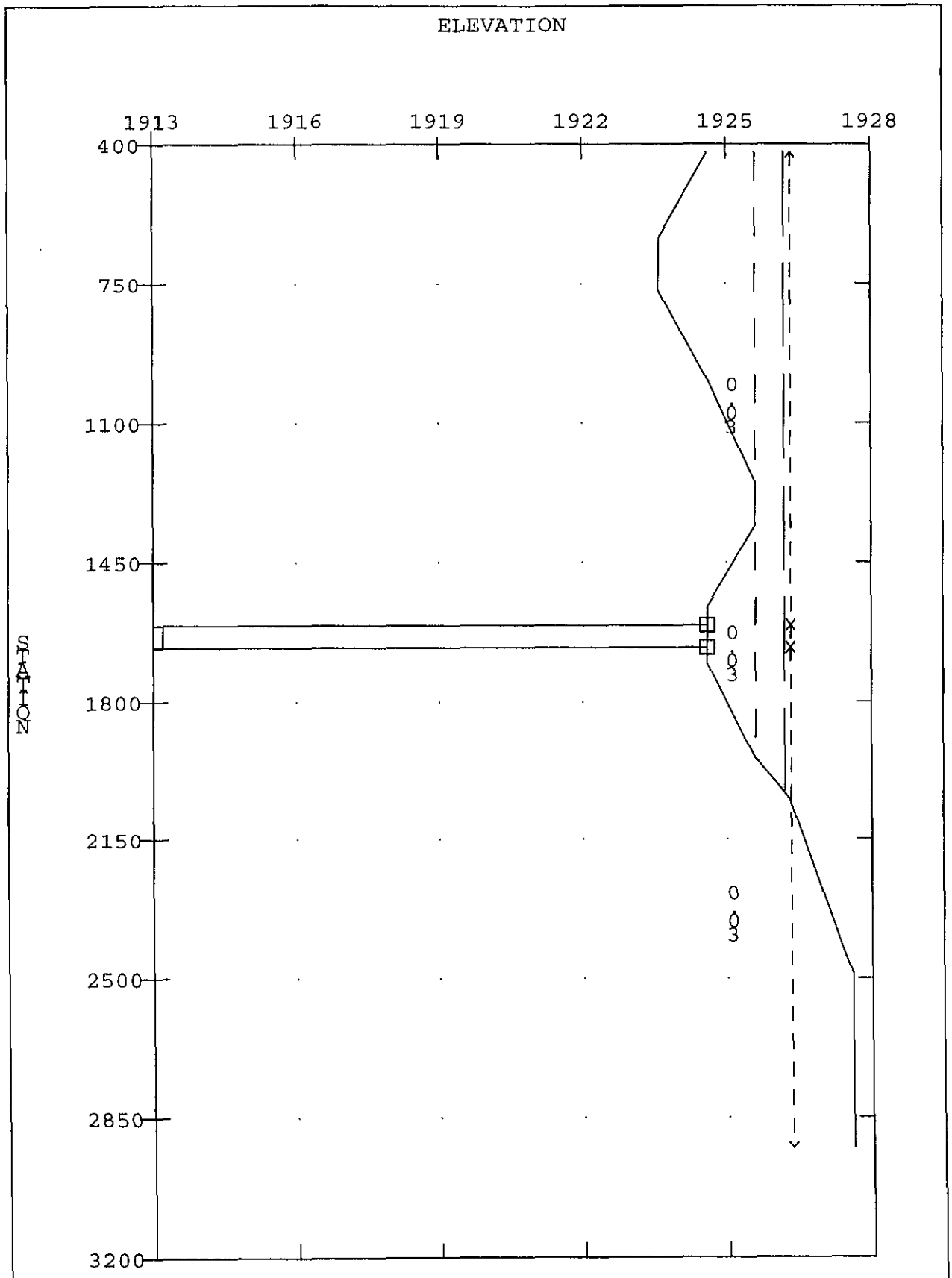
LNLV WASH W/O DIVERSION

Cross Section Plots
LN50026



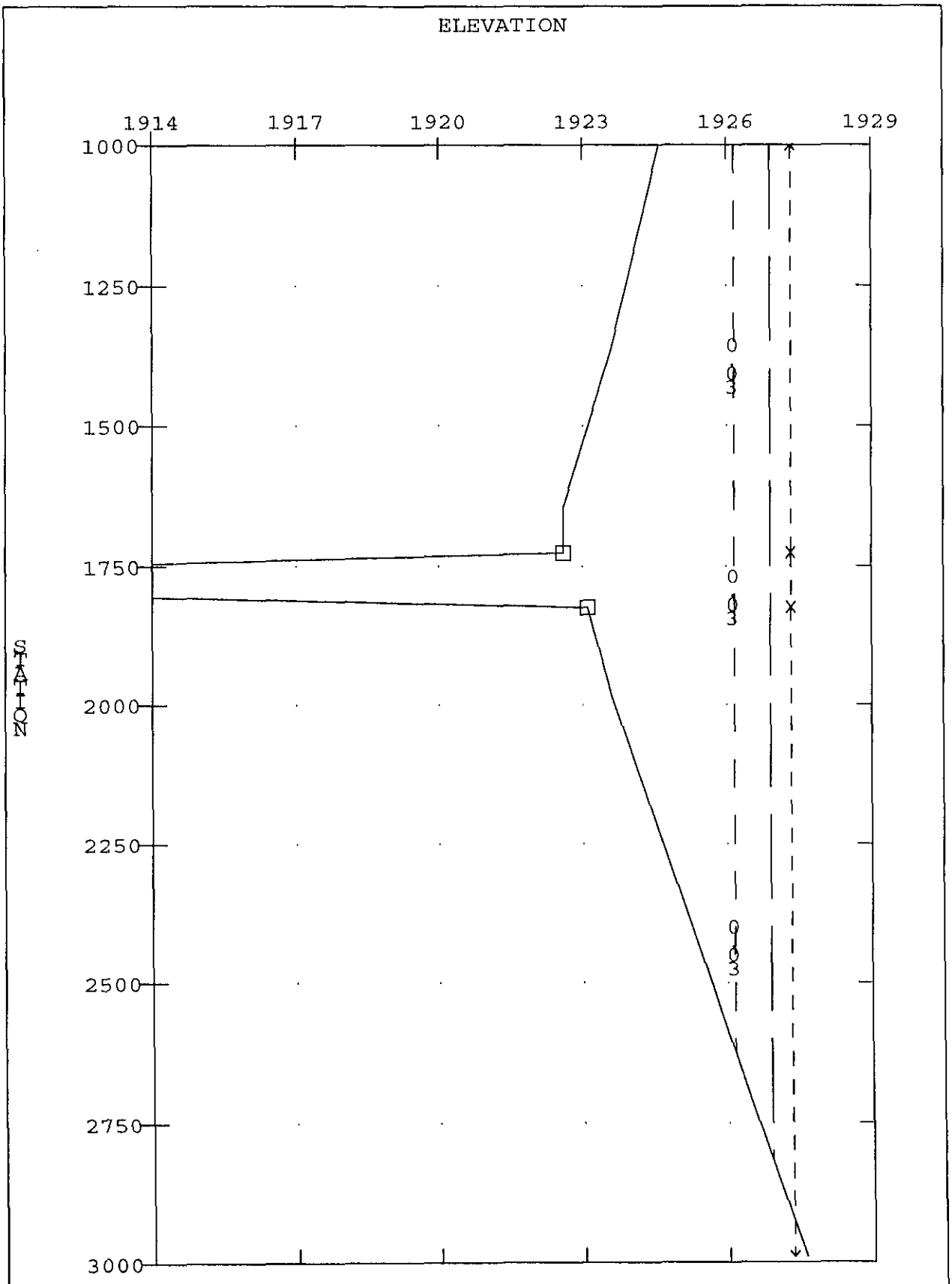
SECTION : 5852

LNLV WASH W/O DIVERSION



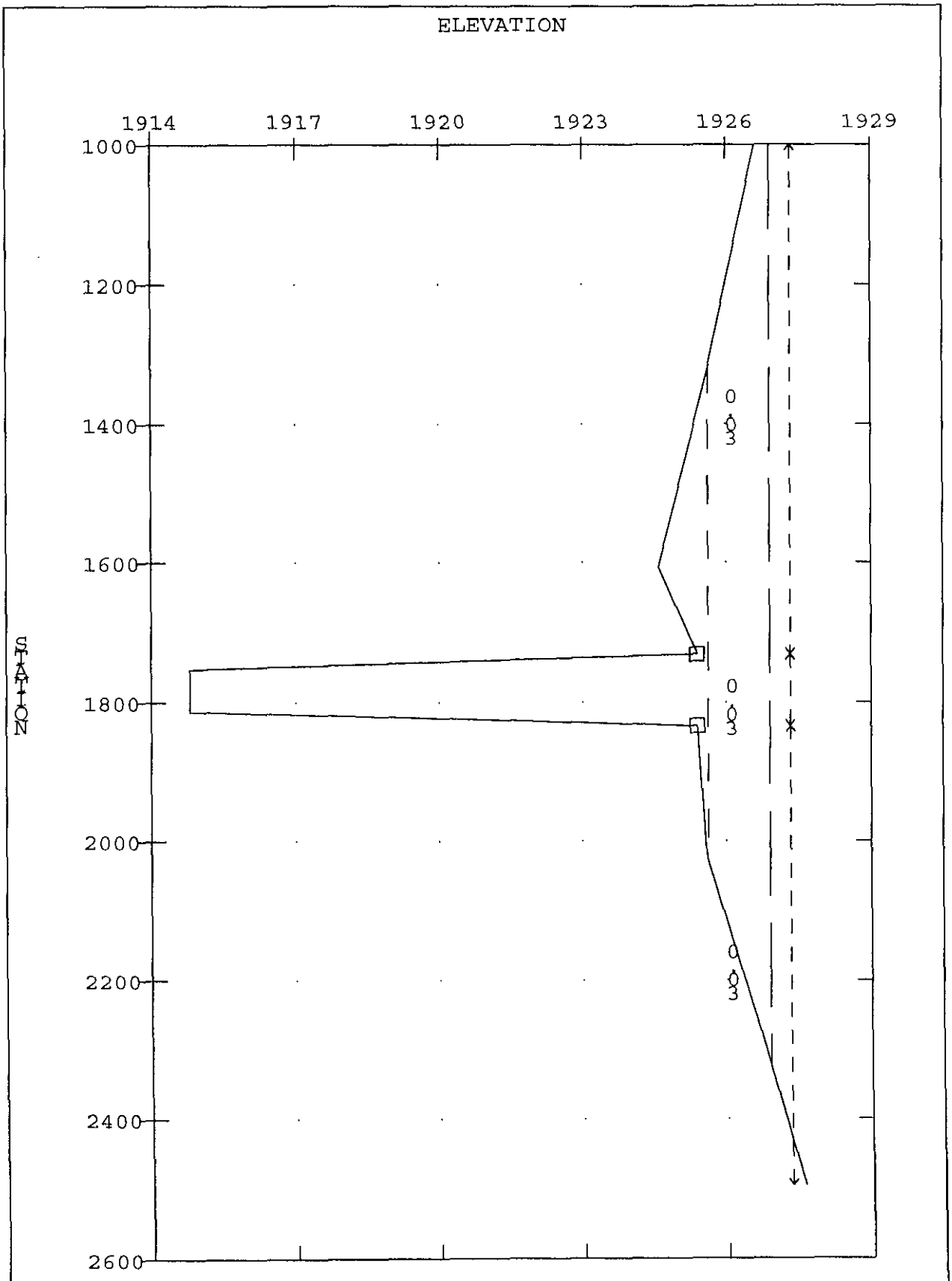
SECTION : 5973

LNLV WASH W/O DIVERSION



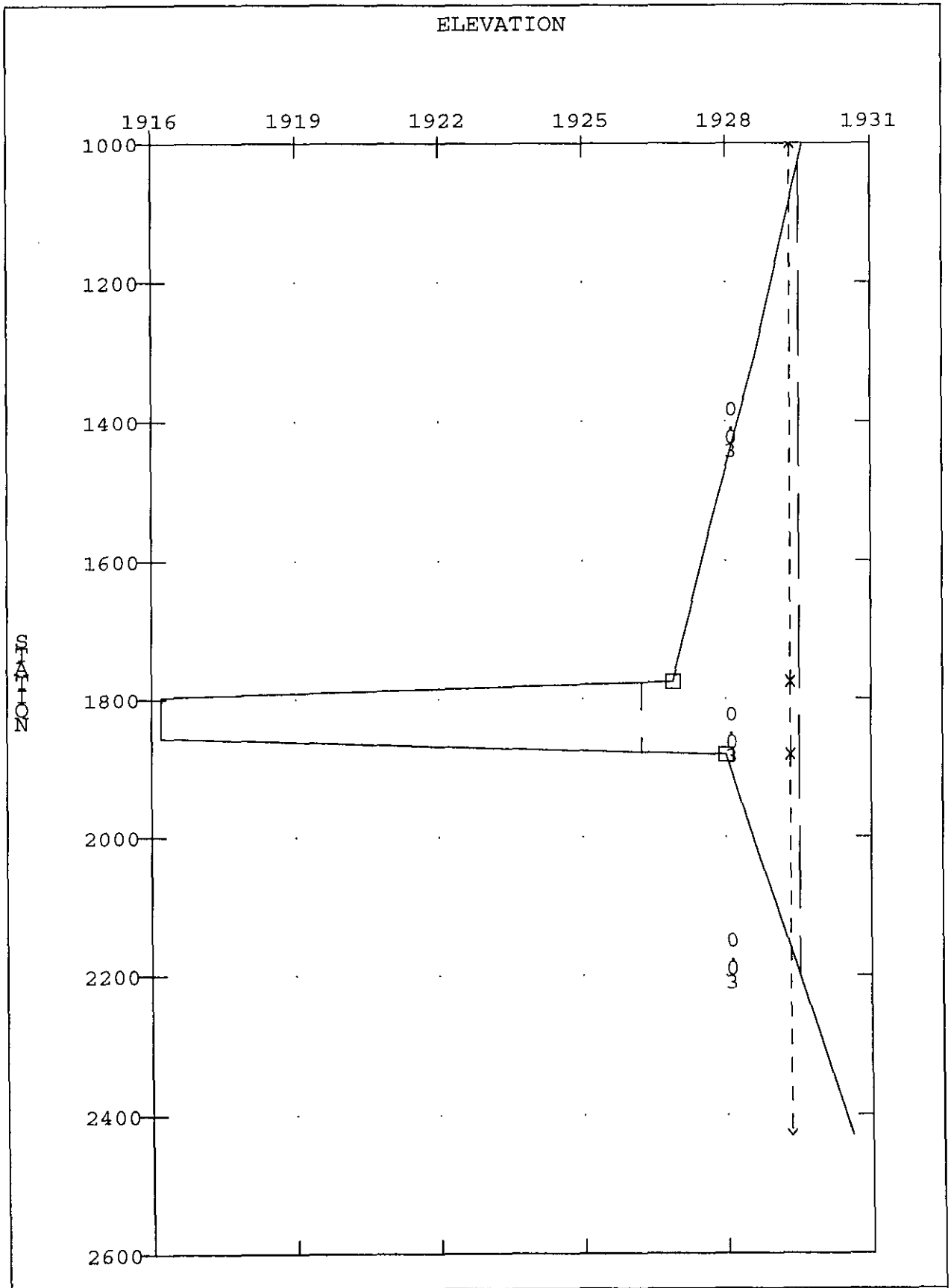
SECTION : 6092

LNLV WASH W/O DIVERSION



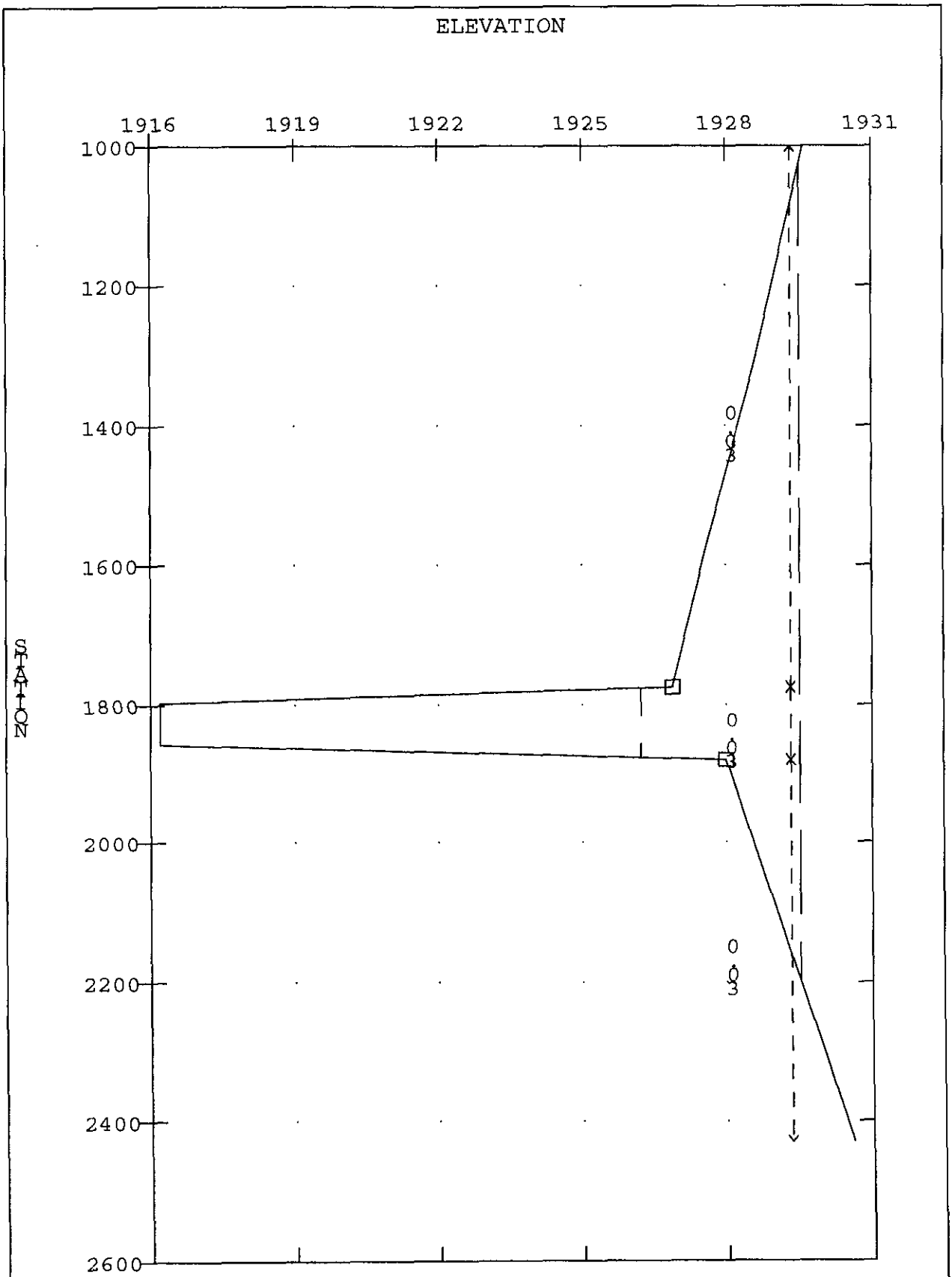
SECTION : 6370

LNLV WASH W/O DIVERSION



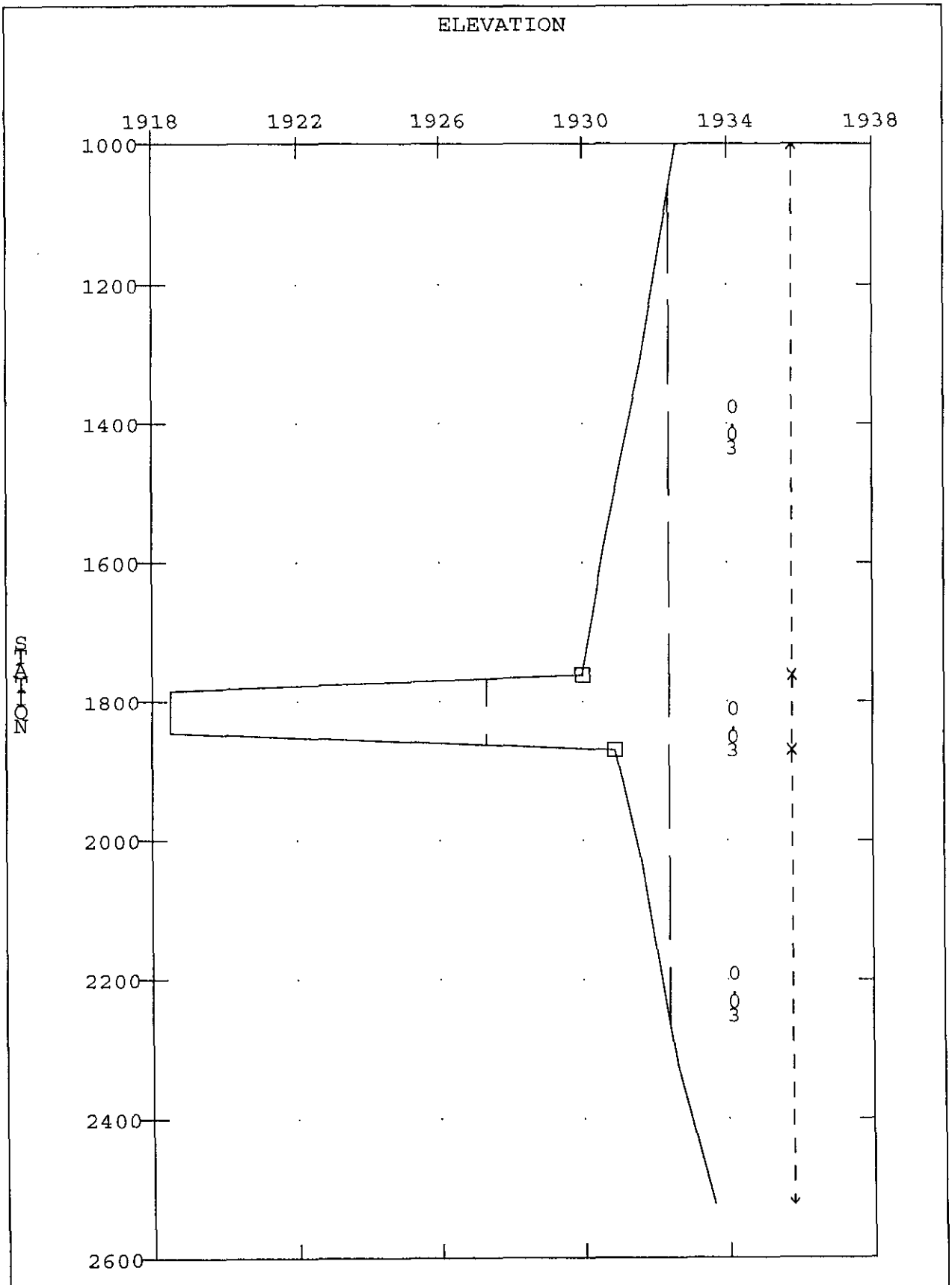
SECTION : 6828

LNLV WASH W/O DIVERSION



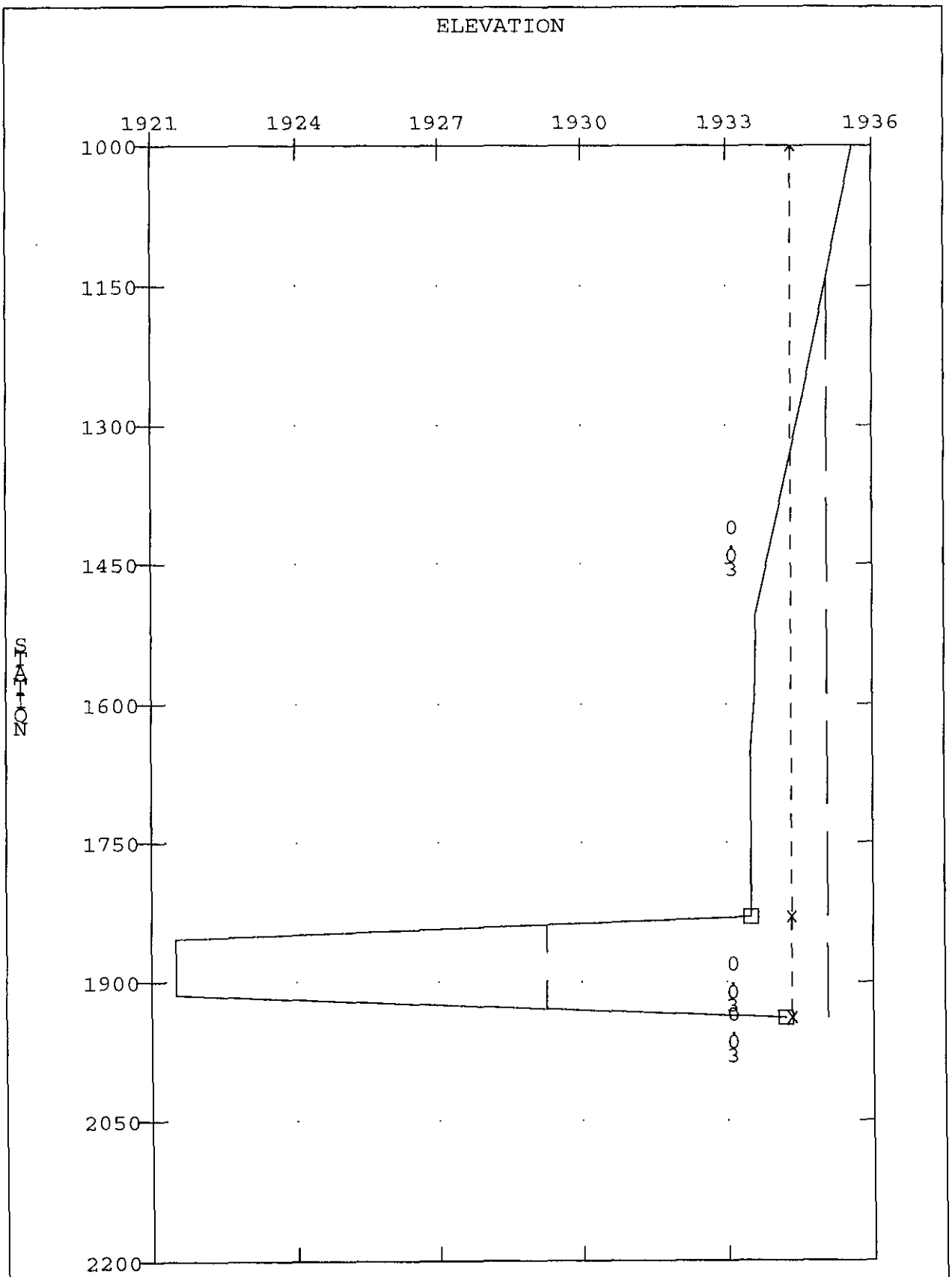
SECTION : 6828

LNLV WASH W/O DIVERSION



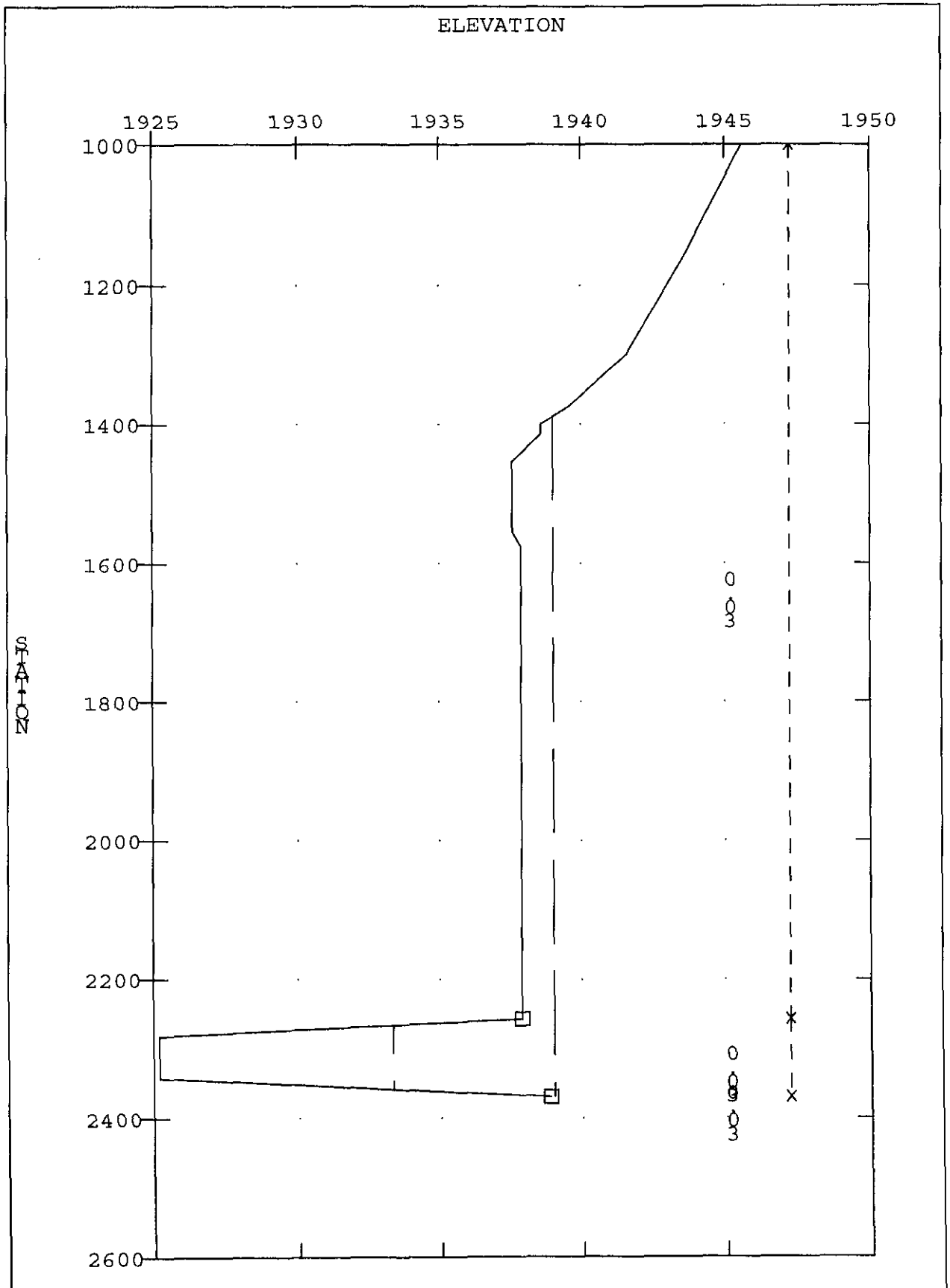
SECTION : 7265

LNLV WASH W/O DIVERSION



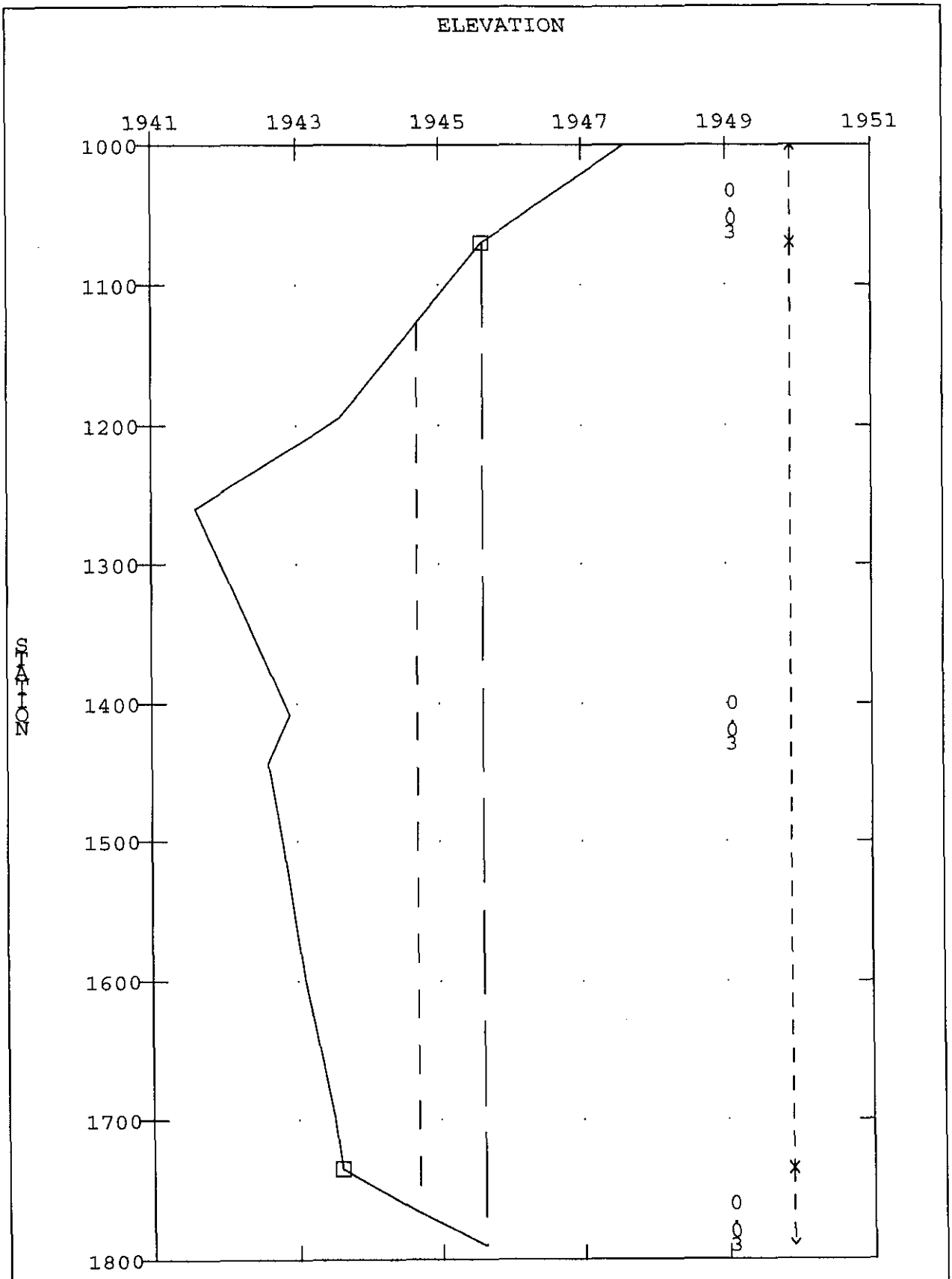
SECTION : 7730

LNLV WASH W/O DIVERSION



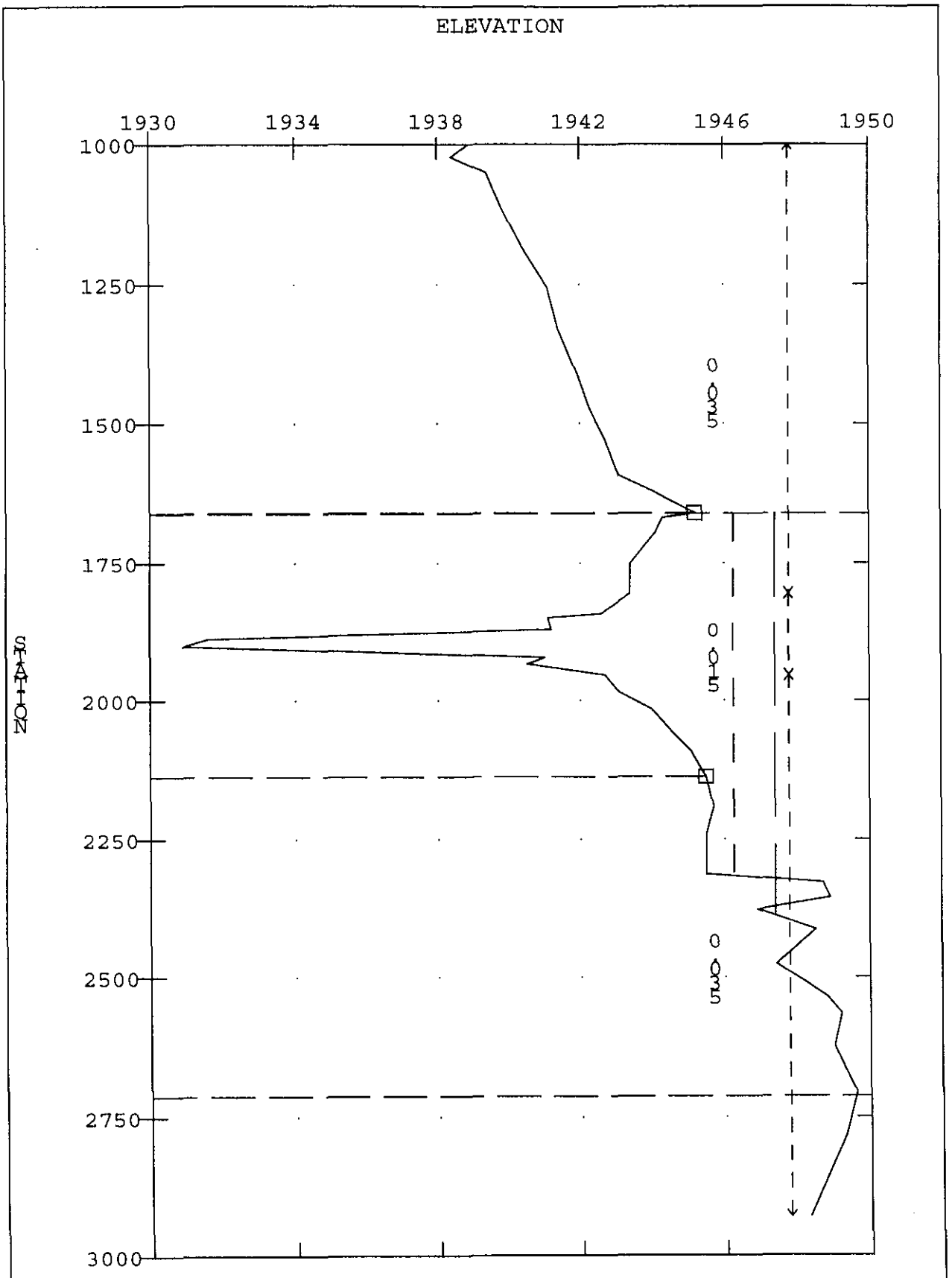
SECTION : 8323

LNLV WASH W/O DIVERSION



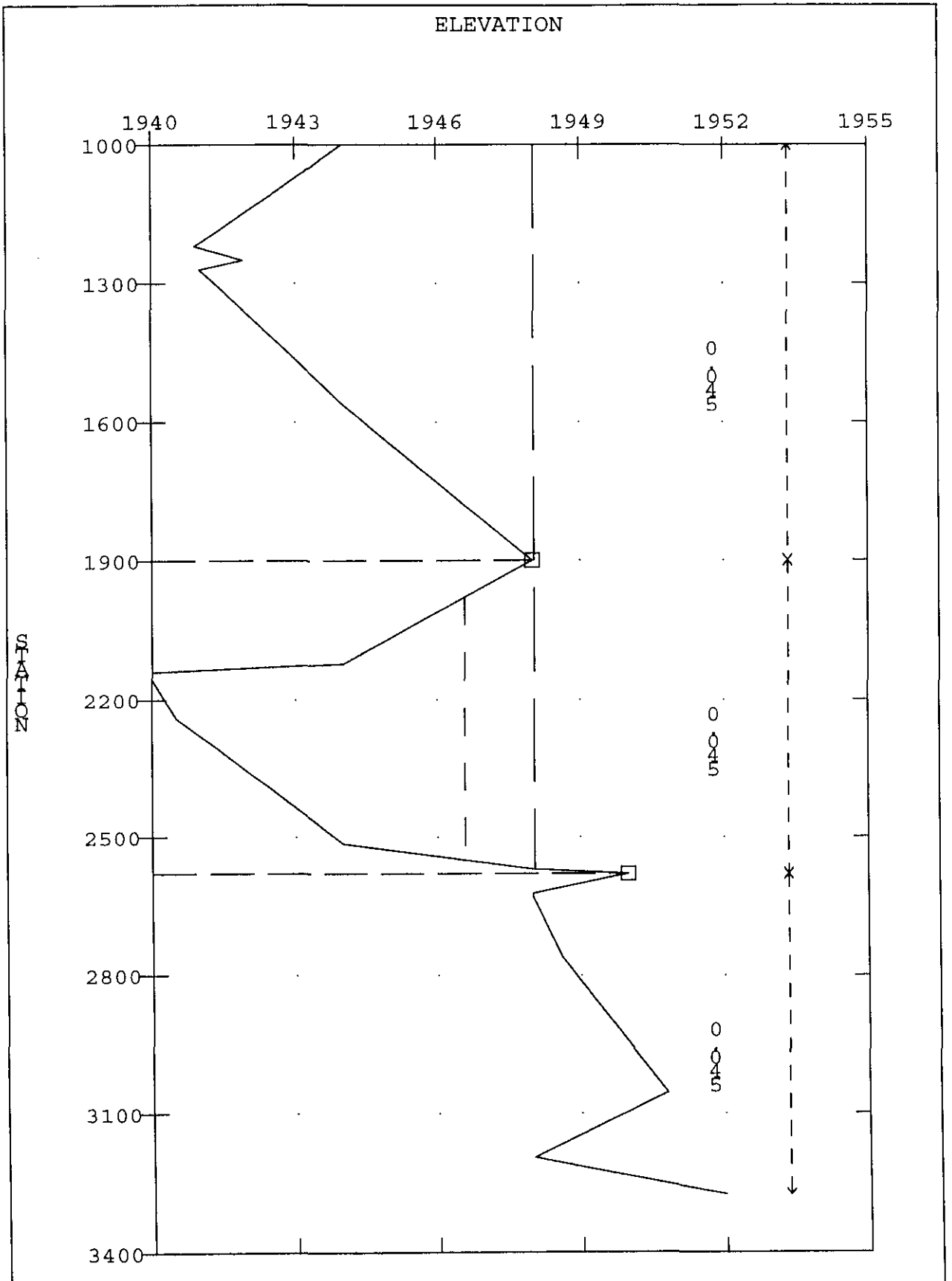
SECTION : 8794

LNLV WASH W/O DIVERSION



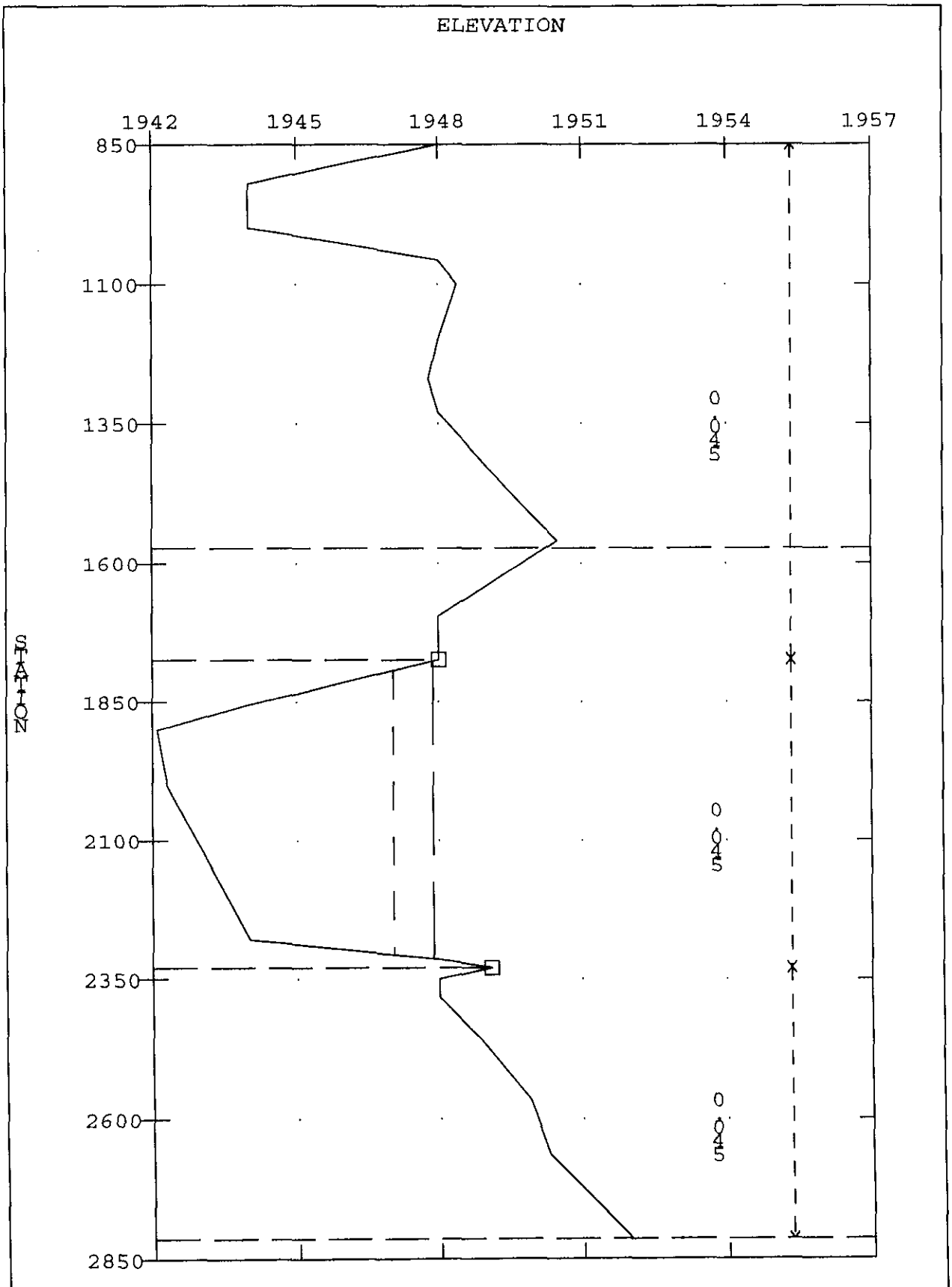
SECTION : 9120

LNLV WASH W/O DIVERSION



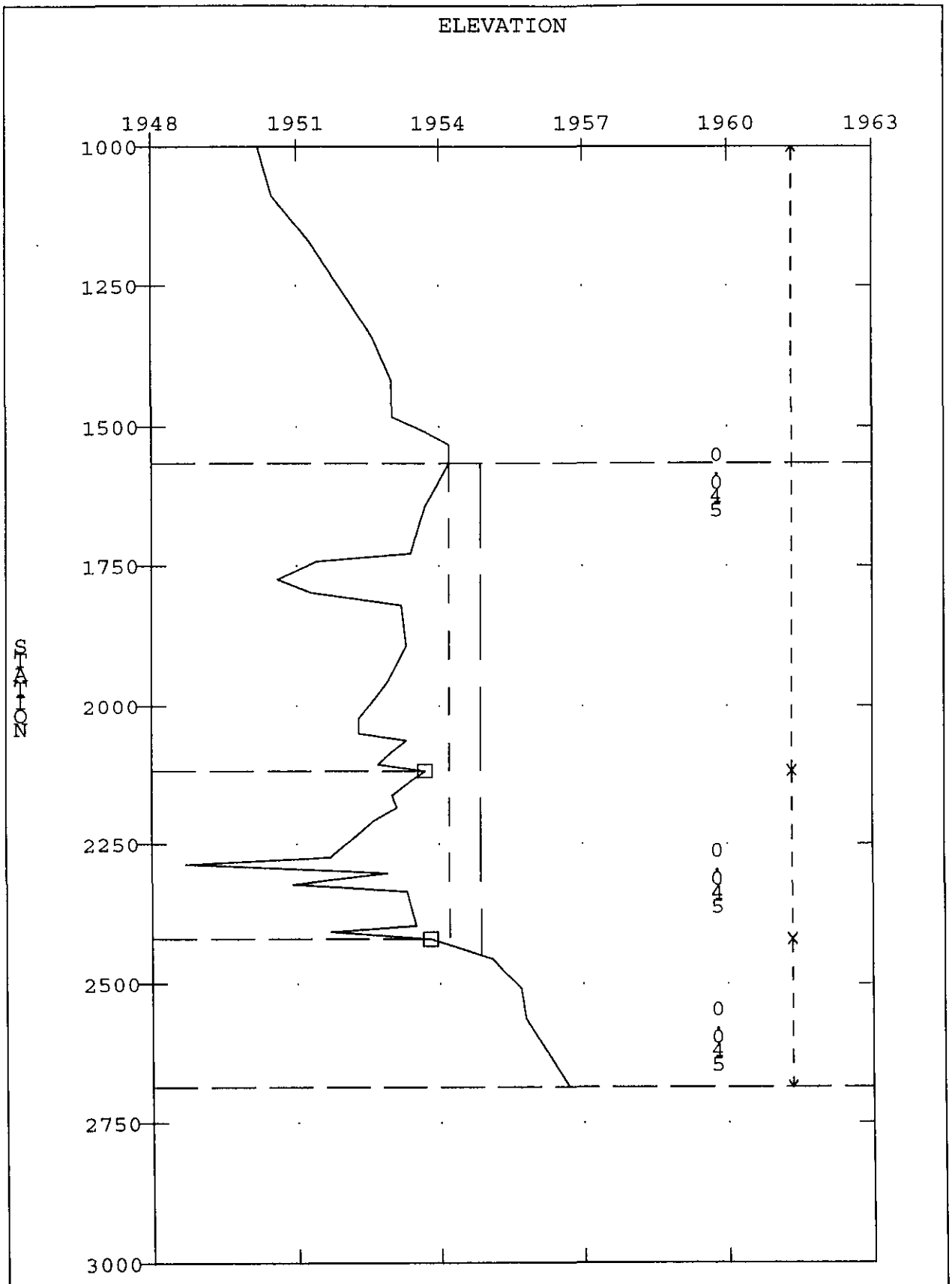
SECTION : 9237

LNLV WASH W/O DIVERSION



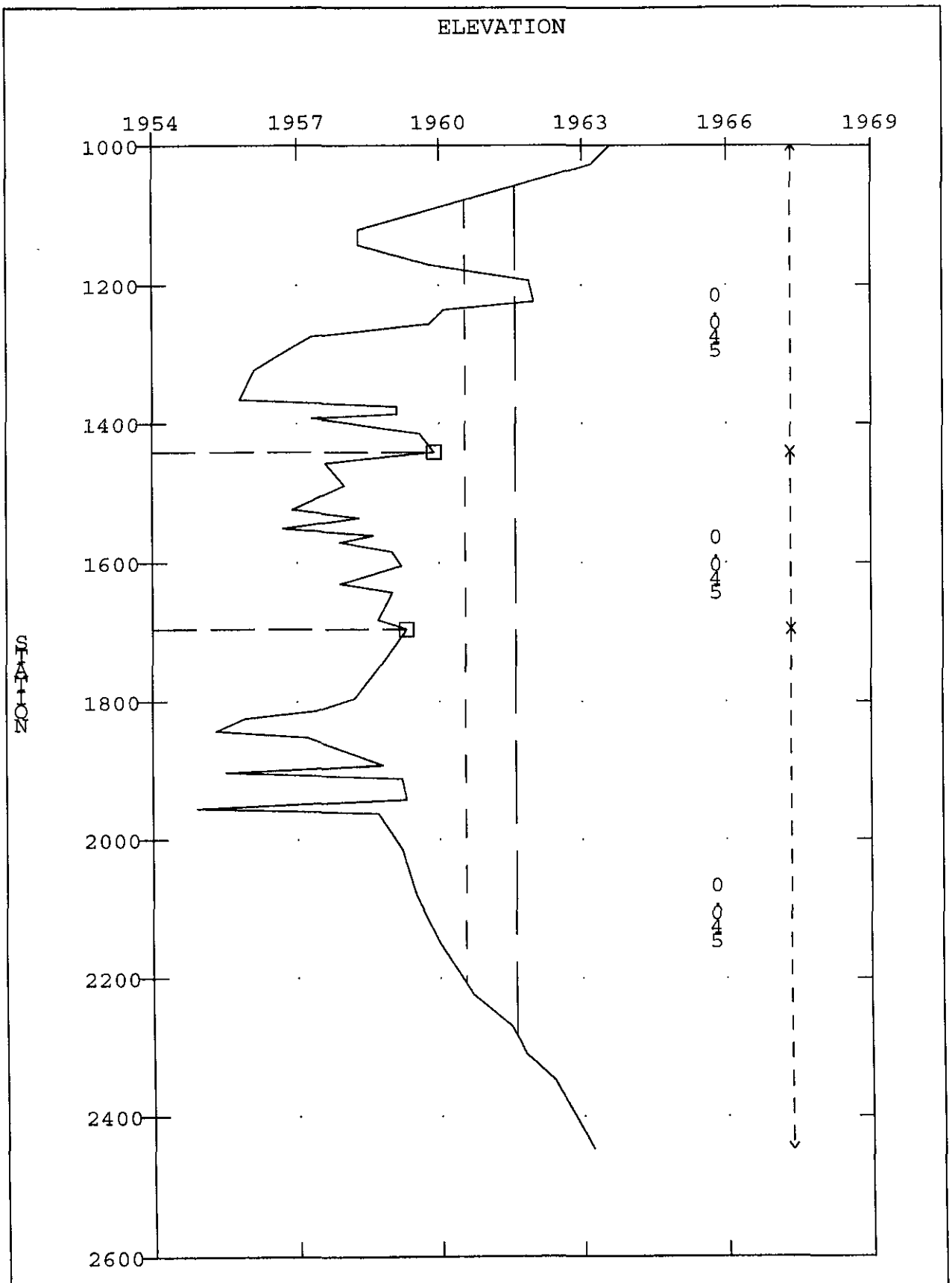
SECTION : 9429

LNLV WASH W/O DIVERSION



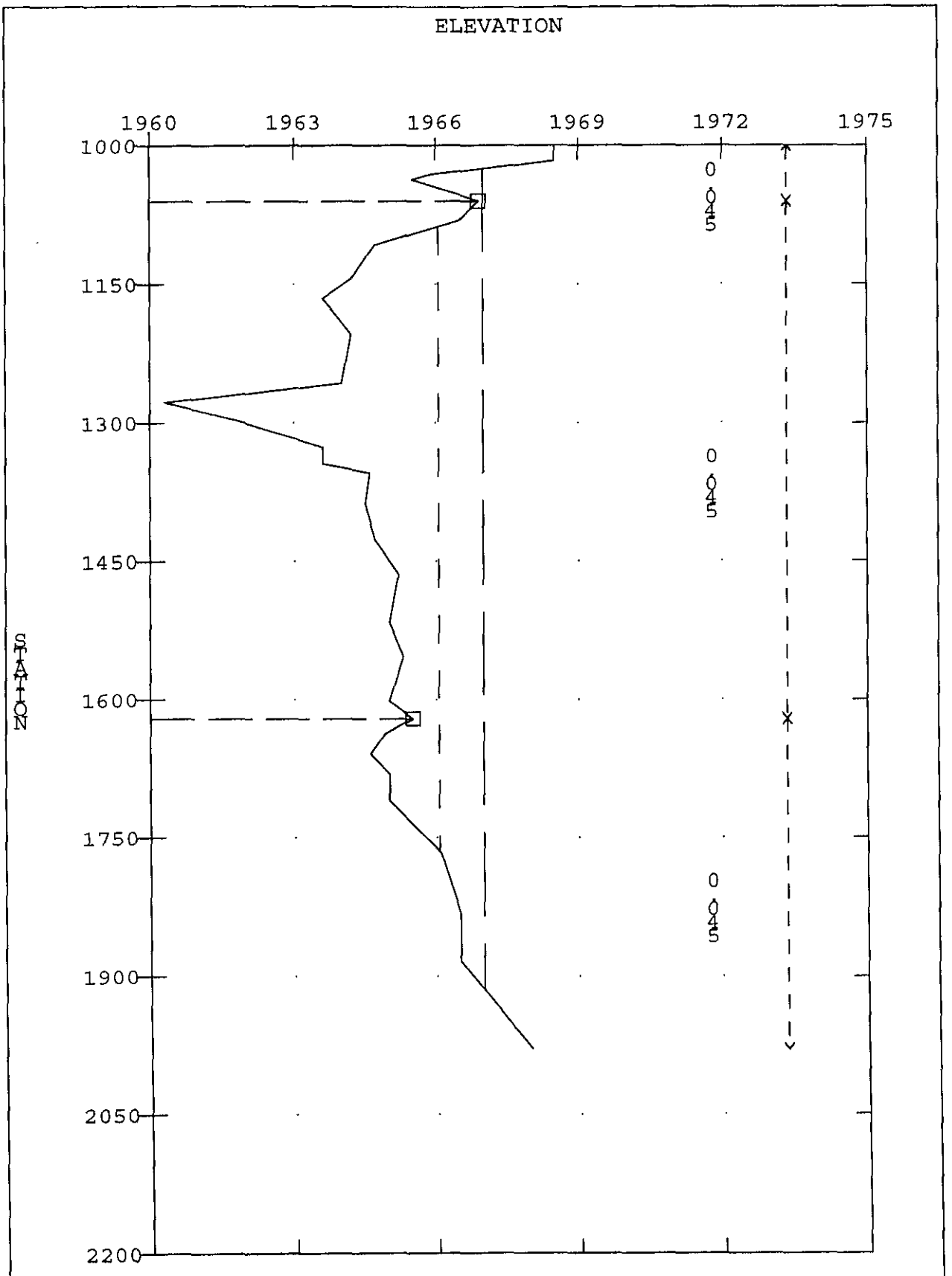
SECTION : 10155

LNLV WASH W/O DIVERSION



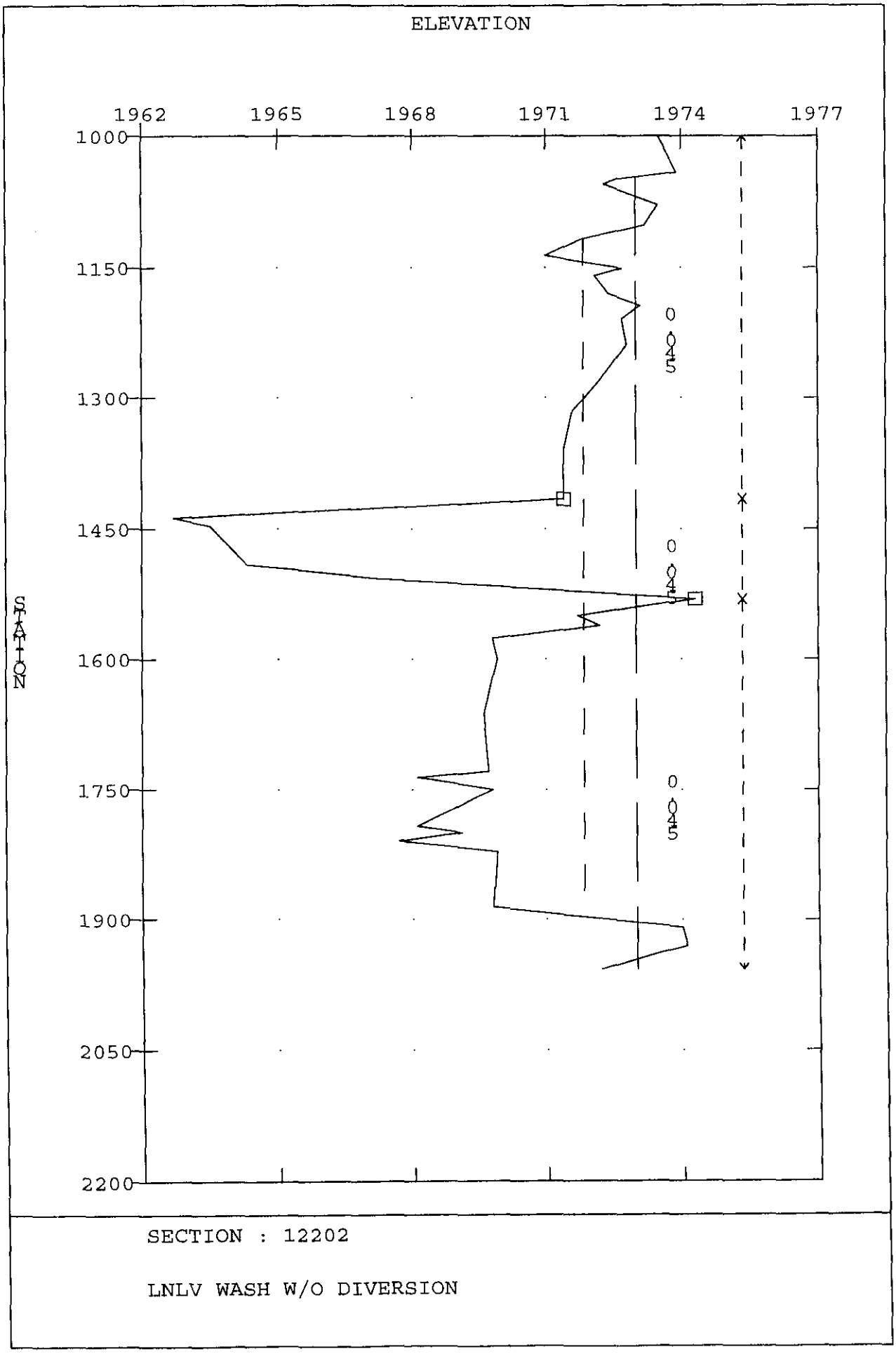
SECTION : 10962

LNLV WASH W/O DIVERSION



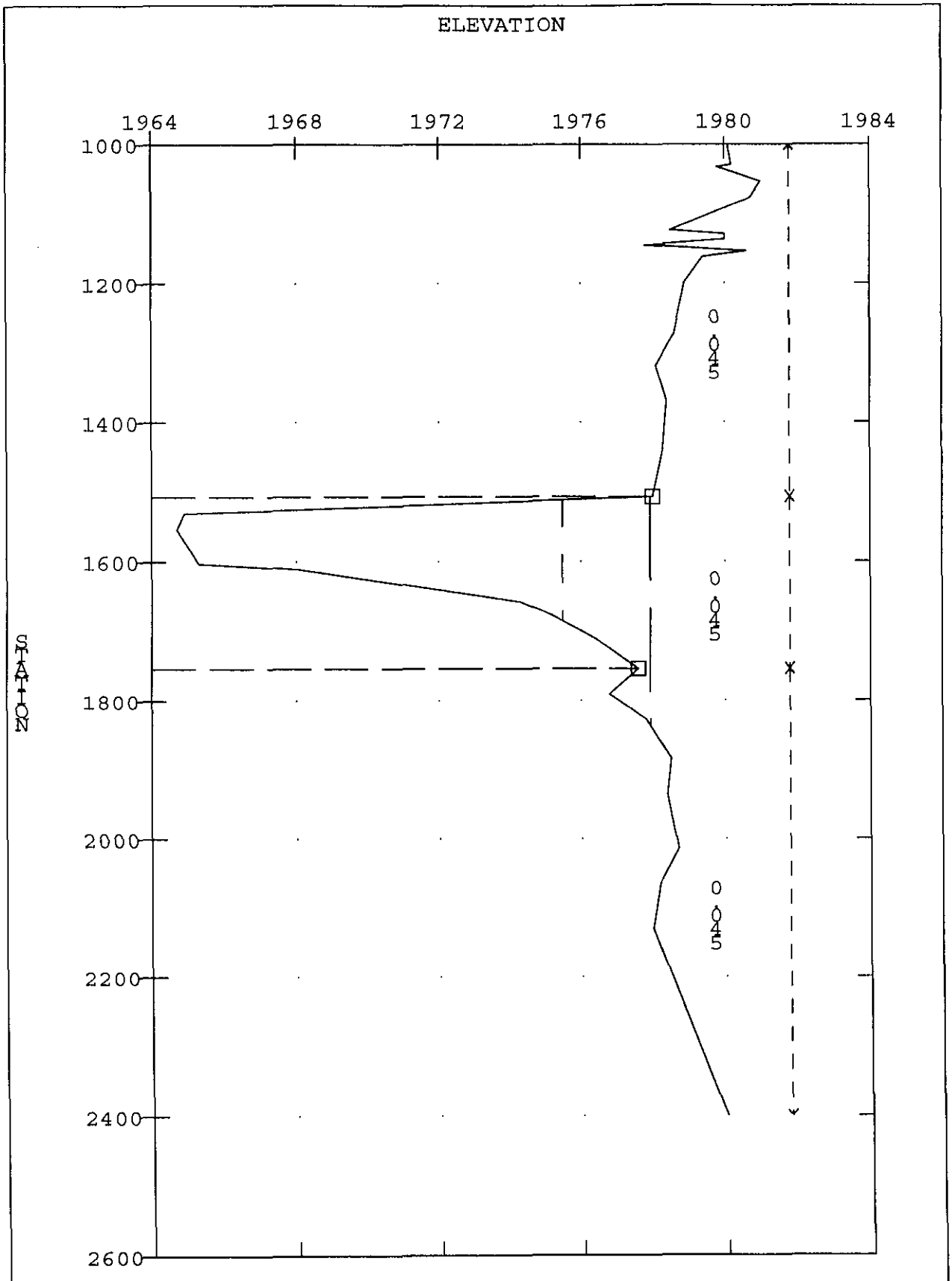
SECTION : 11614

LNLV WASH W/O DIVERSION



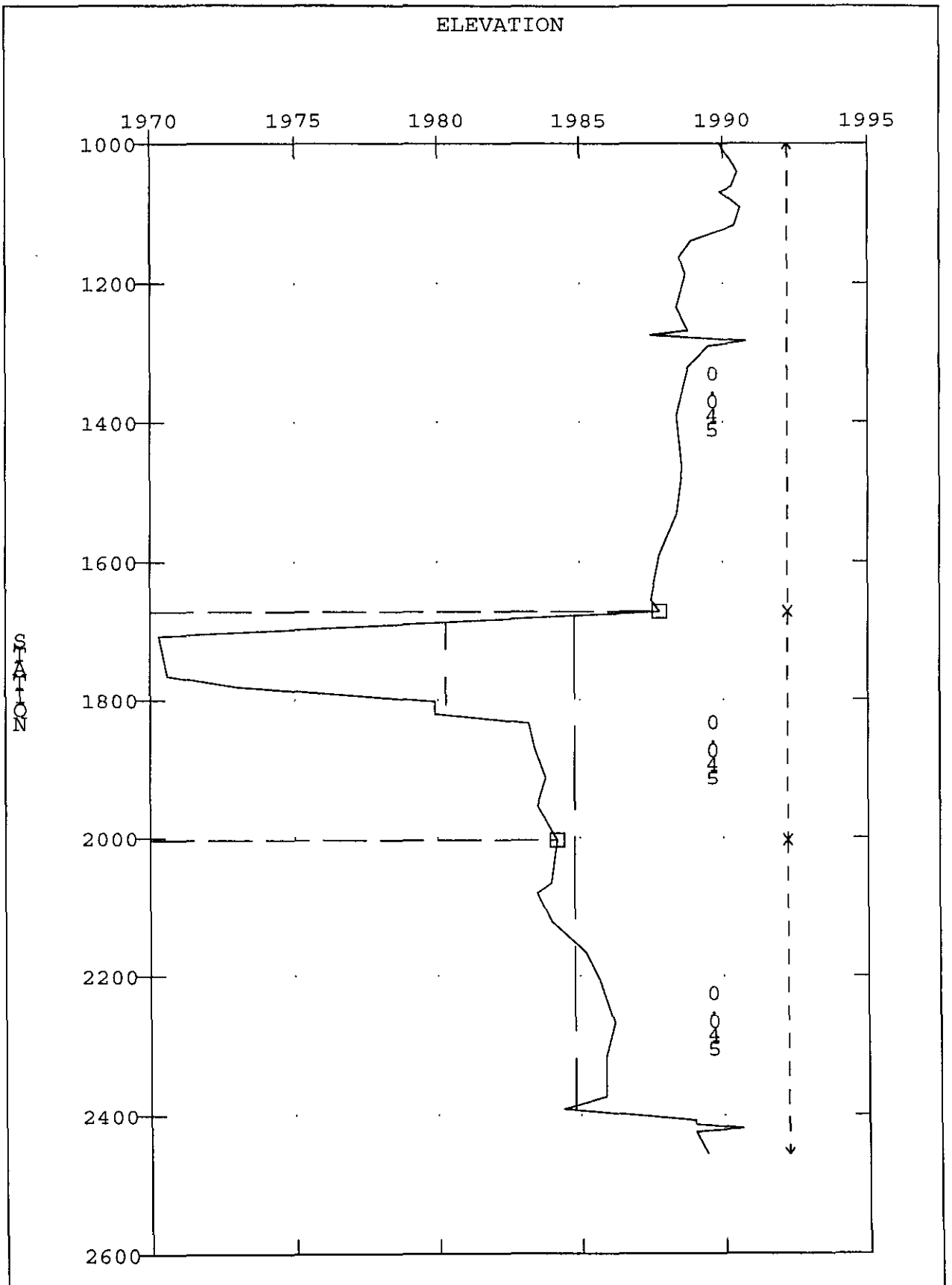
SECTION : 12202

LNLV WASH W/O DIVERSION



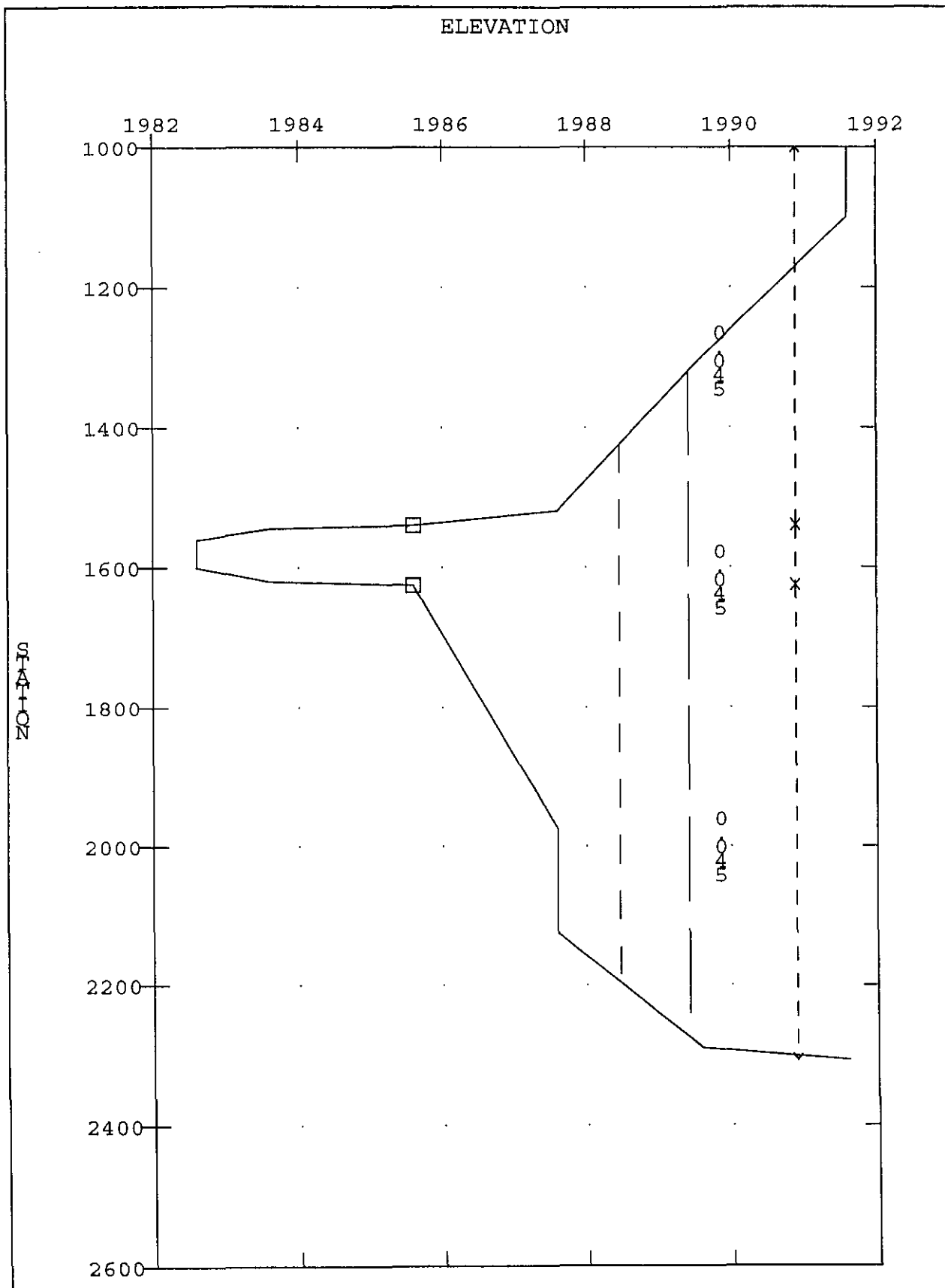
SECTION : 13094

LNLV WASH W/O DIVERSION



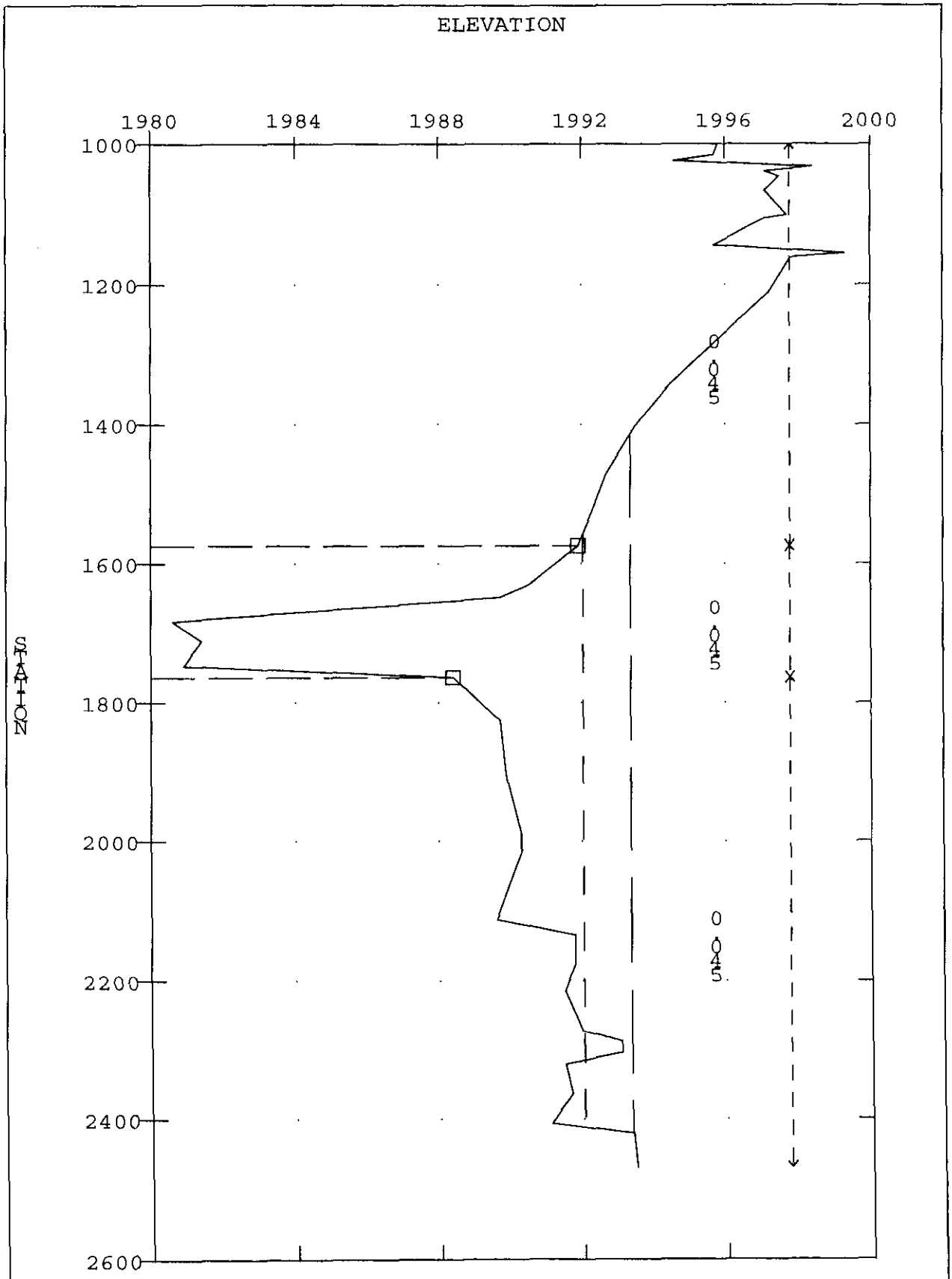
SECTION : 14167

LNLV WASH W/O DIVERSION



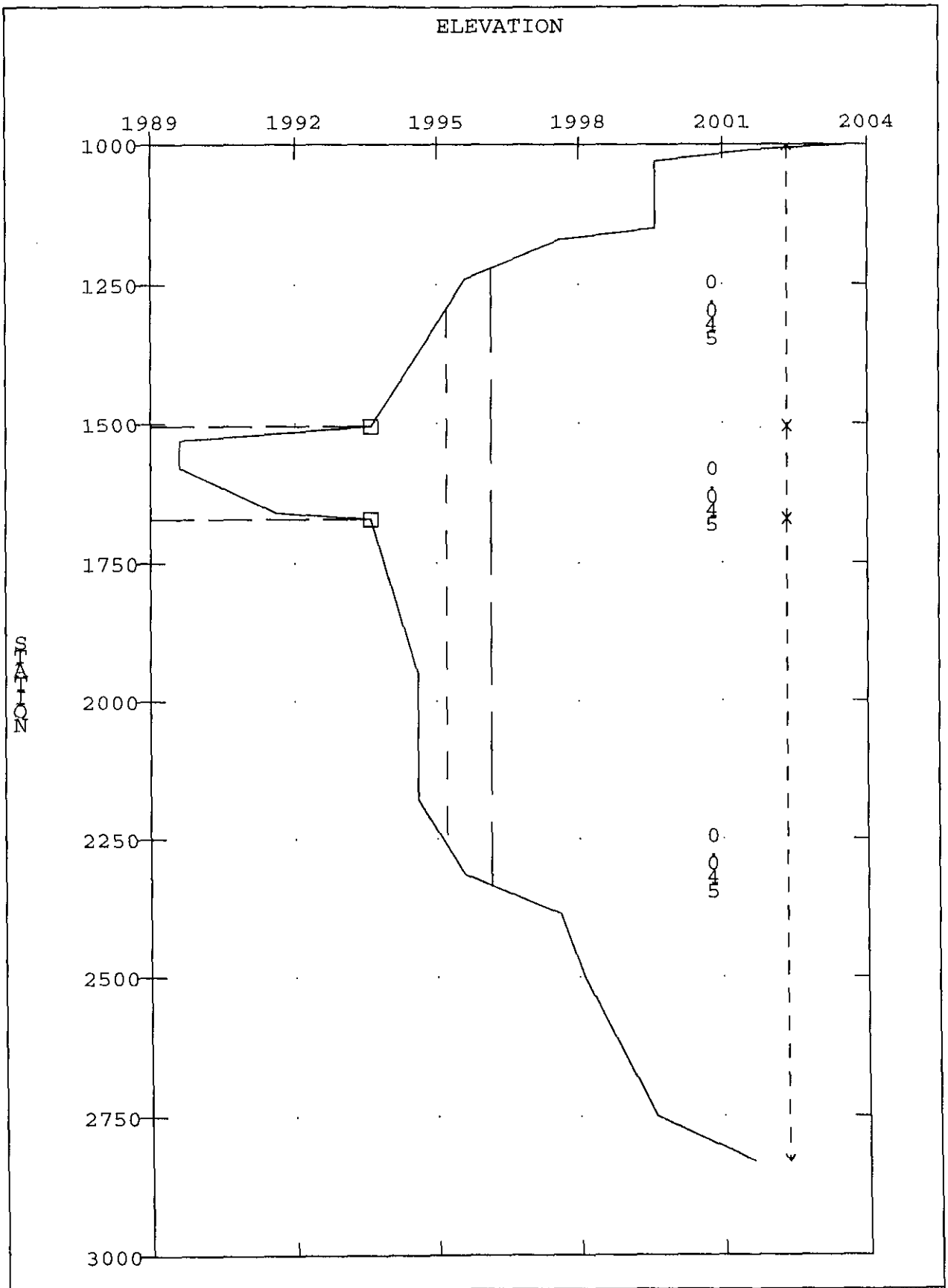
SECTION : 14368

LNLV WASH W/O DIVERSION



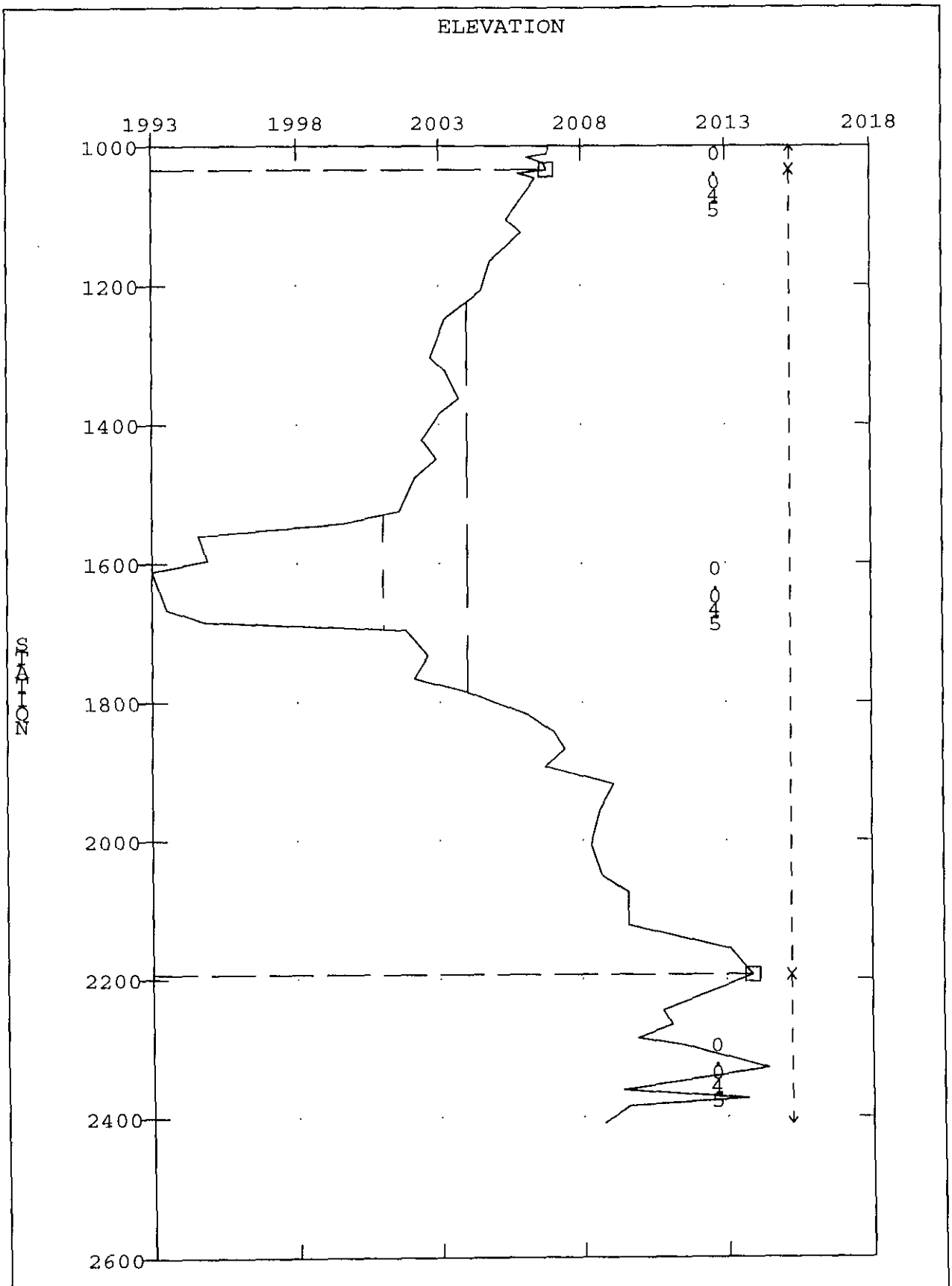
SECTION : 15114

LNLV WASH W/O DIVERSION



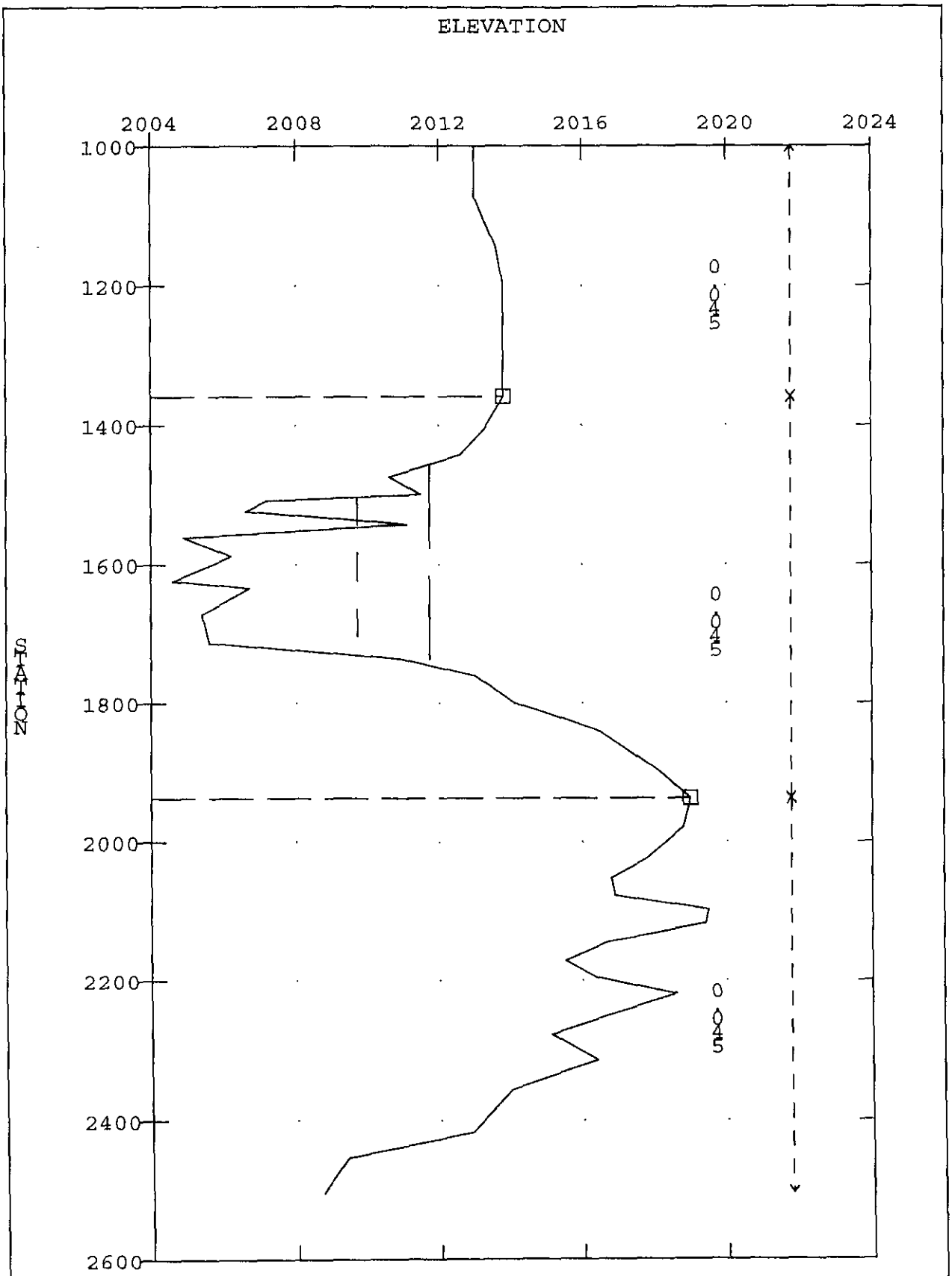
SECTION : 15667

LNLV WASH W/O DIVERSION



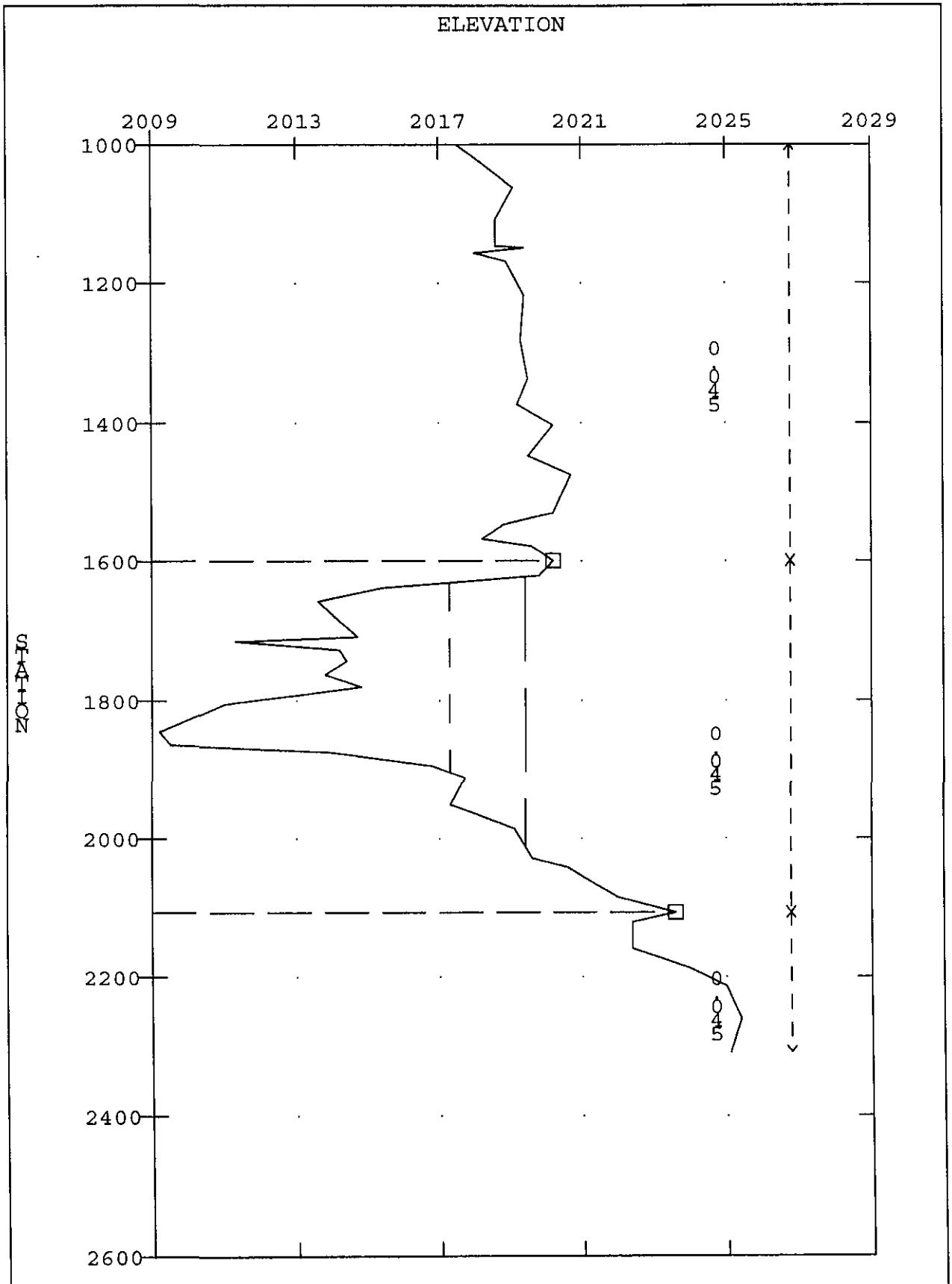
SECTION : 16546

LNLV WASH W/O DIVERSION



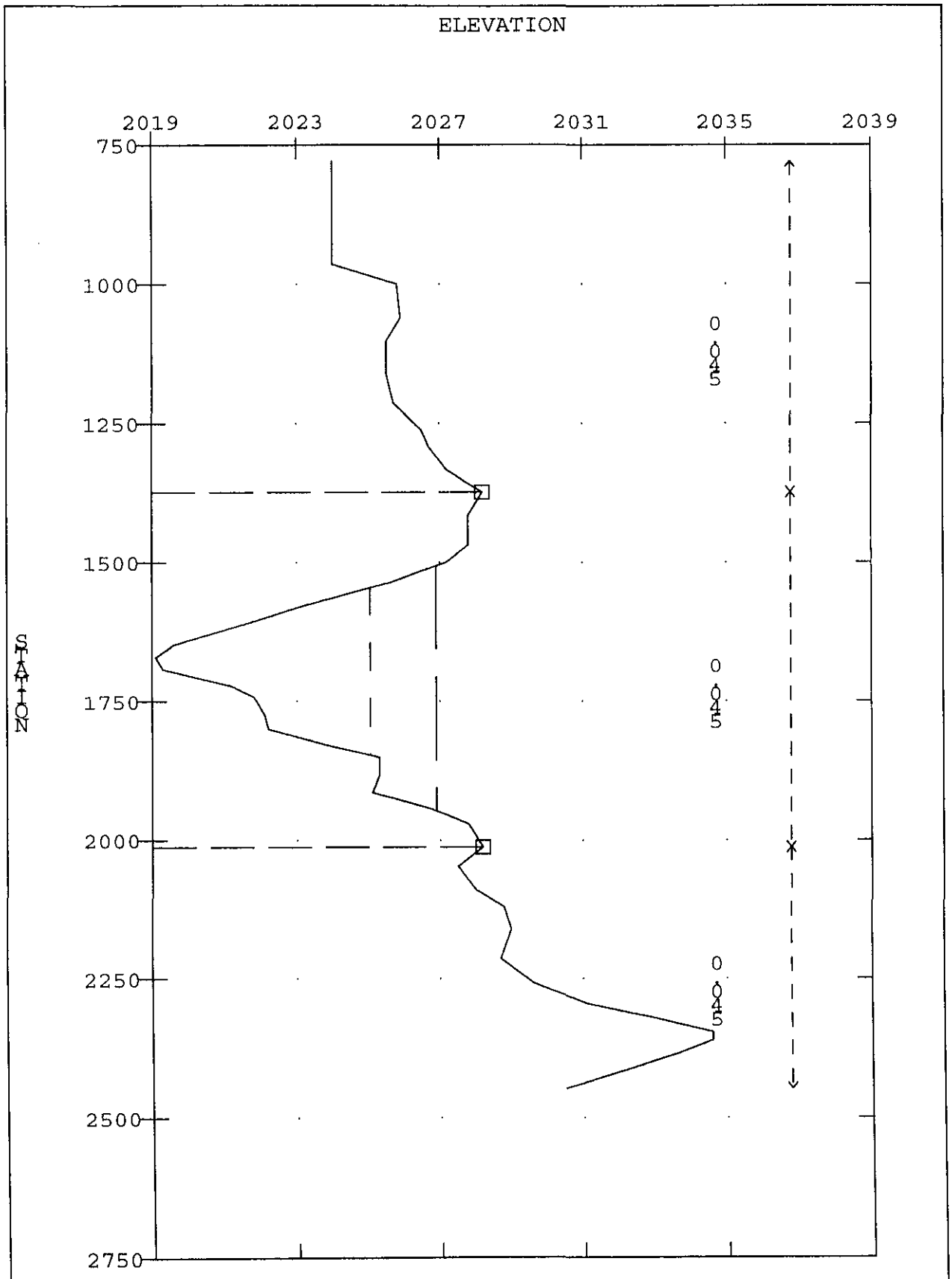
SECTION : 17058

LNLV WASH W/O DIVERSION



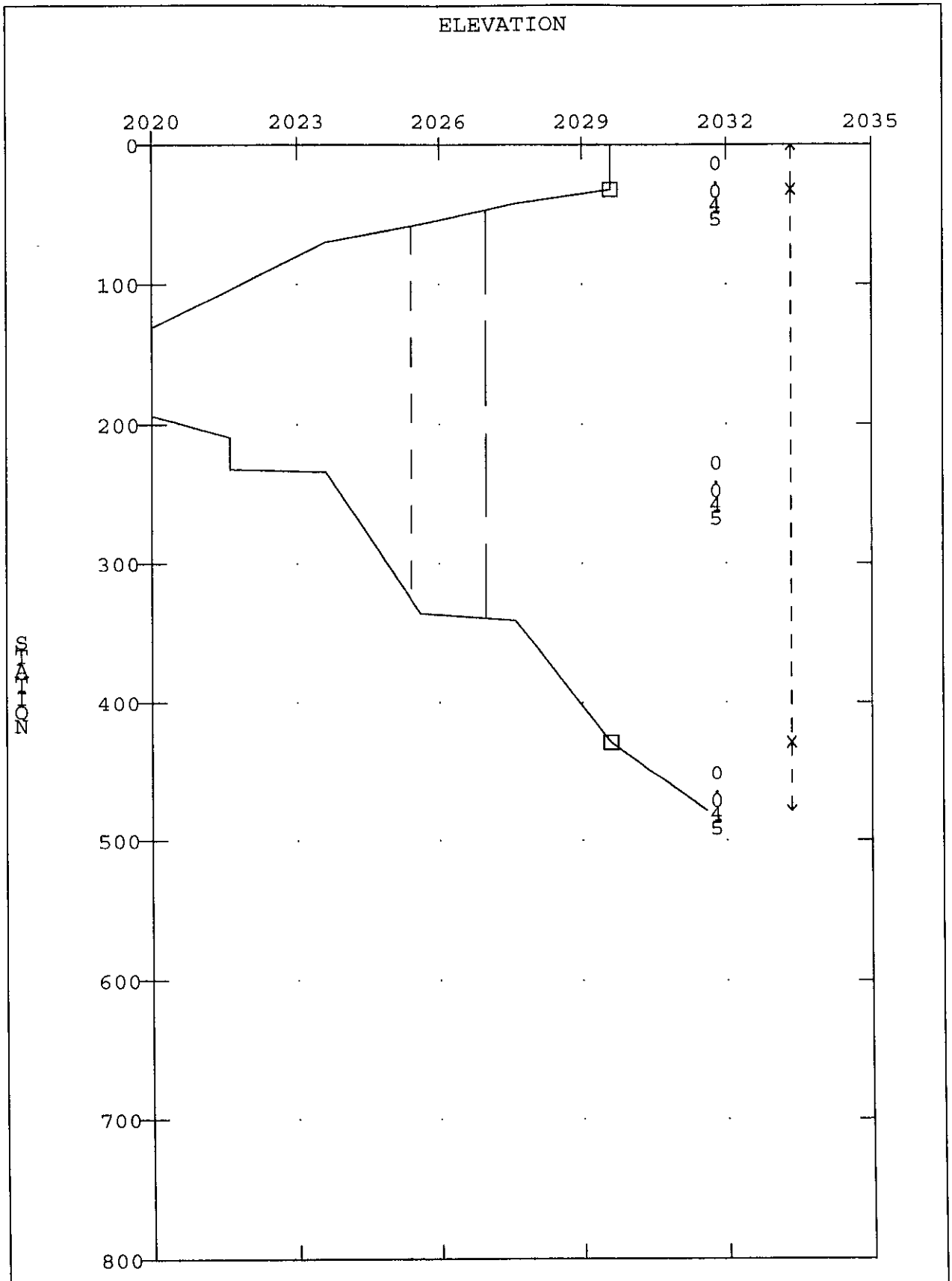
SECTION : 17612

LNLV WASH W/O DIVERSION



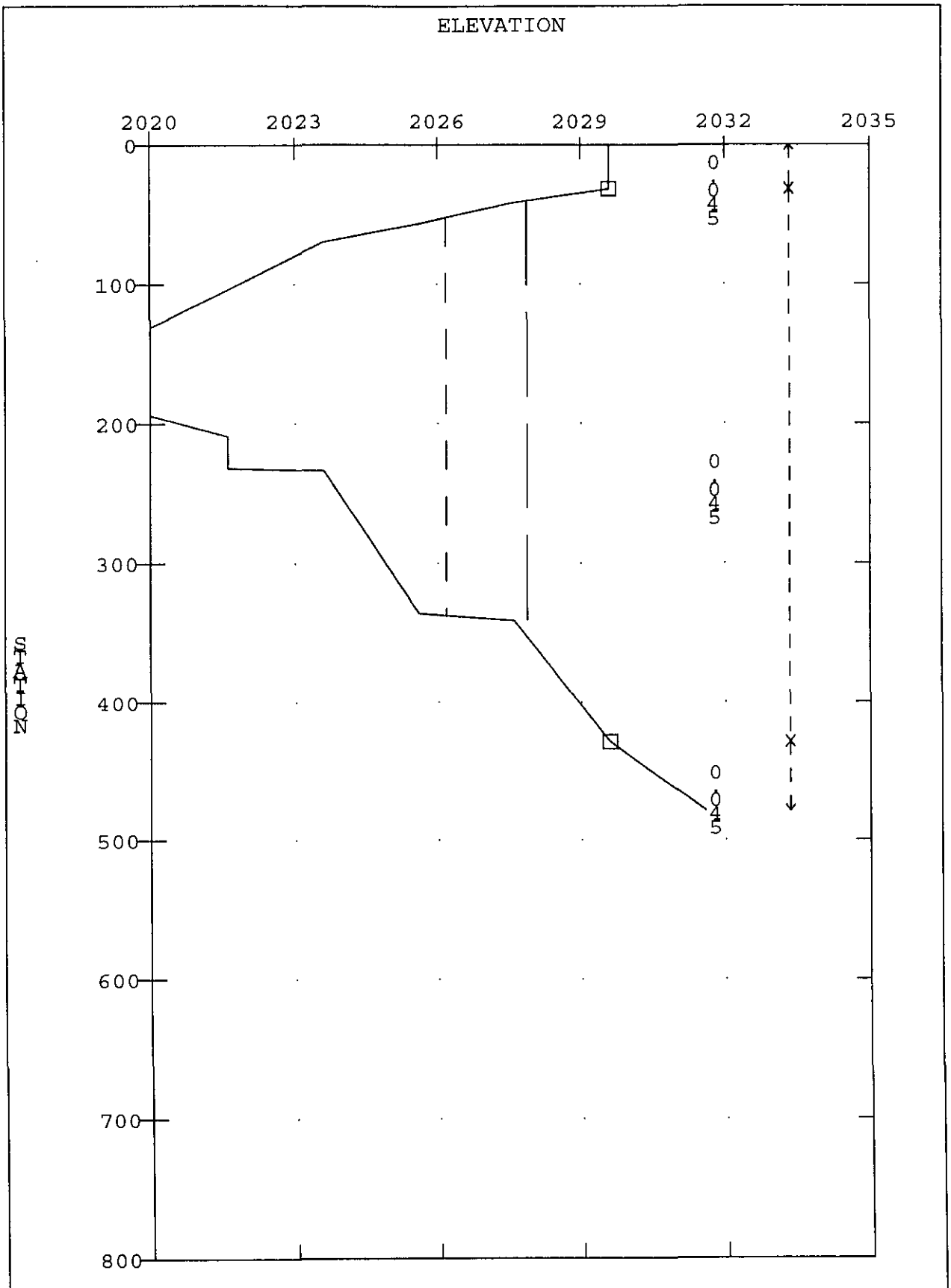
SECTION : 18436

LNLV WASH W/O DIVERSION



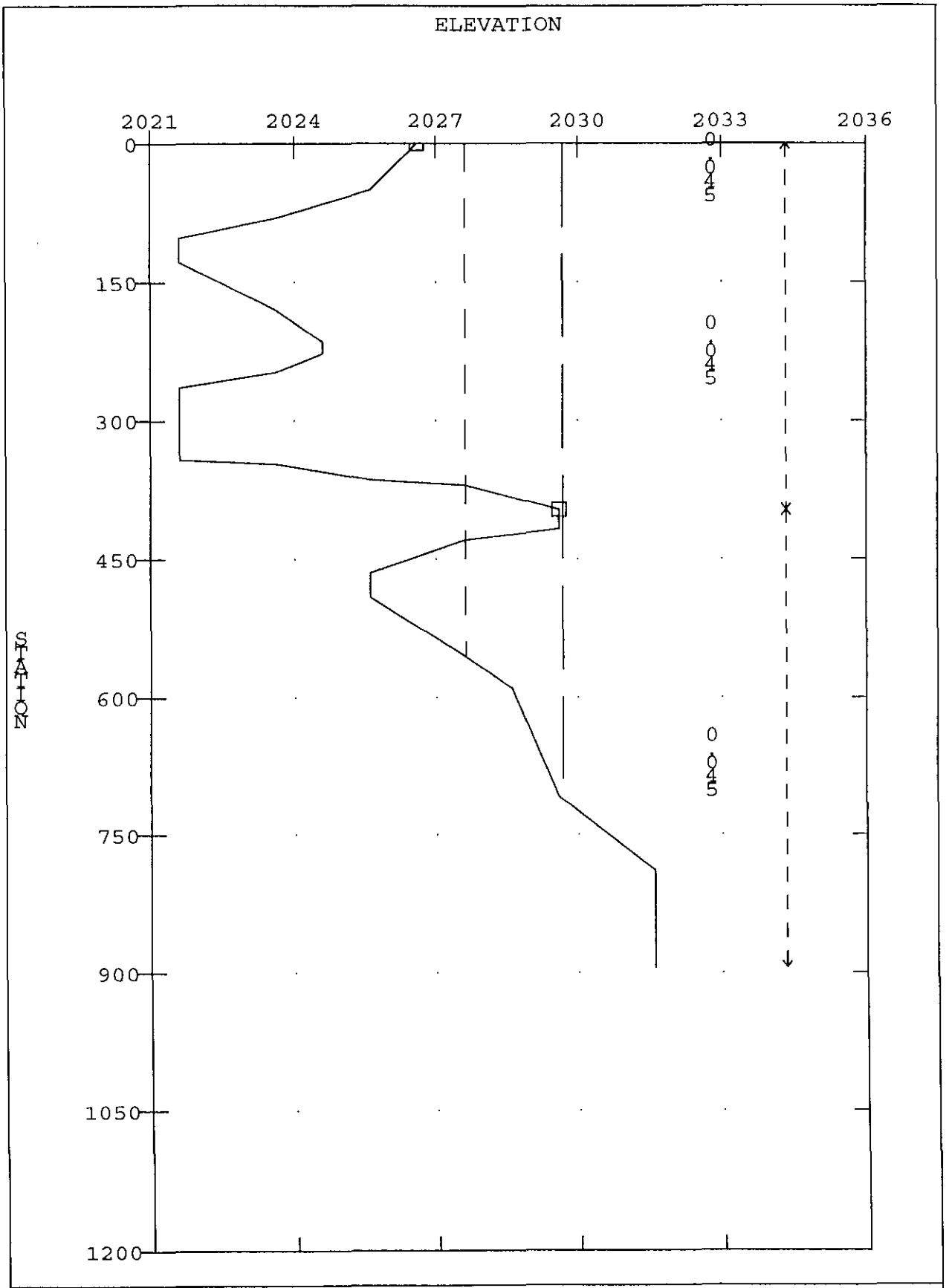
SECTION : 18462

LNLV WASH W/O DIVERSION



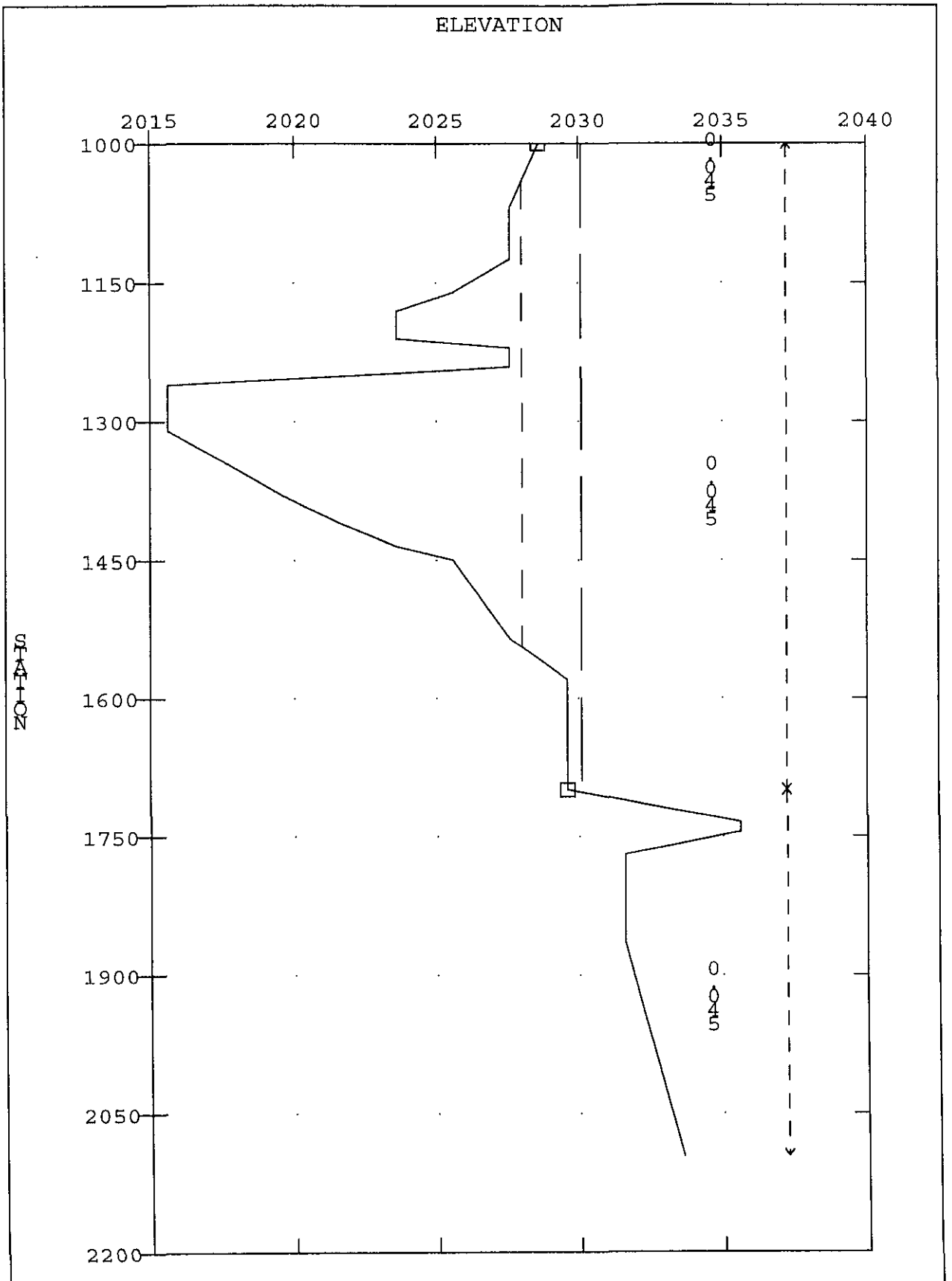
SECTION : 18472

LNLV WASH W/O DIVERSION



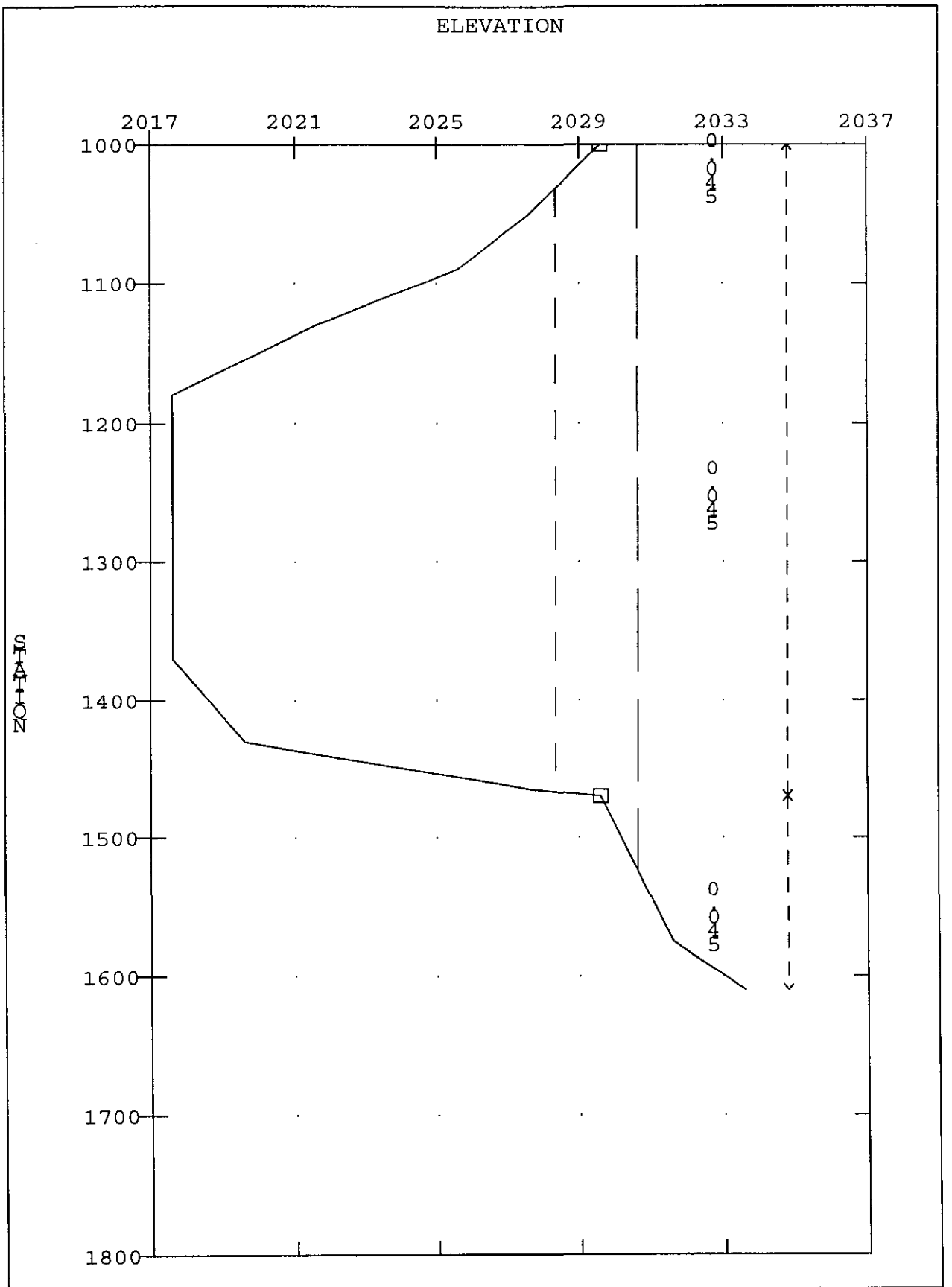
SECTION : 18619

LNLV WASH W/O DIVERSION



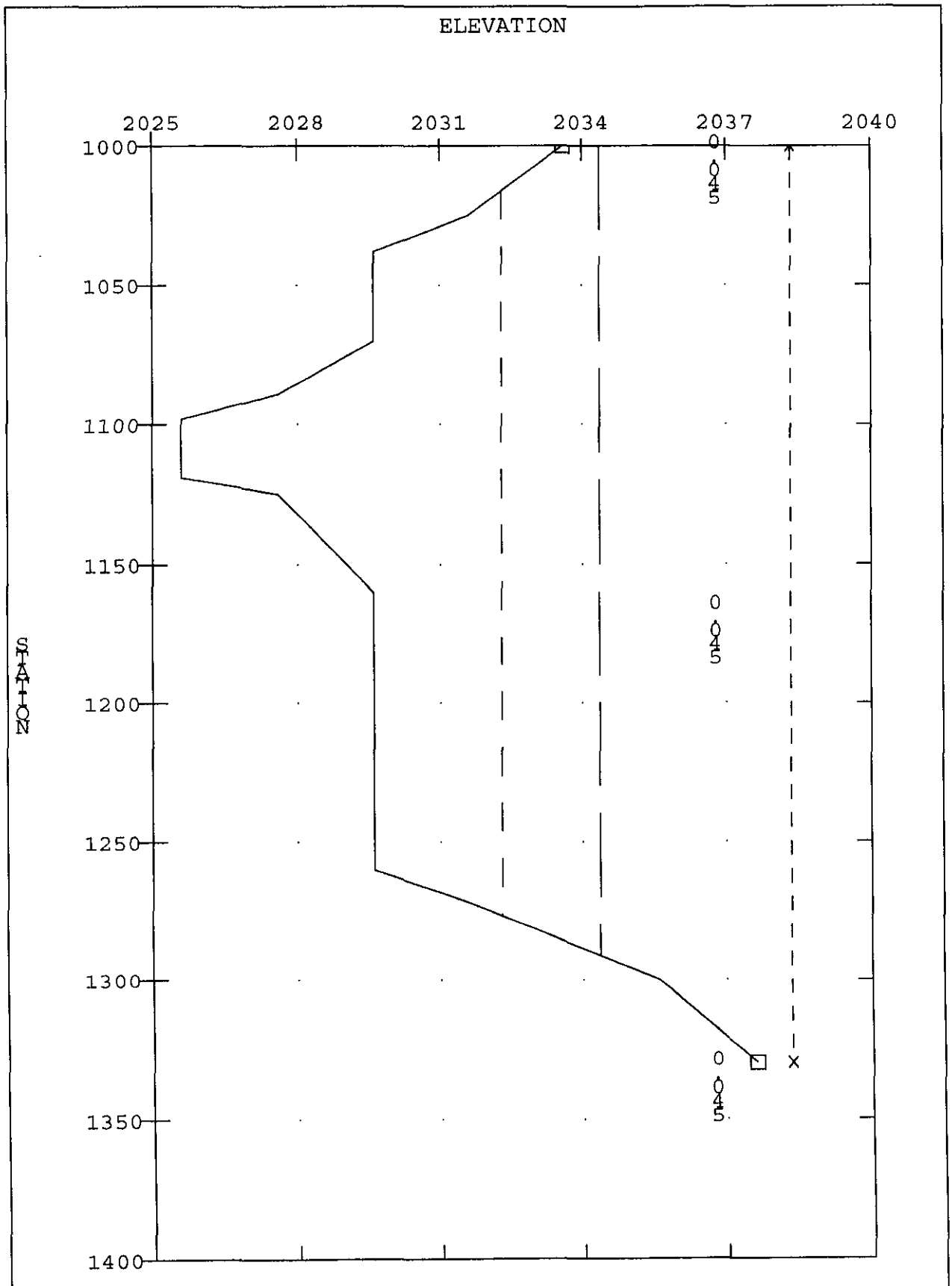
SECTION : 18710

LNLV WASH W/O DIVERSION



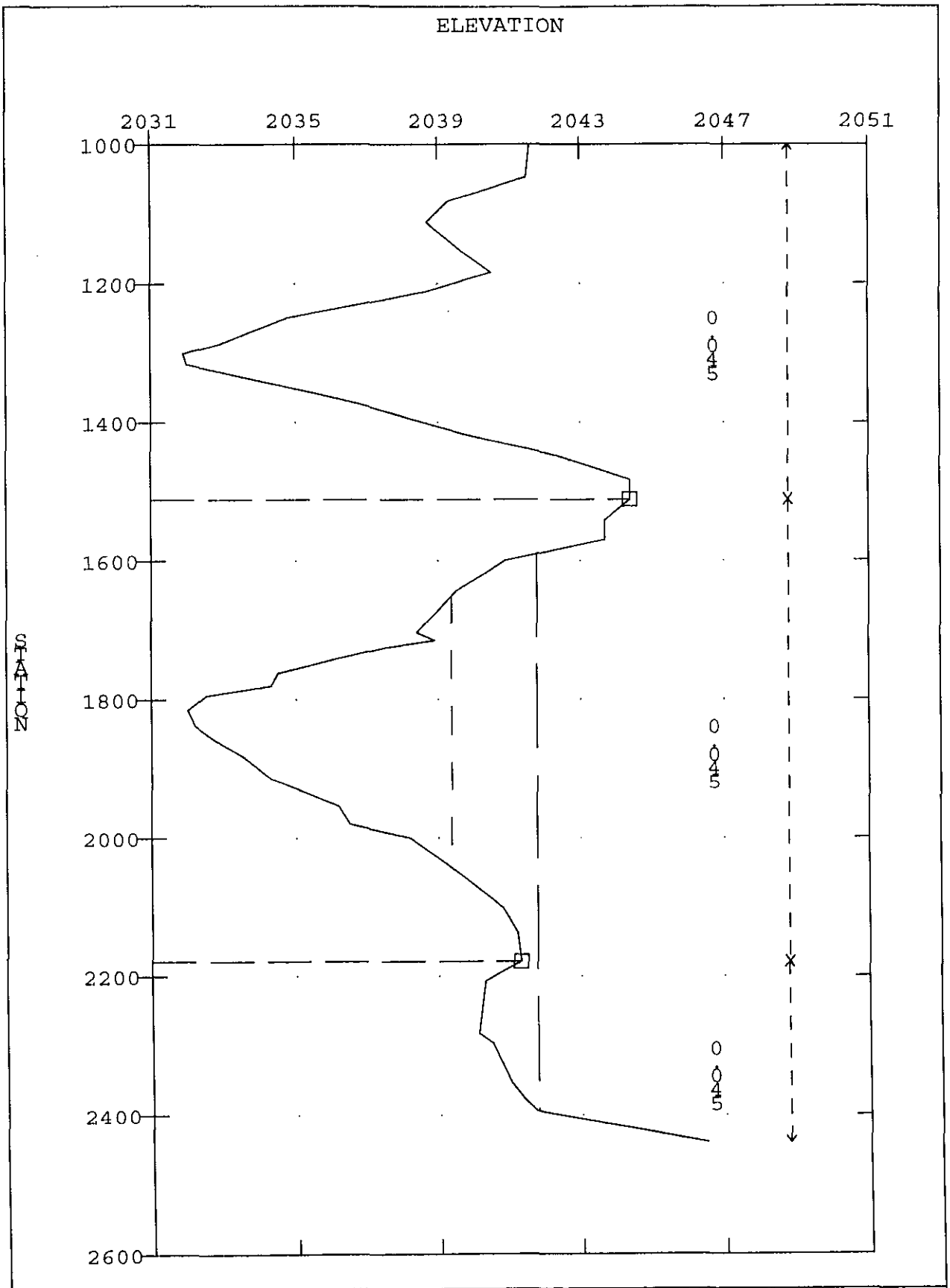
SECTION : 19020

LNLV WASH W/O DIVERSION



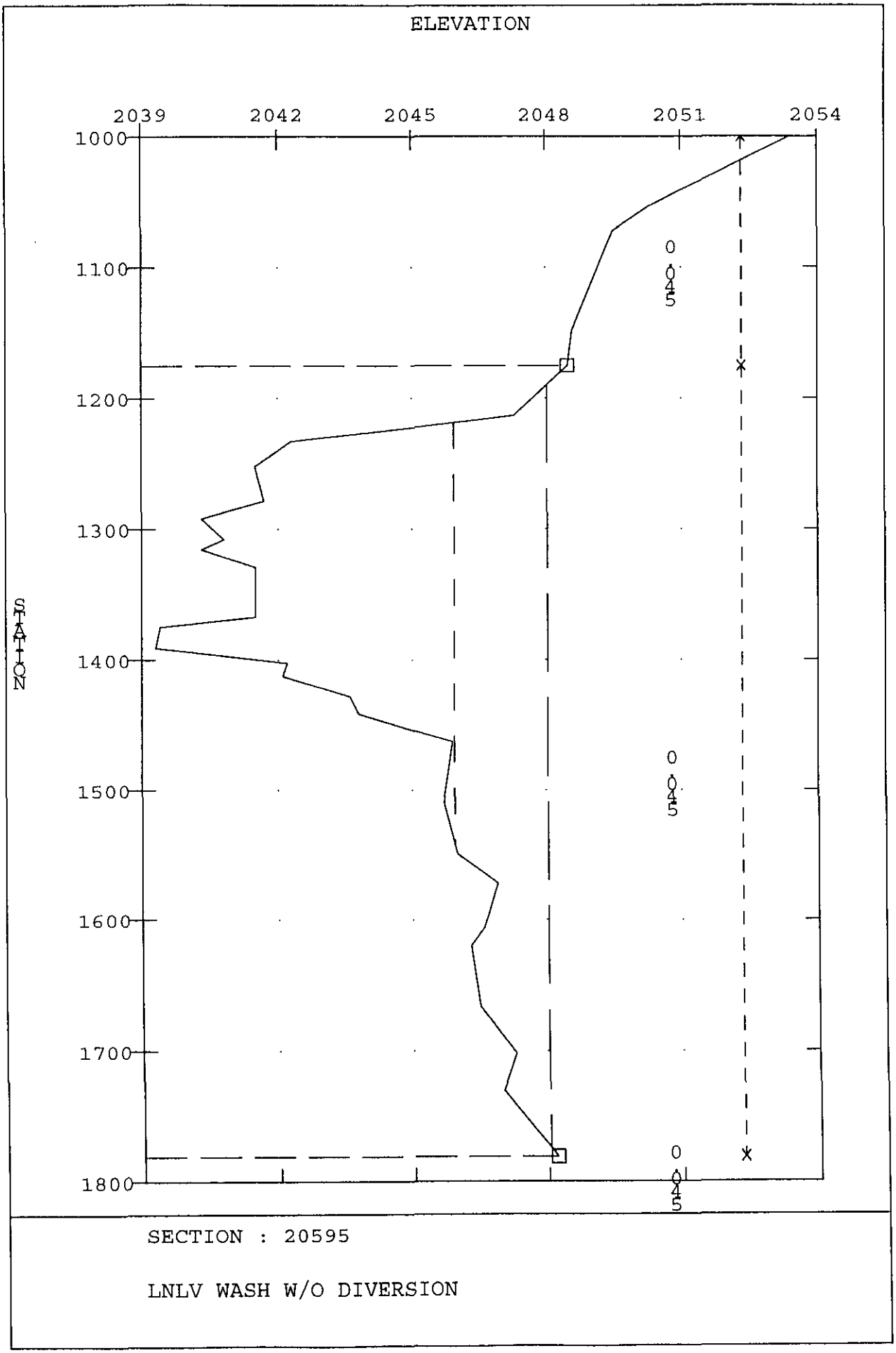
SECTION : 19215

LNLV WASH W/O DIVERSION



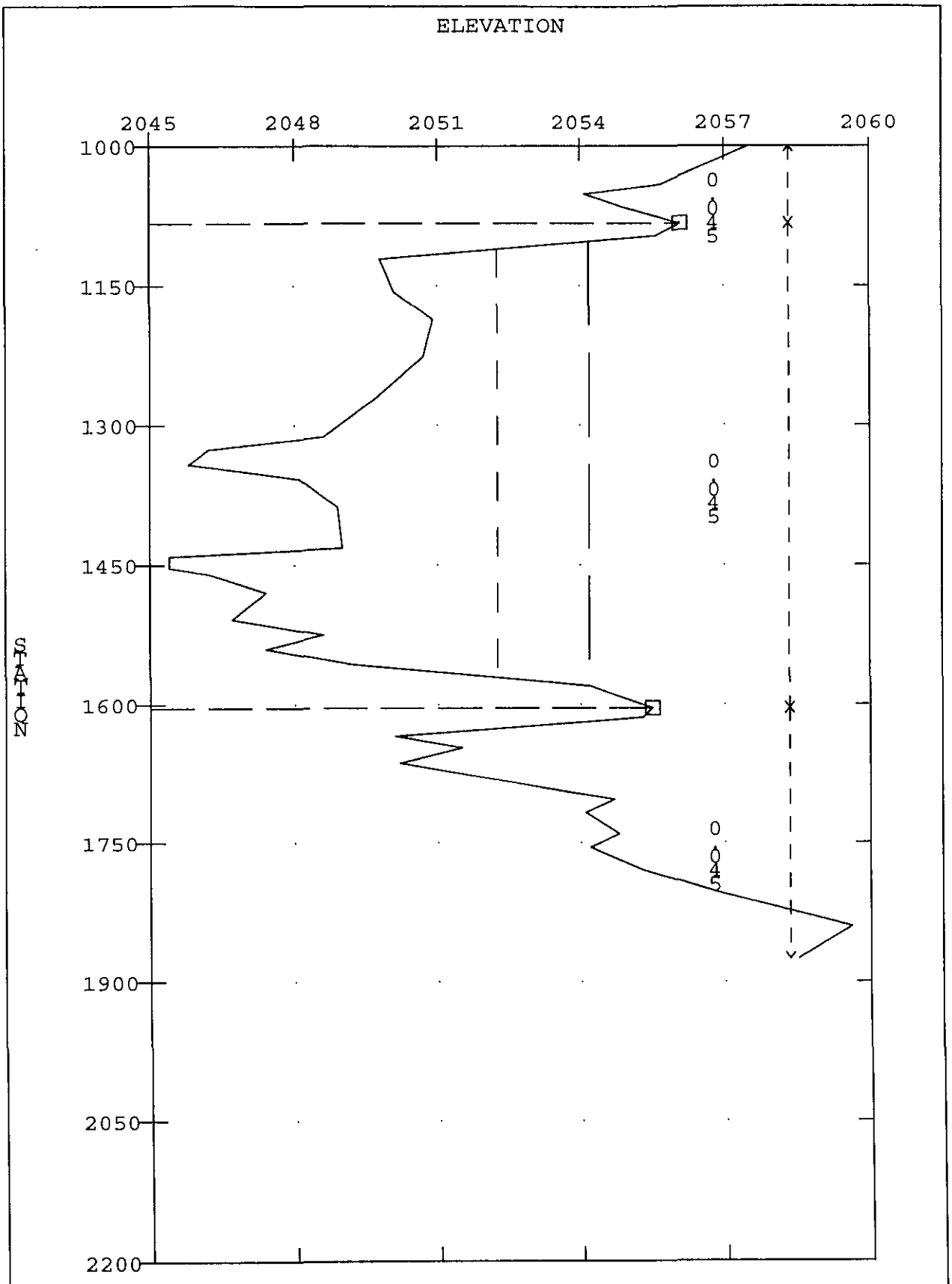
SECTION : 19802

LNLV WASH W/O DIVERSION



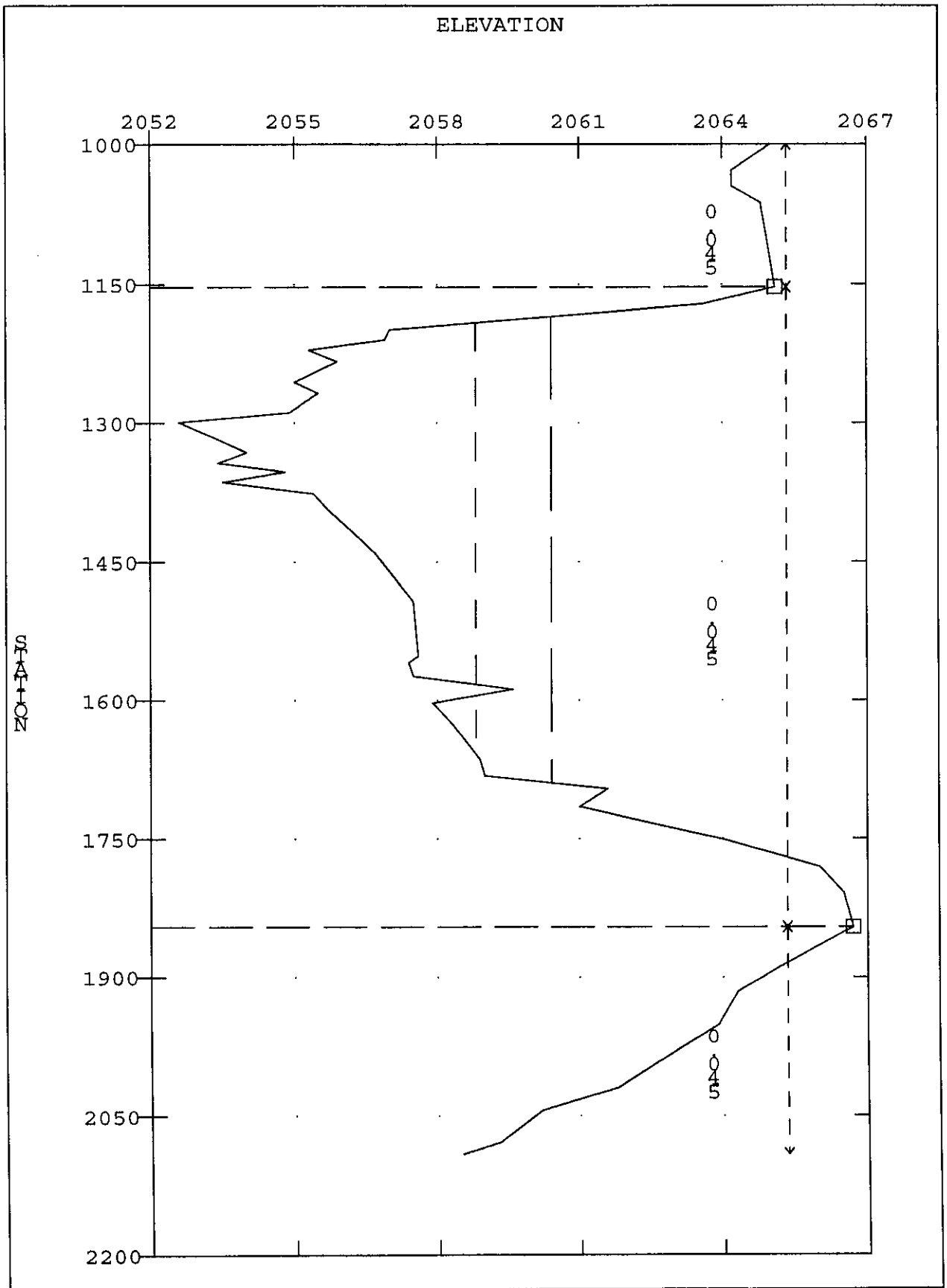
SECTION : 20595

LNLV WASH W/O DIVERSION



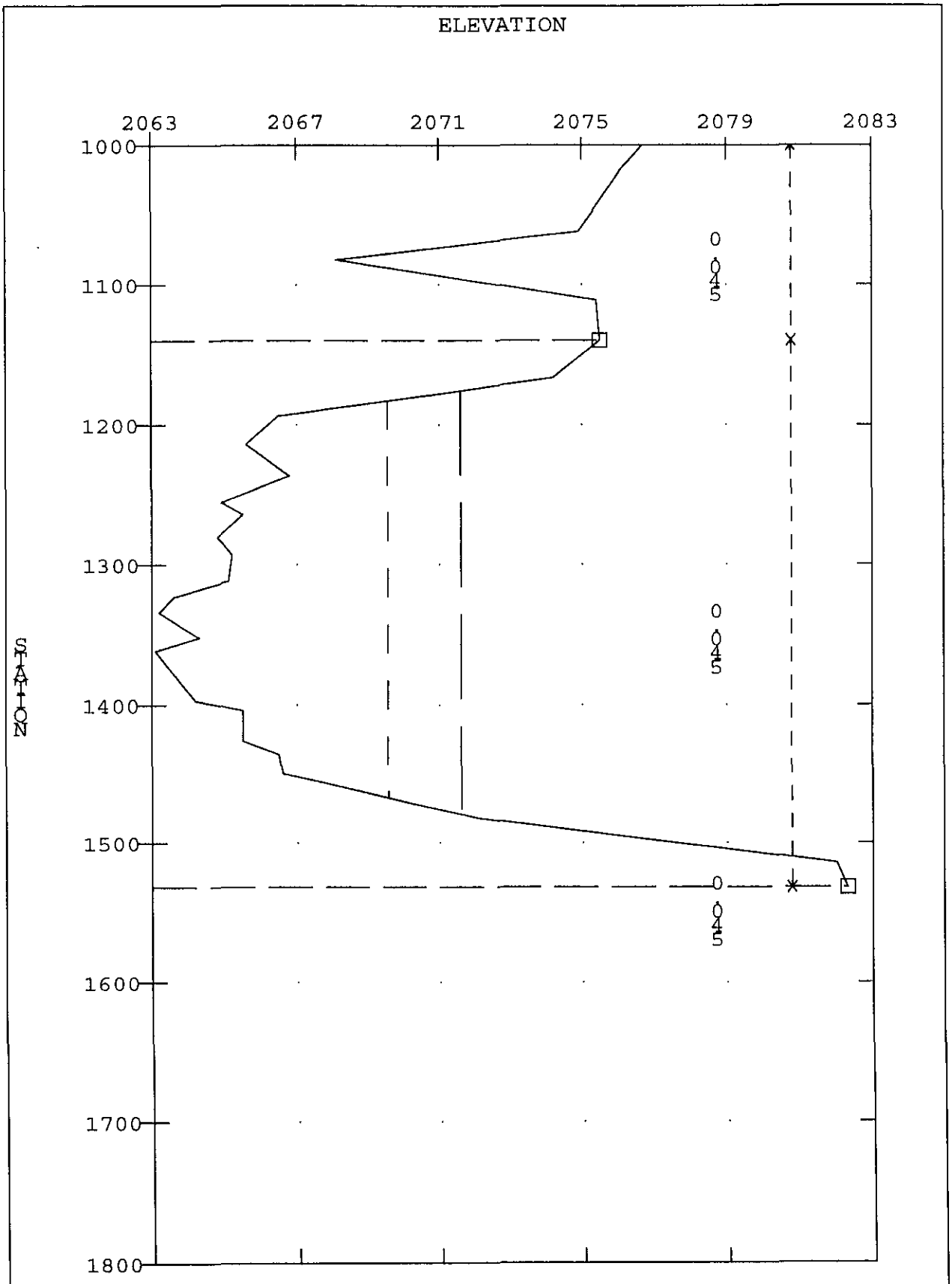
SECTION : 21291

LNLV WASH W/O DIVERSION



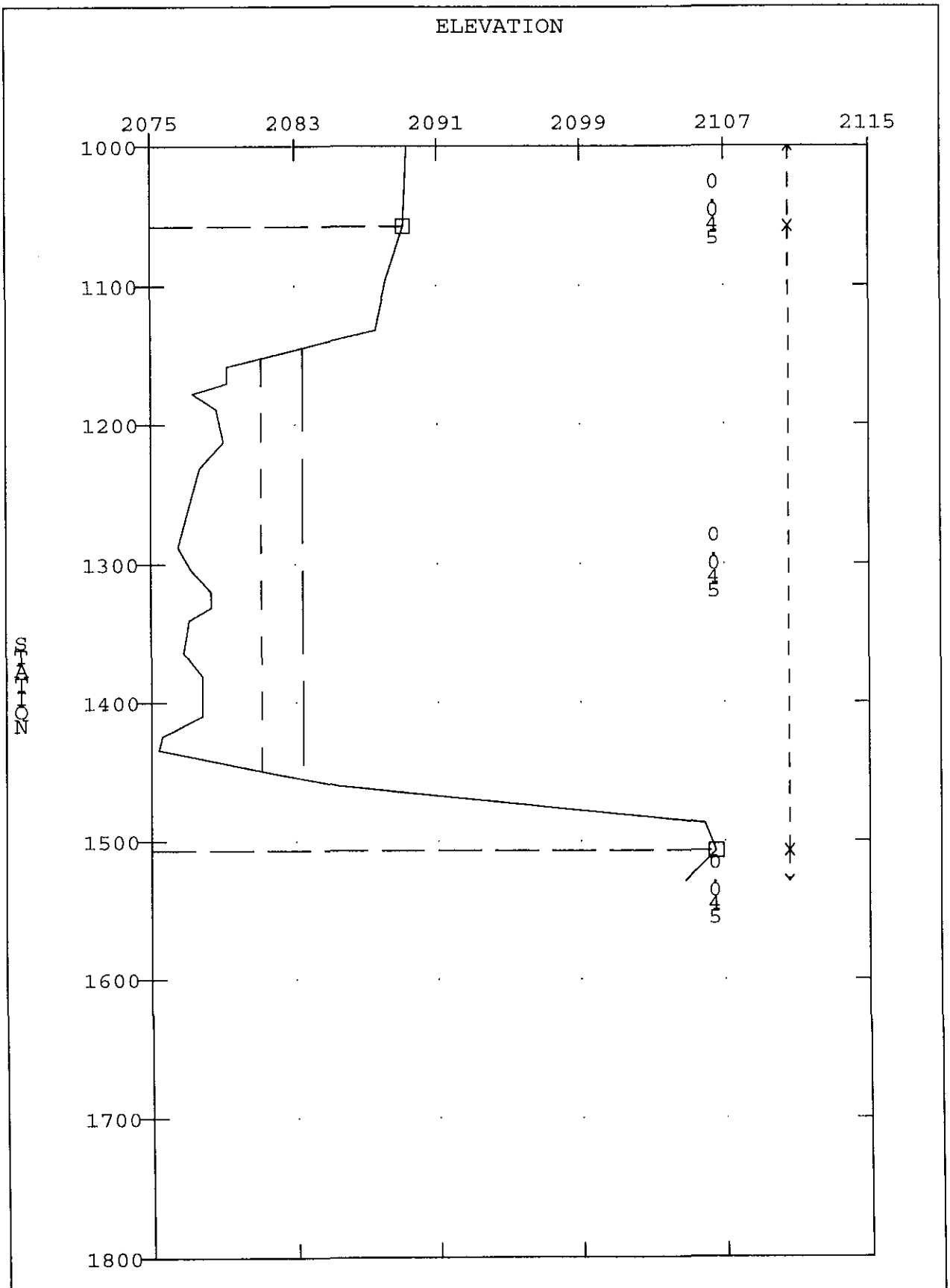
SECTION : 22138

LNLV WASH W/O DIVERSION



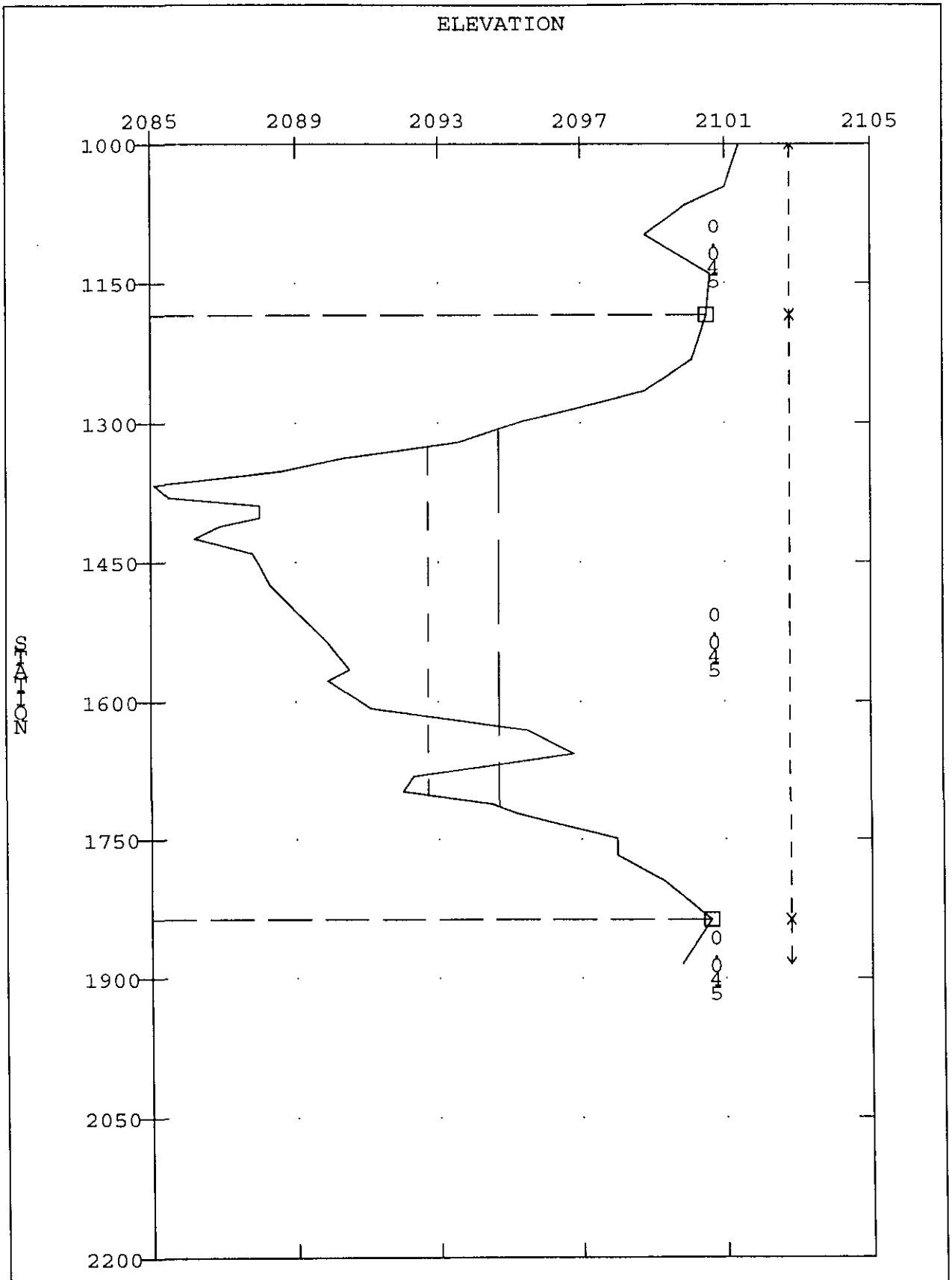
SECTION : 23230

LNLV WASH W/O DIVERSION



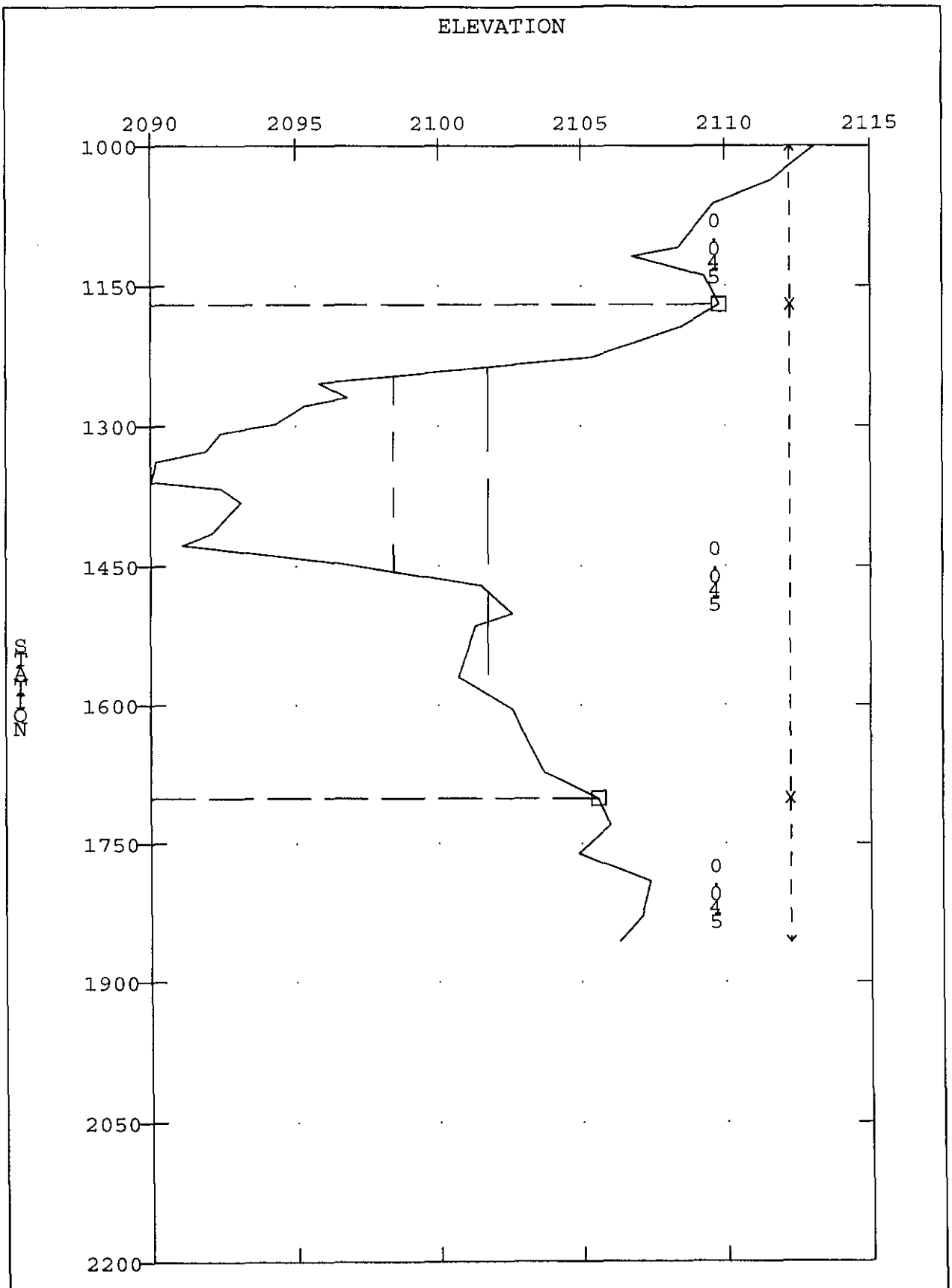
SECTION : 24530

LNLV WASH W/O DIVERSION



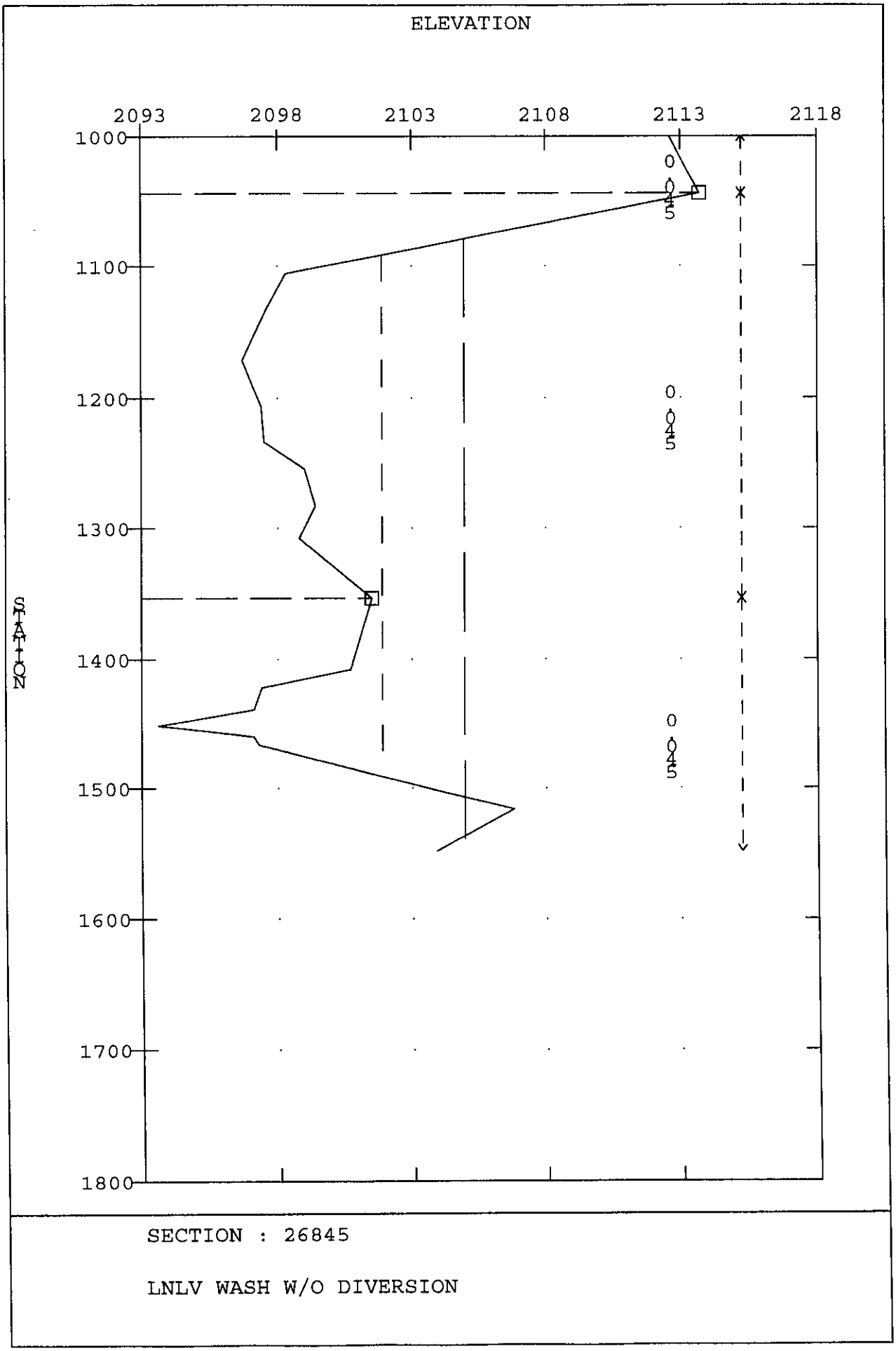
SECTION : 25616

LNLV WASH W/O DIVERSION



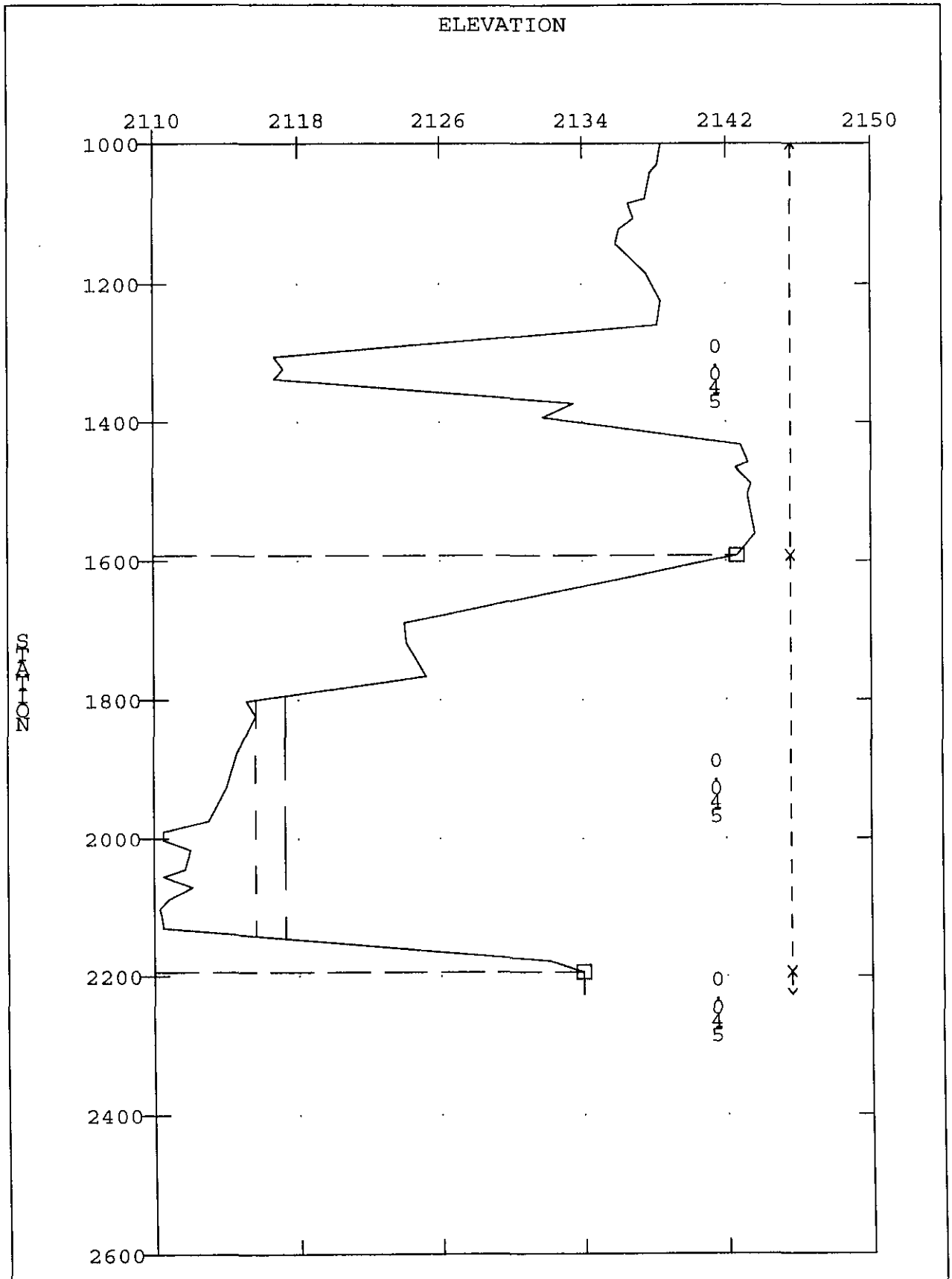
SECTION : 26383

LNLV WASH W/O DIVERSION



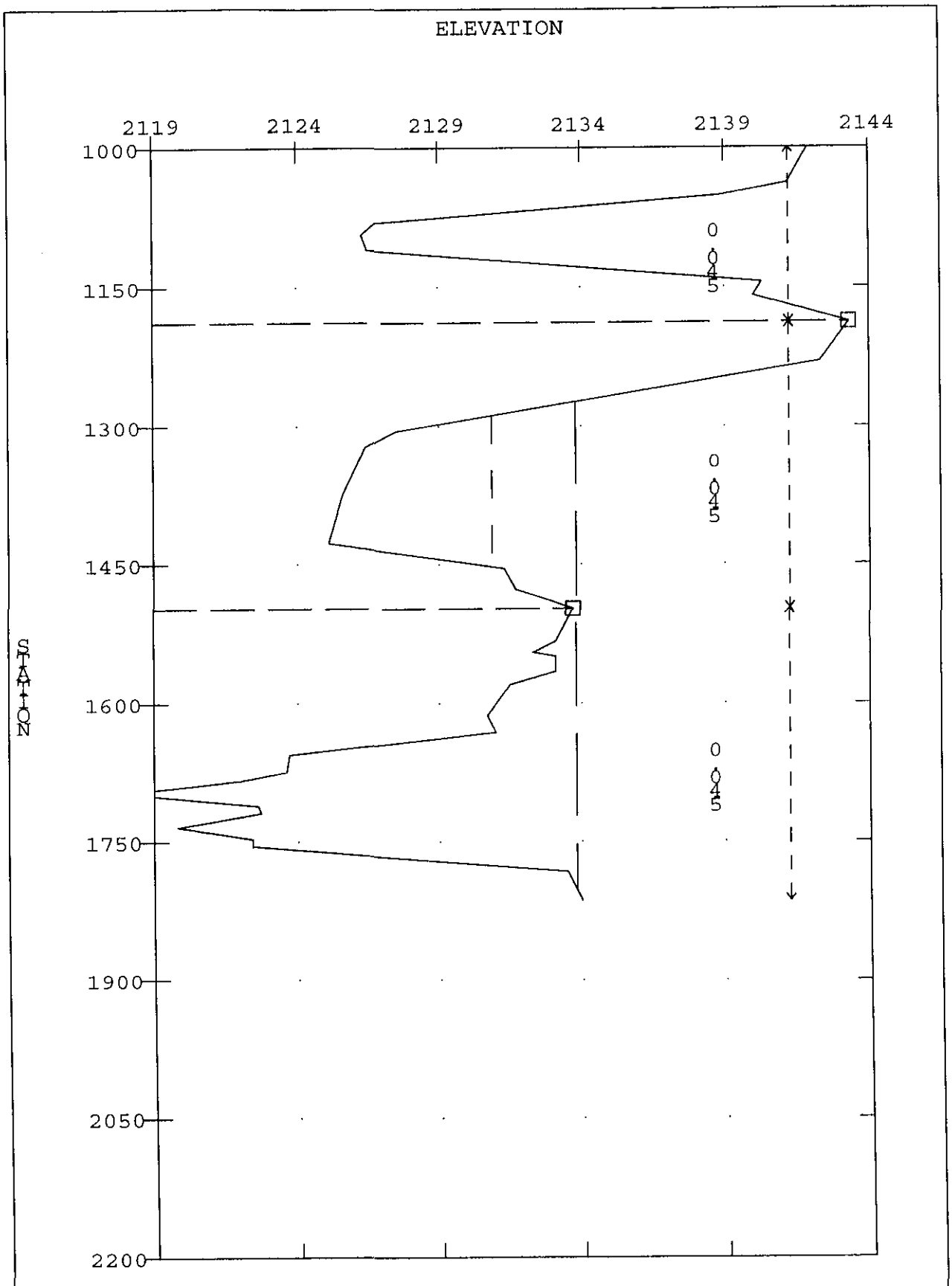
SECTION : 26845

LNLV WASH W/O DIVERSION



SECTION : 28095

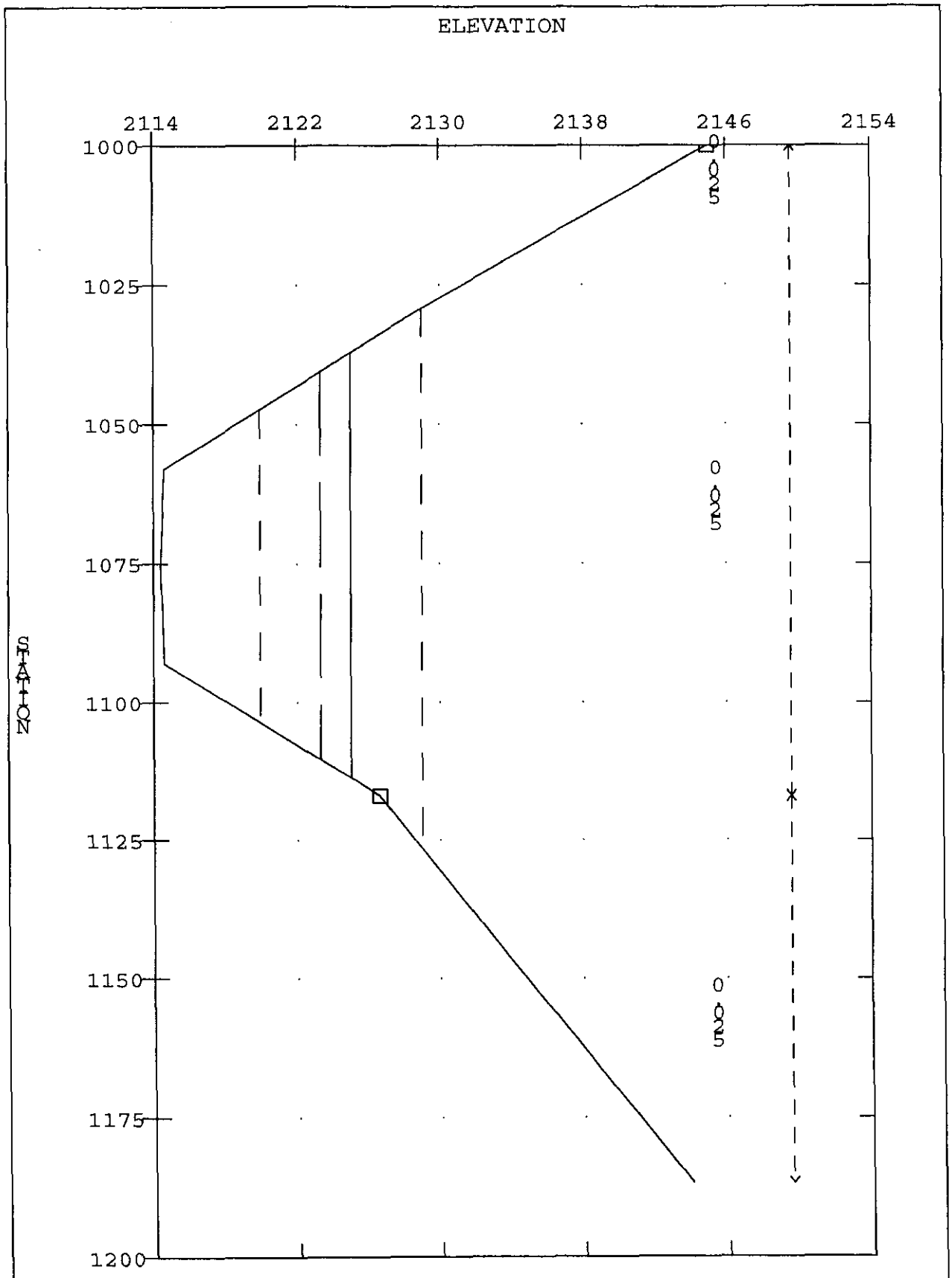
LNLV WASH W/O DIVERSION



SECTION : 29413

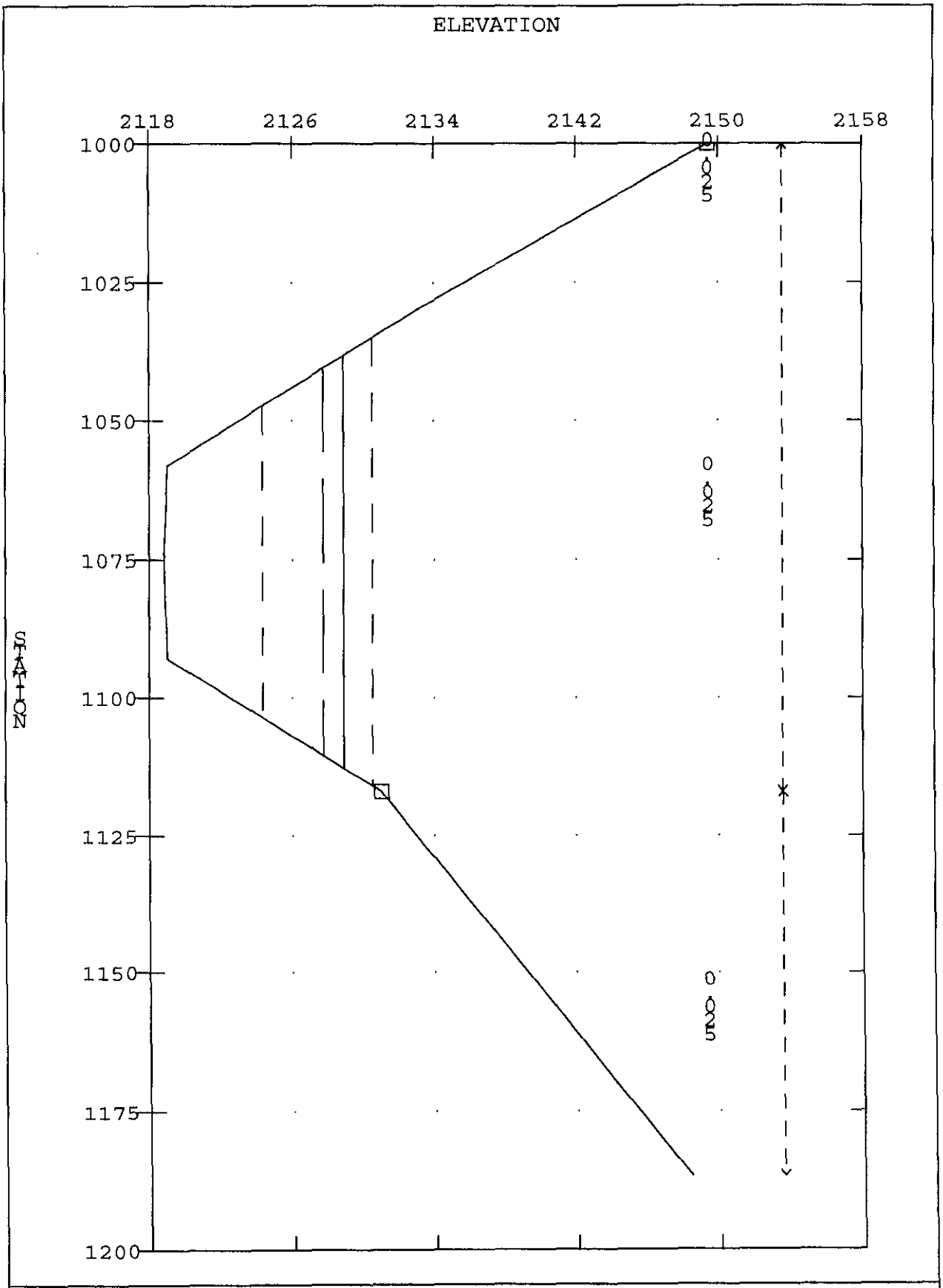
LNLV WASH W/O DIVERSION

Cross Section Plots
NLVDBV6B



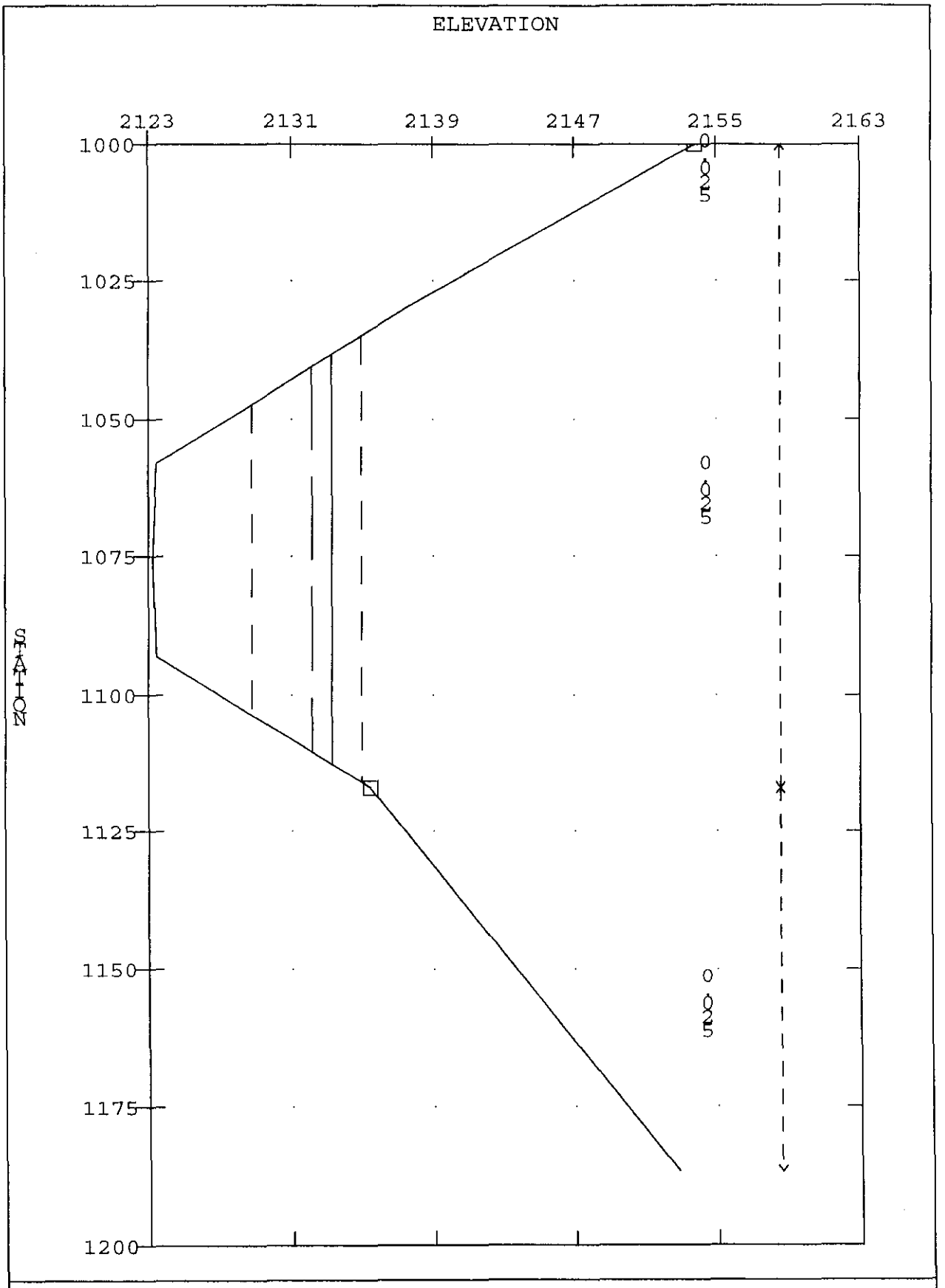
SECTION : 28903

MIDDLE NO. LAS VEGAS WASH



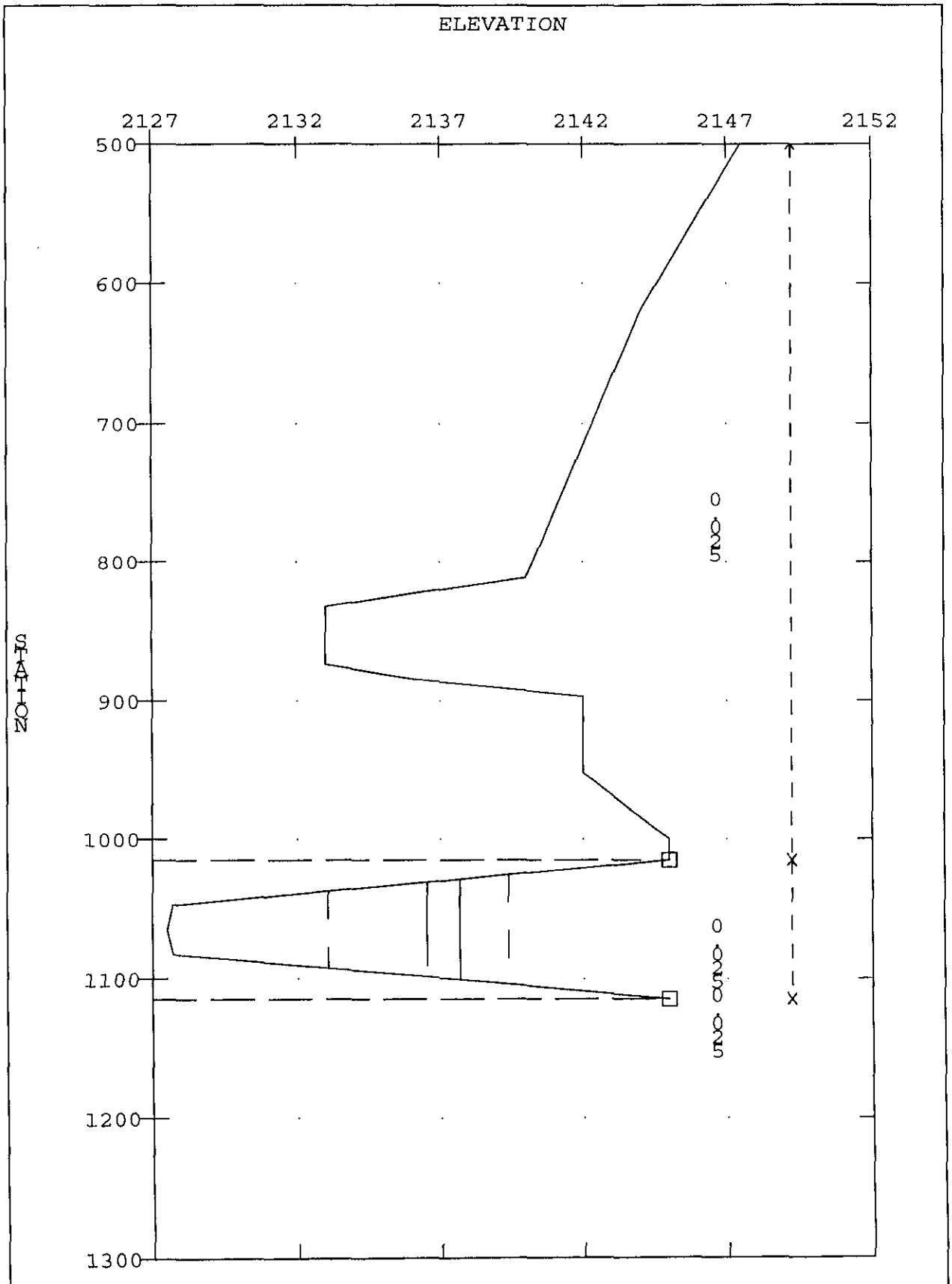
SECTION : 29486

MIDDLE NO. LAS VEGAS WASH



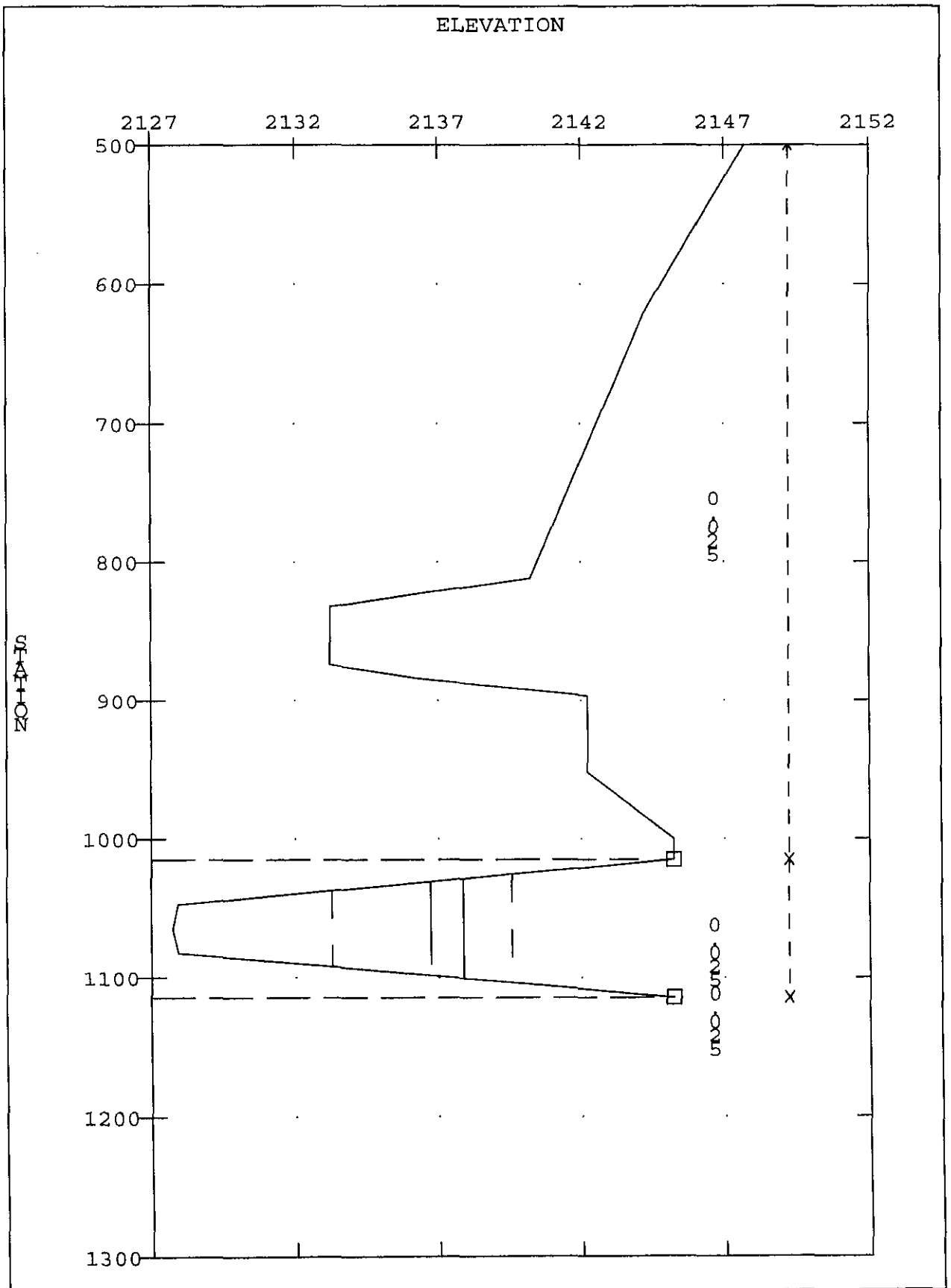
SECTION : 30067

MIDDLE NO. LAS VEGAS WASH



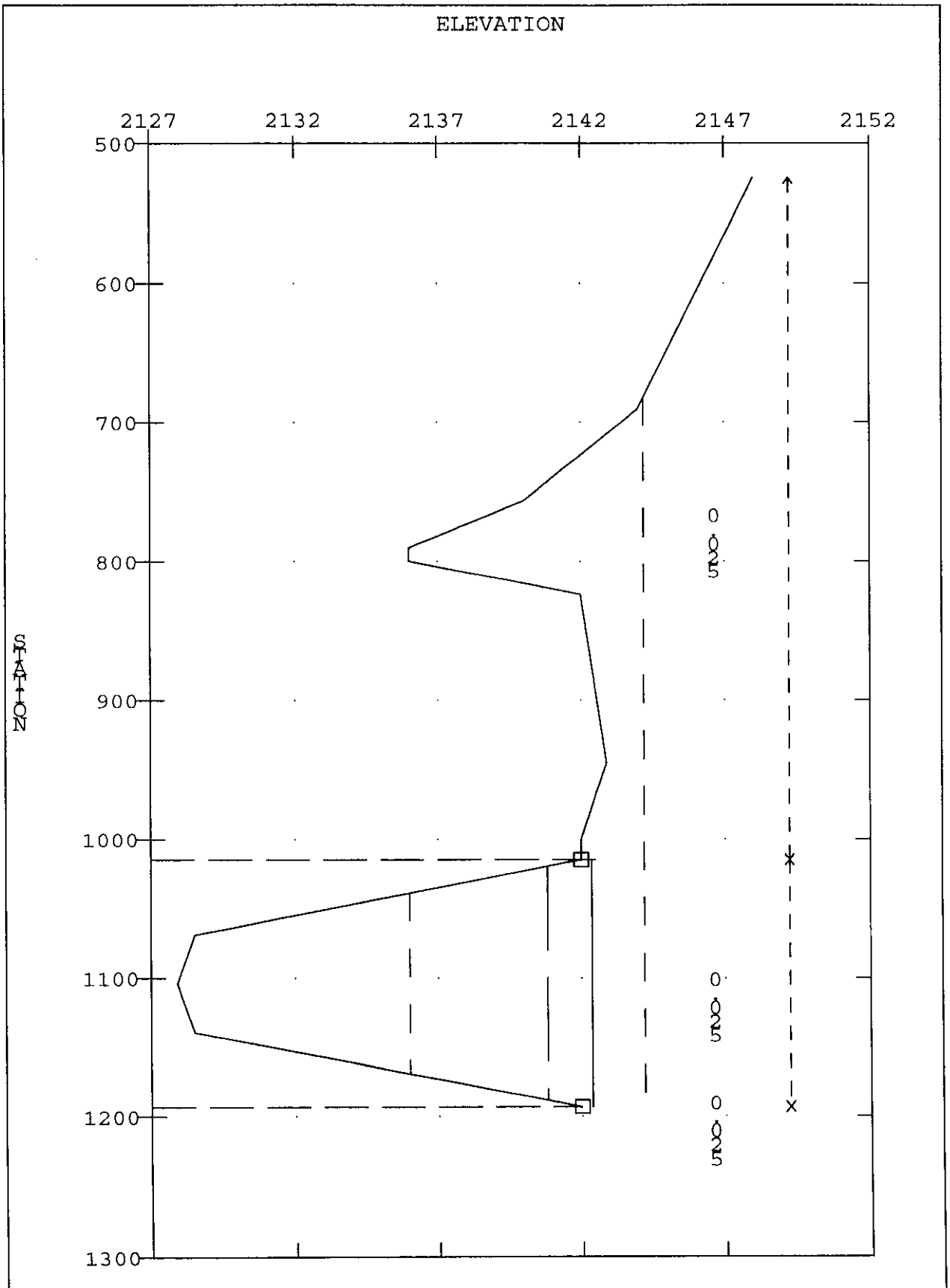
SECTION : 30650

MIDDLE NO. LAS VEGAS WASH



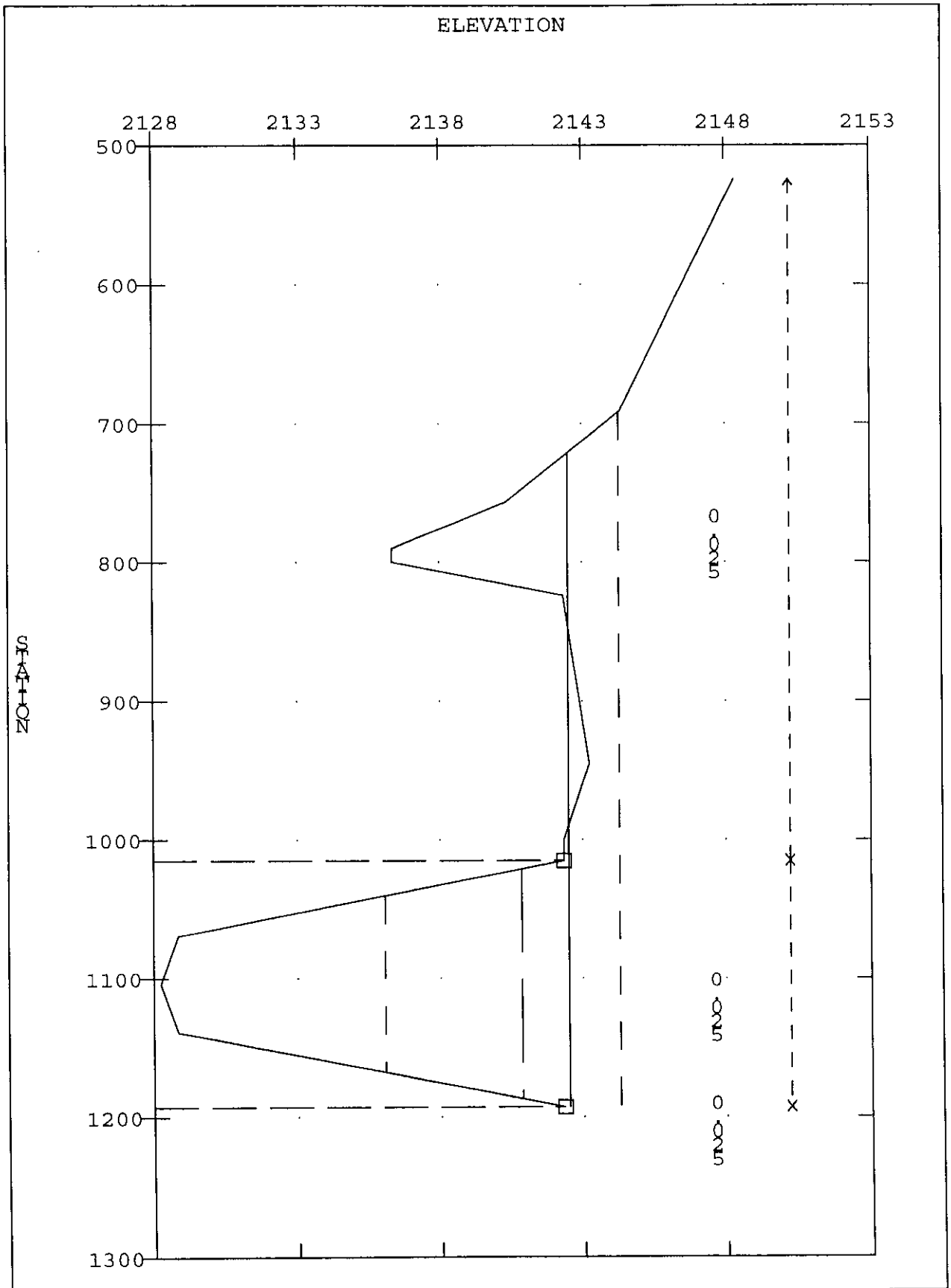
SECTION : 30680

MIDDLE NO. LAS VEGAS WASH



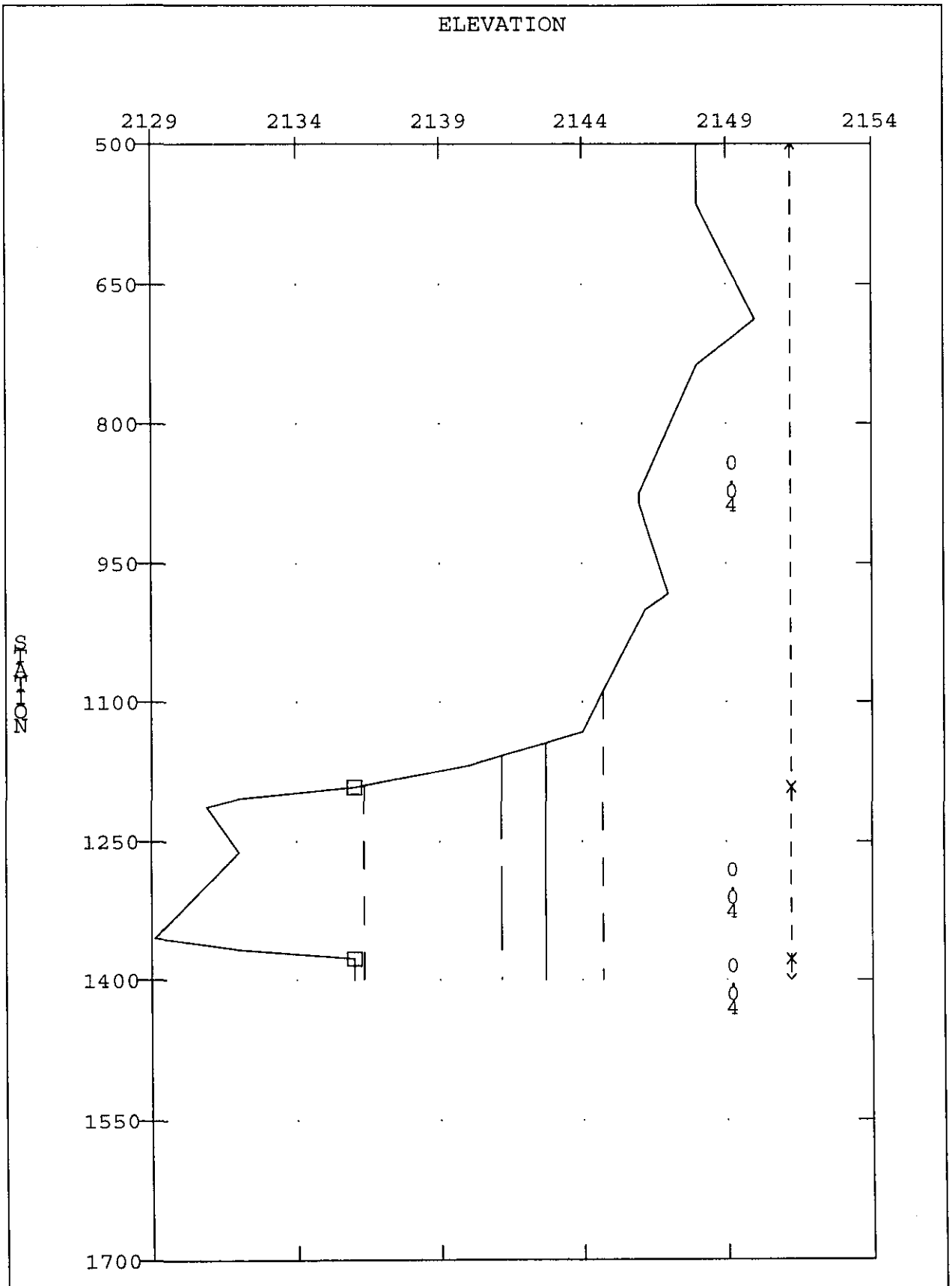
SECTION : 30765

MIDDLE NO. LAS VEGAS WASH



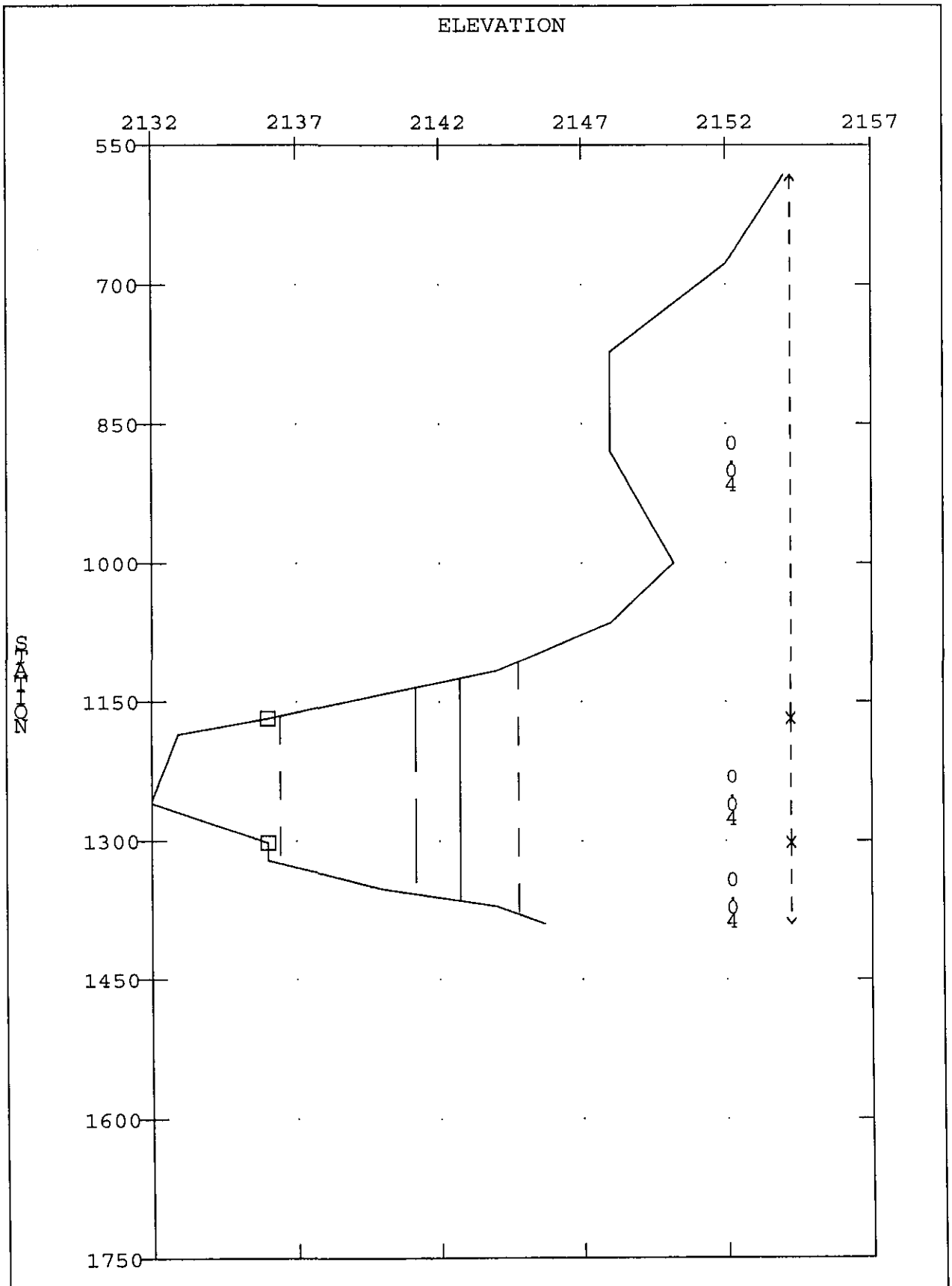
SECTION : 30935

MIDDLE NO. LAS VEGAS WASH



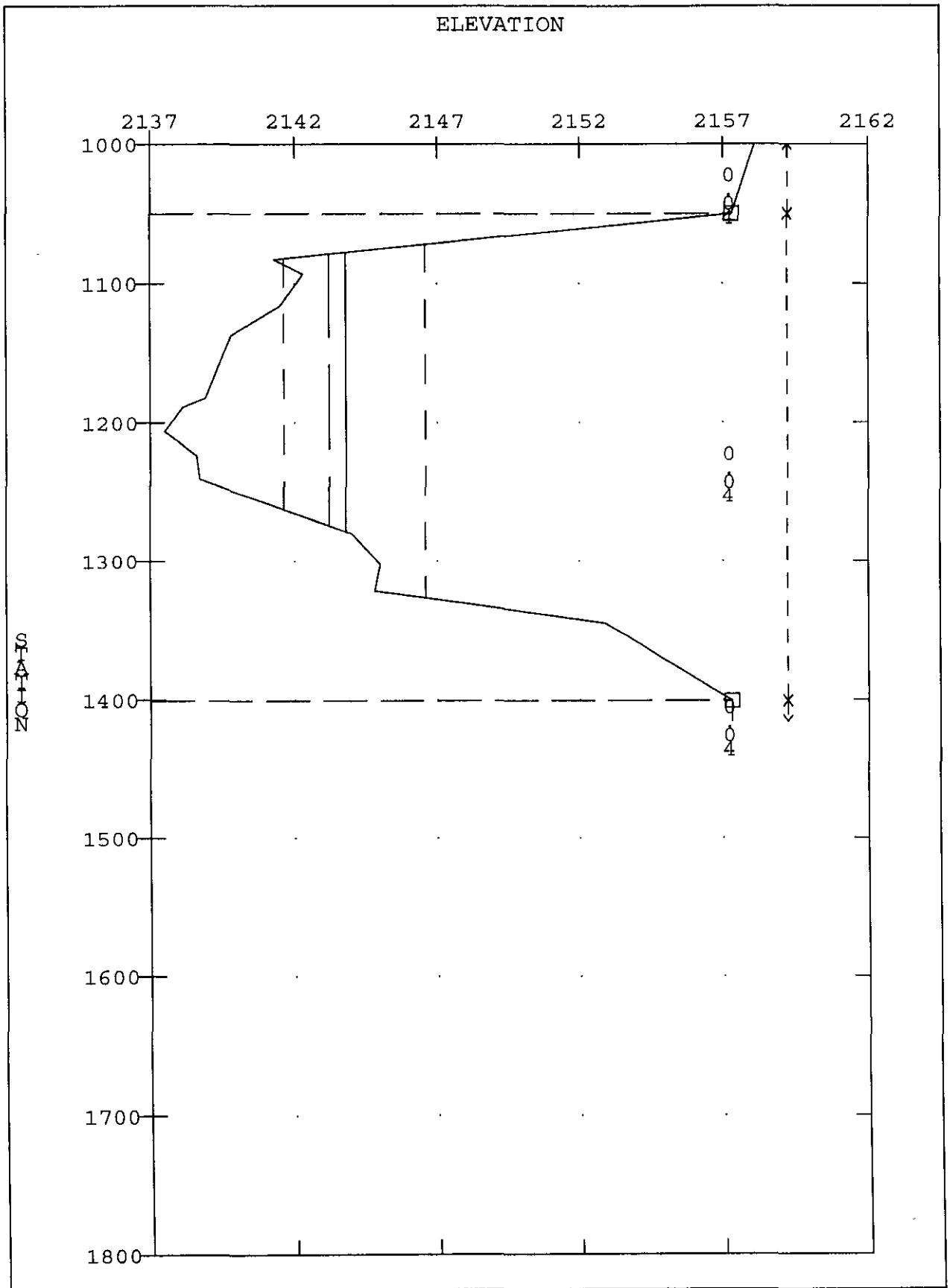
SECTION : 31235

MIDDLE NO. LAS VEGAS WASH



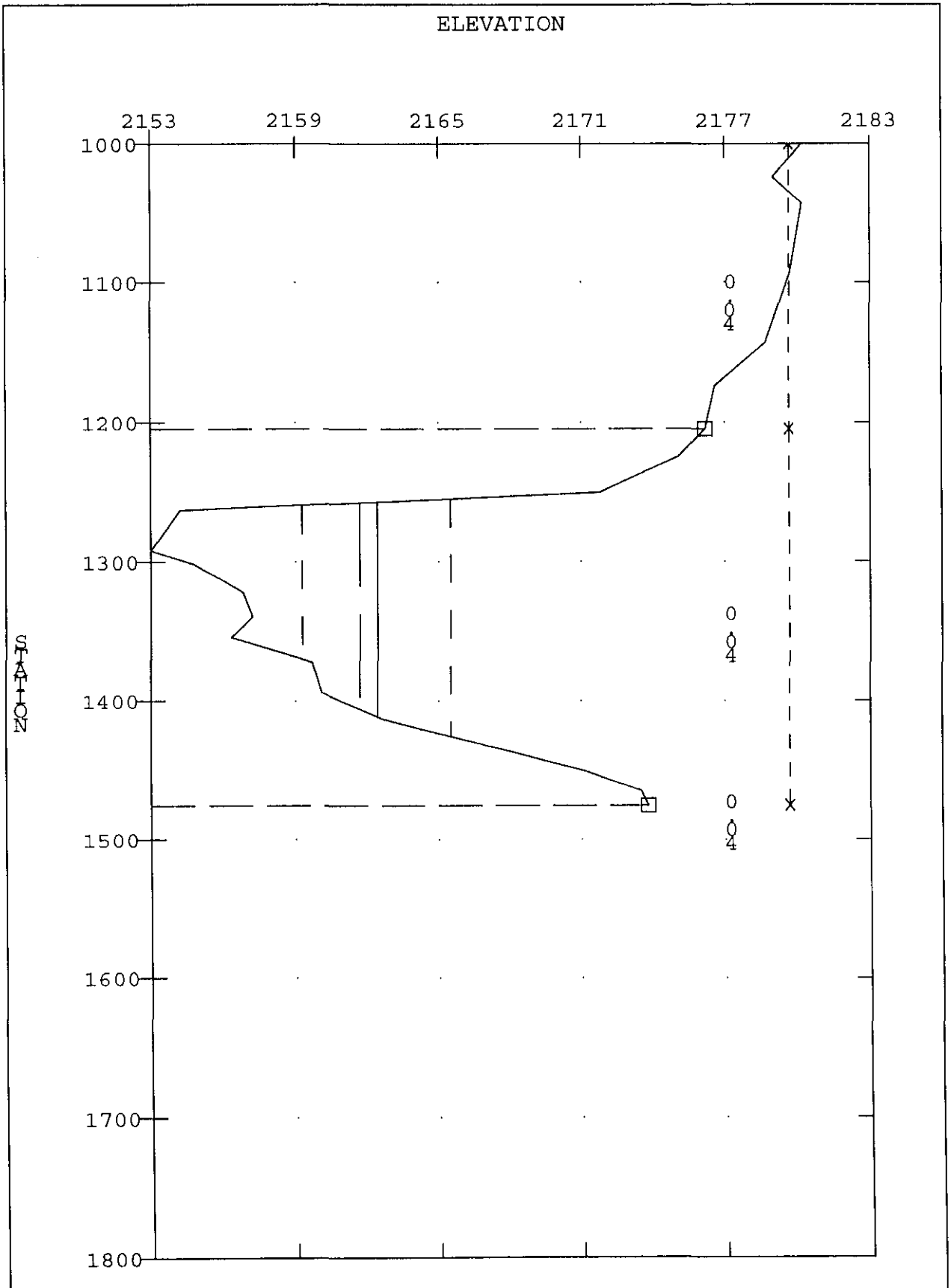
SECTION : 31500

MIDDLE NO. LAS VEGAS WASH



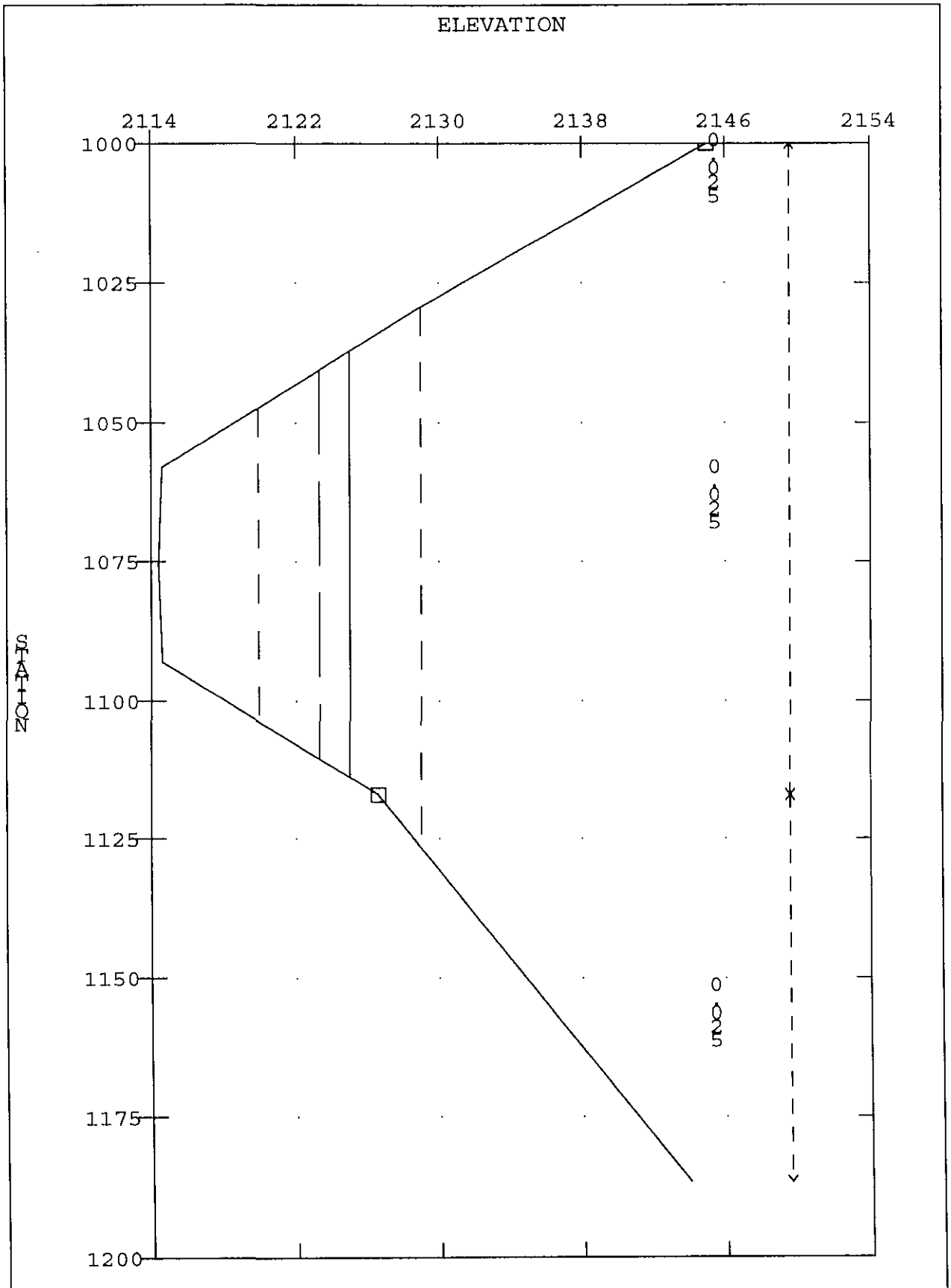
SECTION : 32044

MIDDLE NO. LAS VEGAS WASH



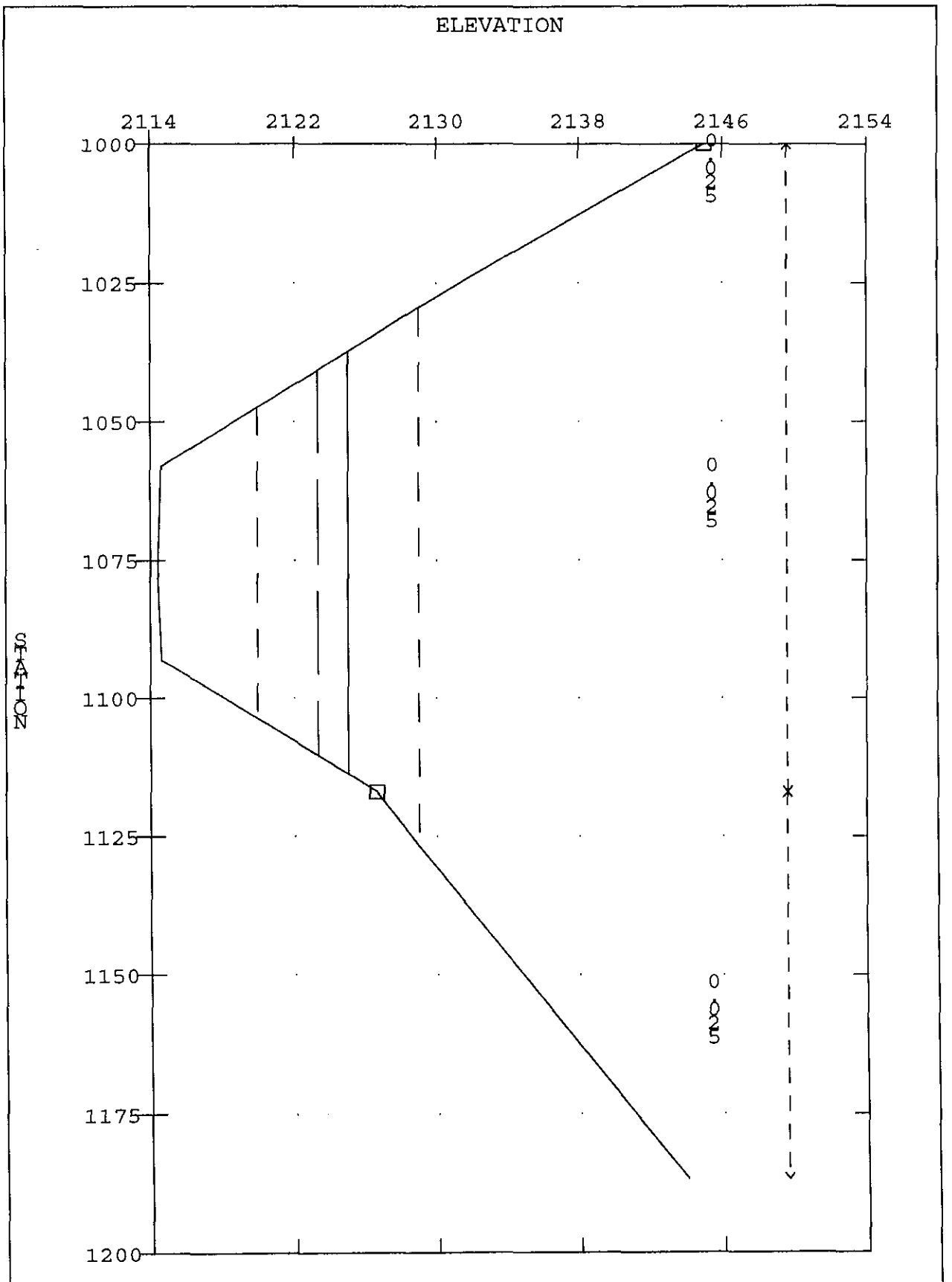
SECTION : 33671

MIDDLE NO. LAS VEGAS WASH



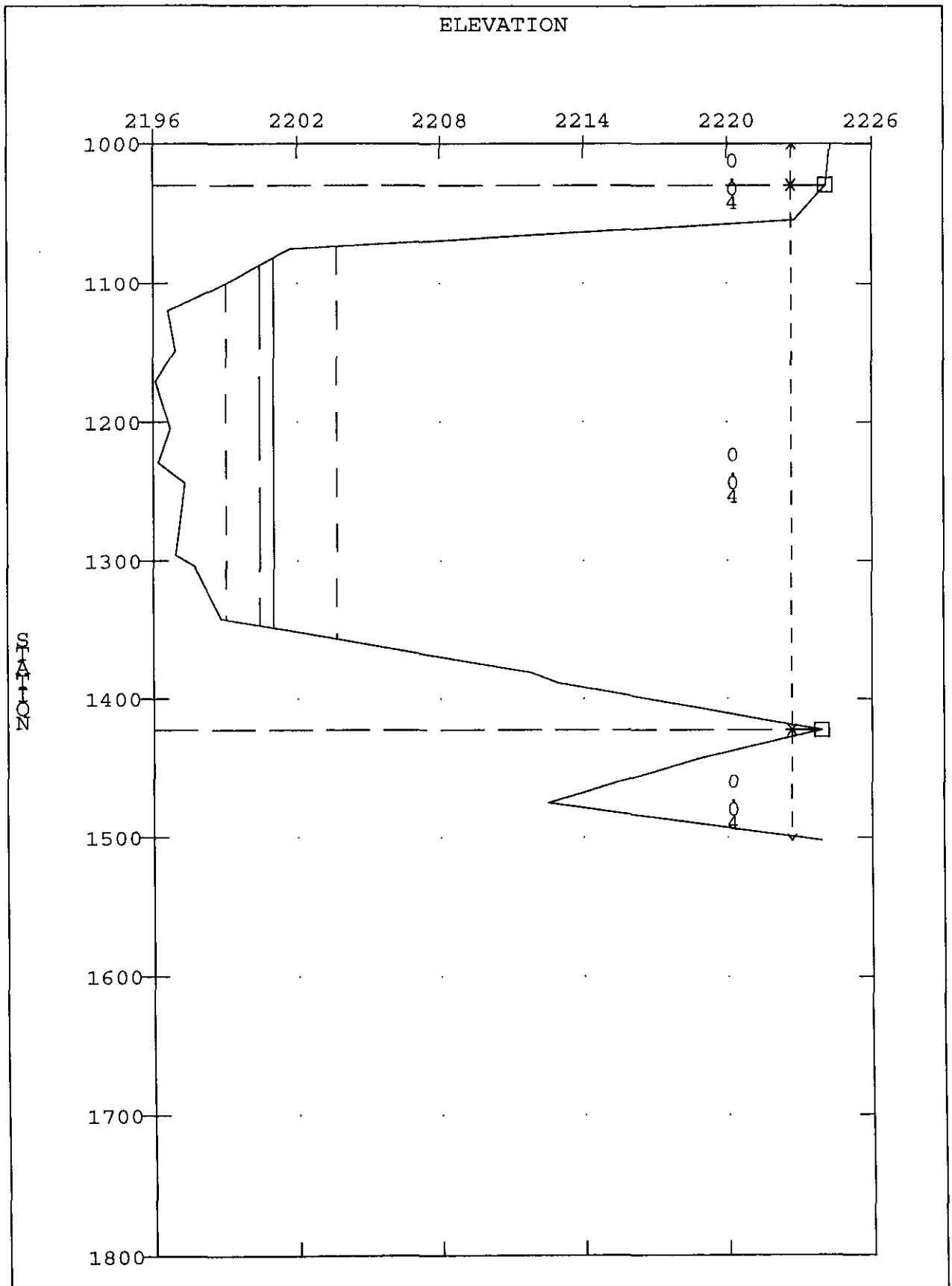
SECTION : 35645

MIDDLE NO. LAS VEGAS WASH



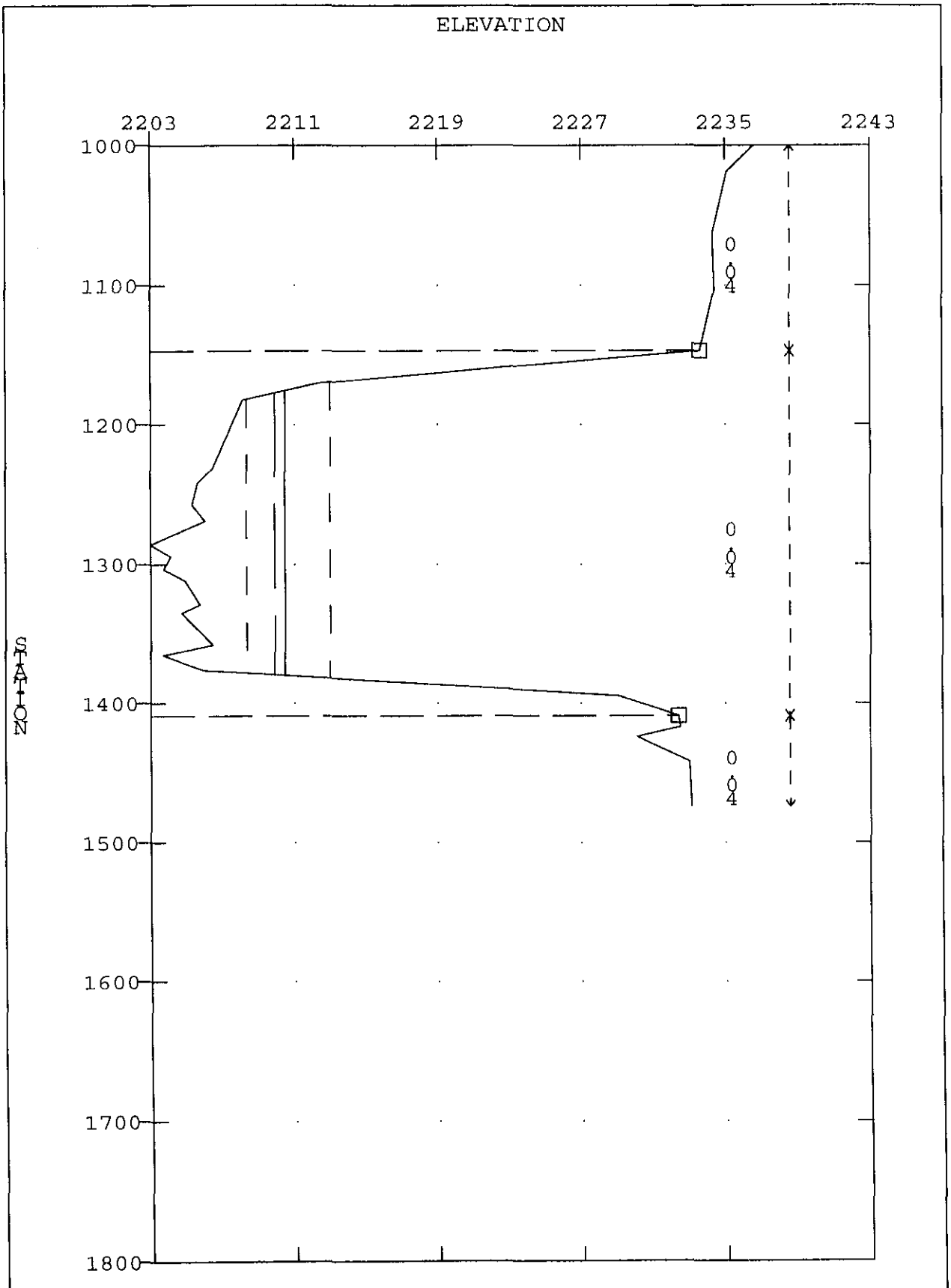
SECTION : 36822

MIDDLE NO. LAS VEGAS WASH



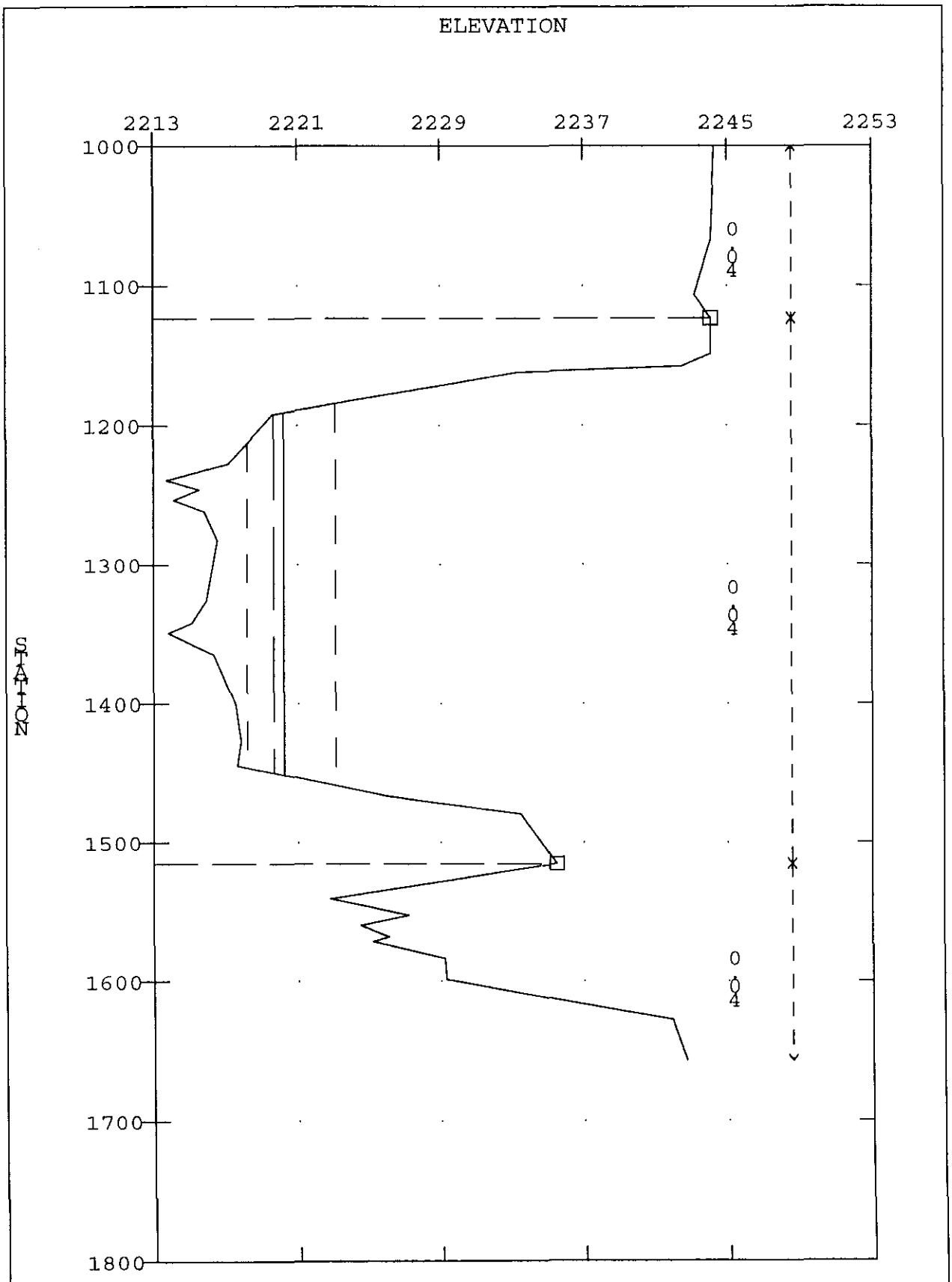
SECTION : 38410

MIDDLE NO. LAS VEGAS WASH



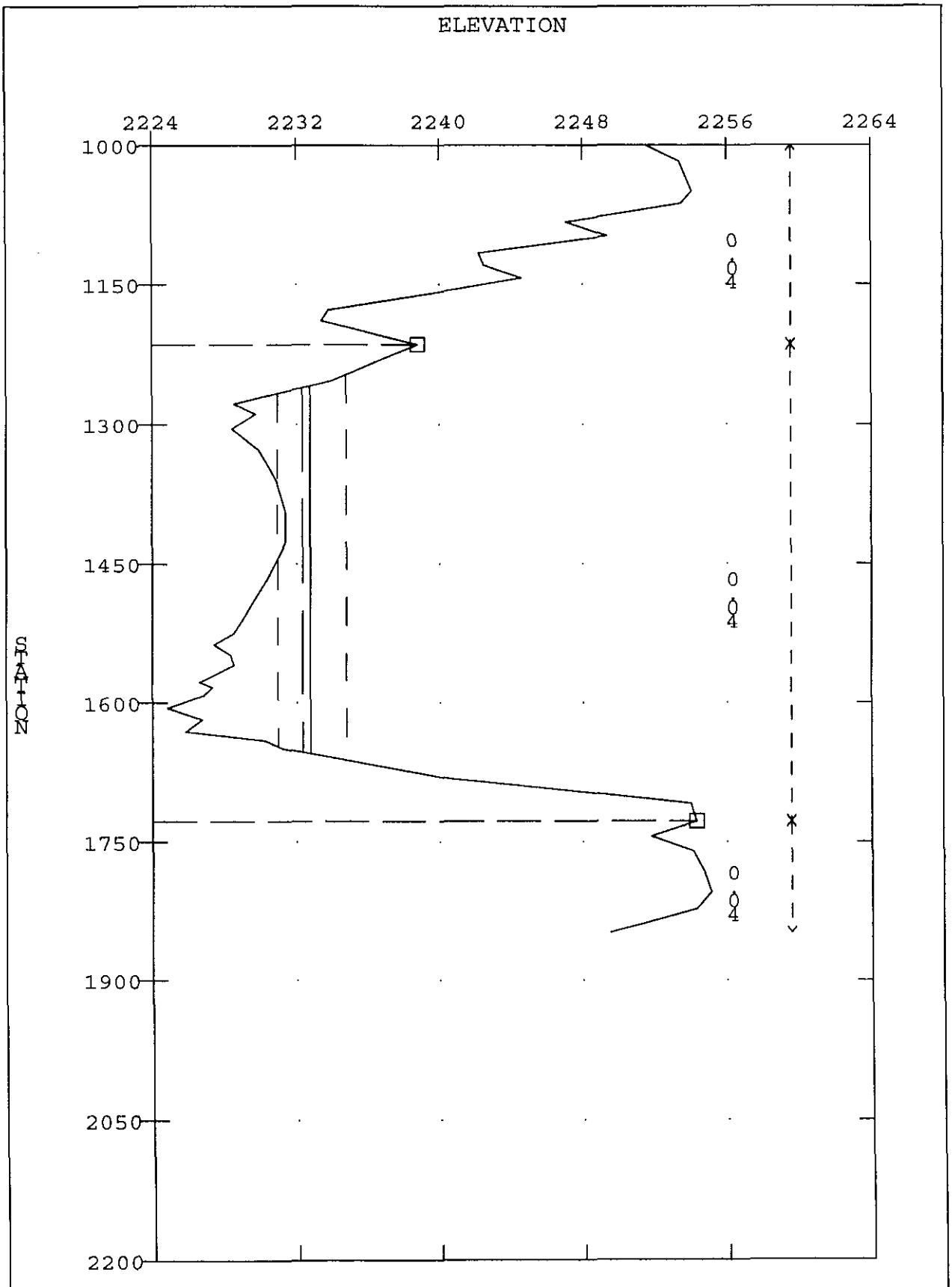
SECTION : 39519

MIDDLE NO. LAS VEGAS WASH



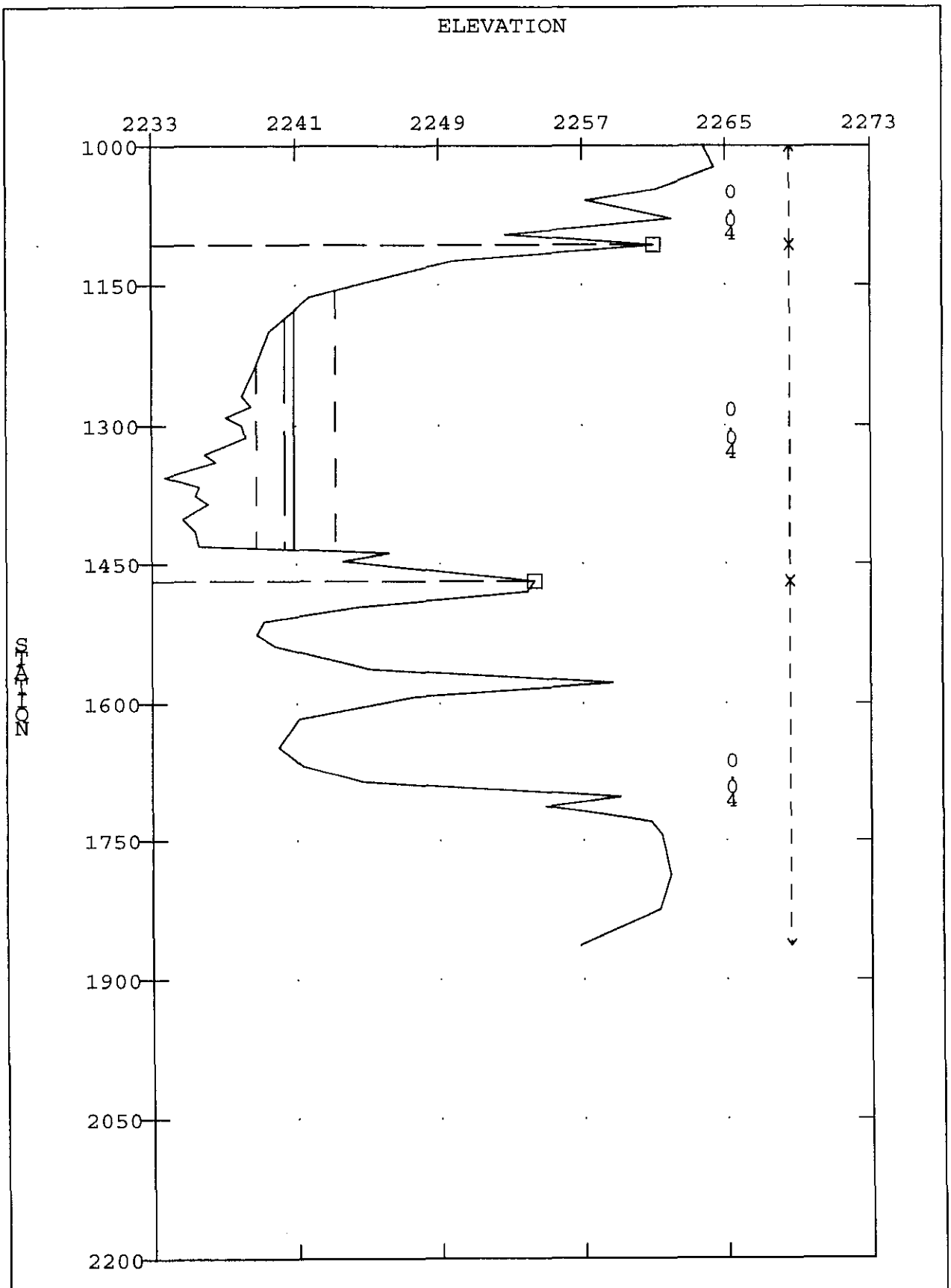
SECTION : 40616

MIDDLE NO. LAS VEGAS WASH



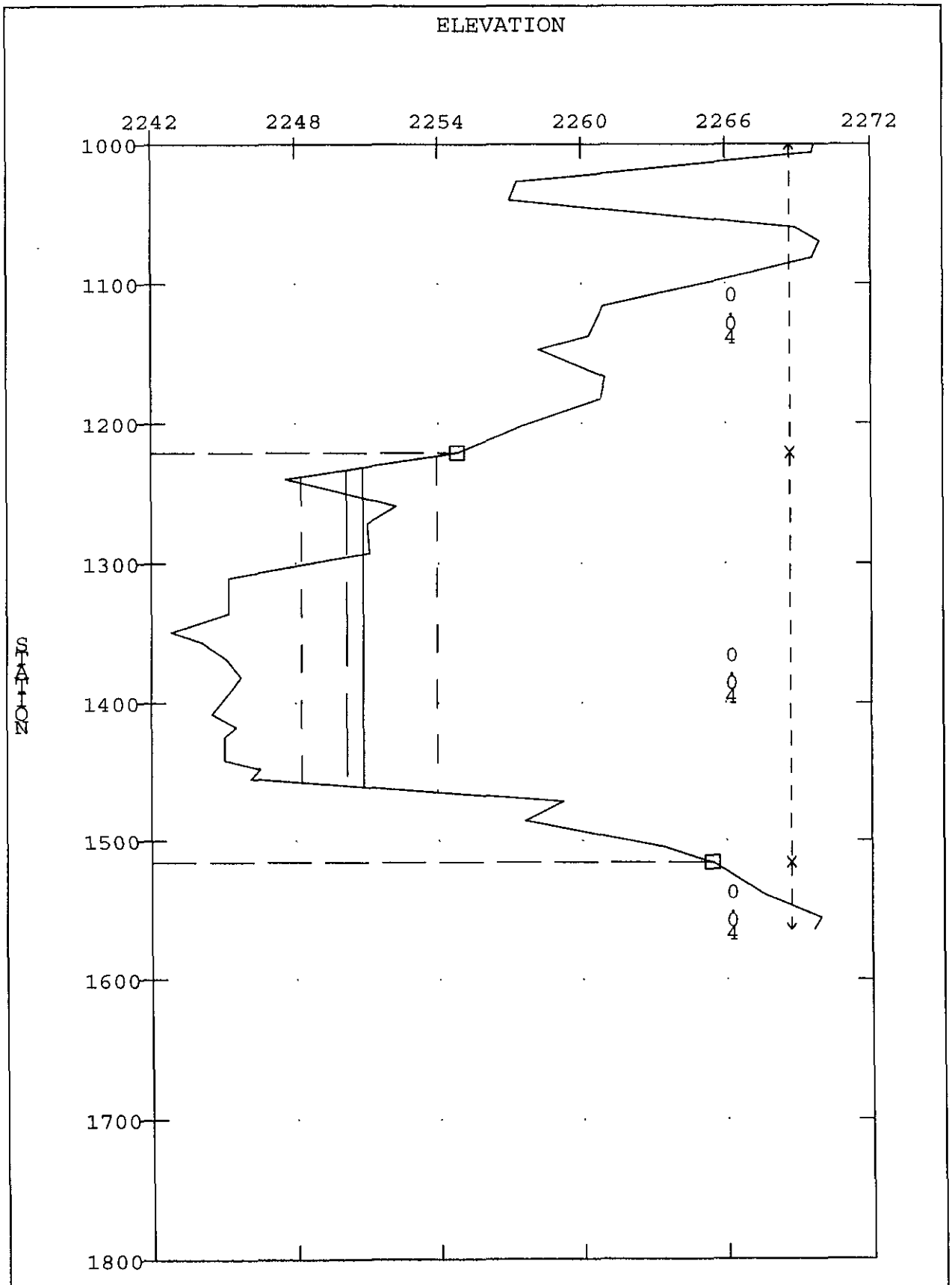
SECTION : 42138

MIDDLE NO. LAS VEGAS WASH



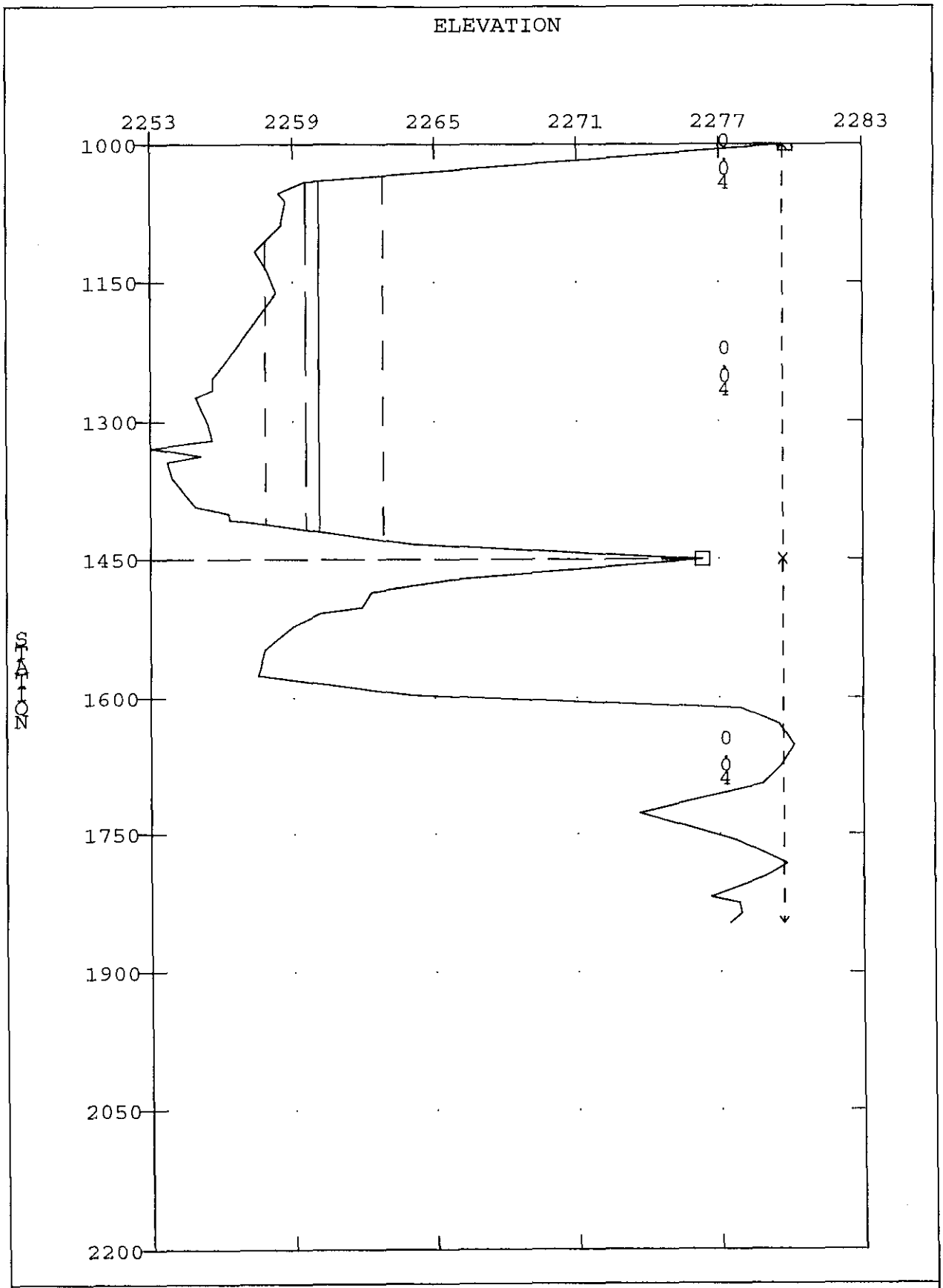
SECTION : 43231

MIDDLE NO. LAS VEGAS WASH



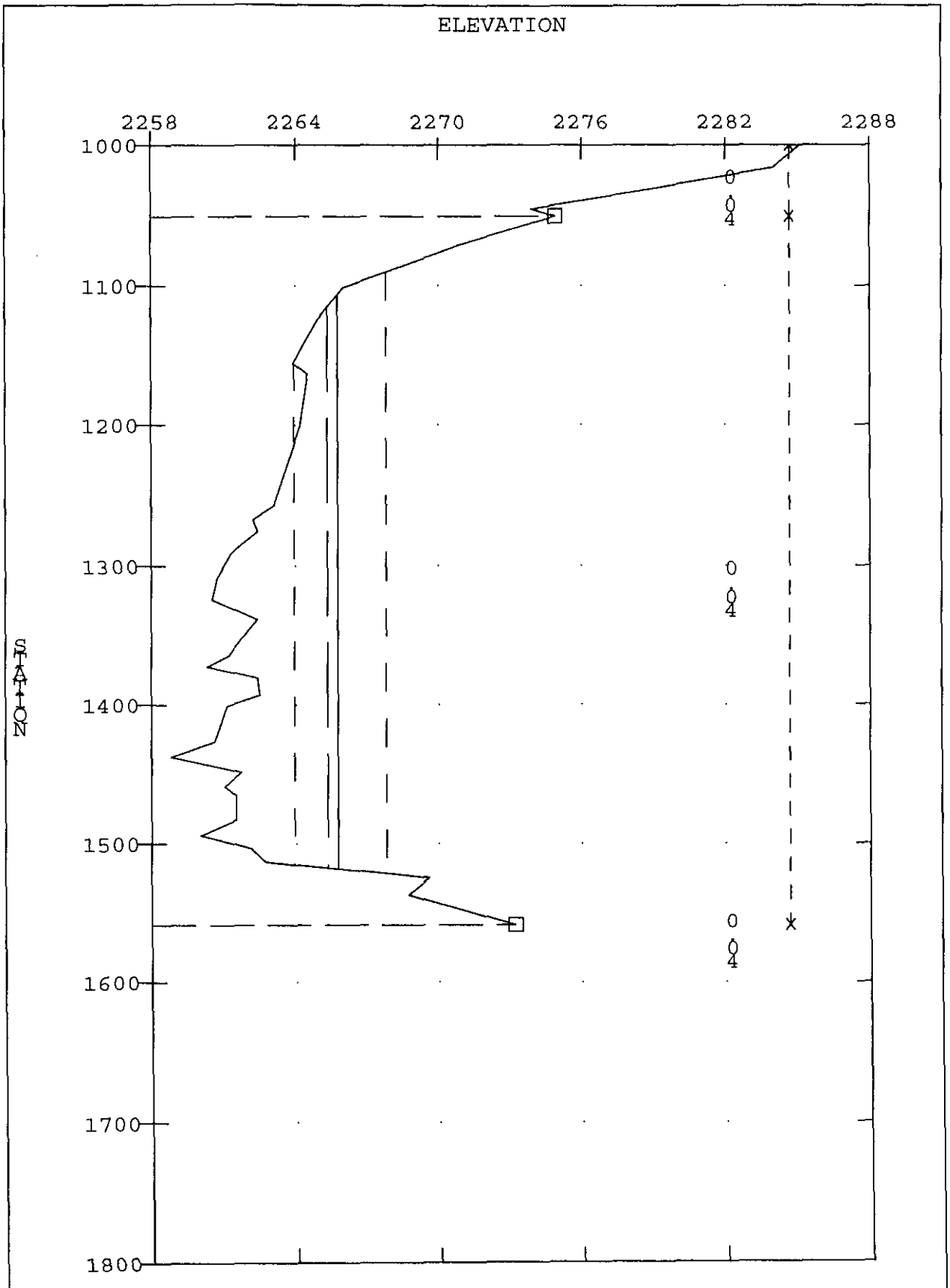
SECTION : 44345

MIDDLE NO. LAS VEGAS WASH



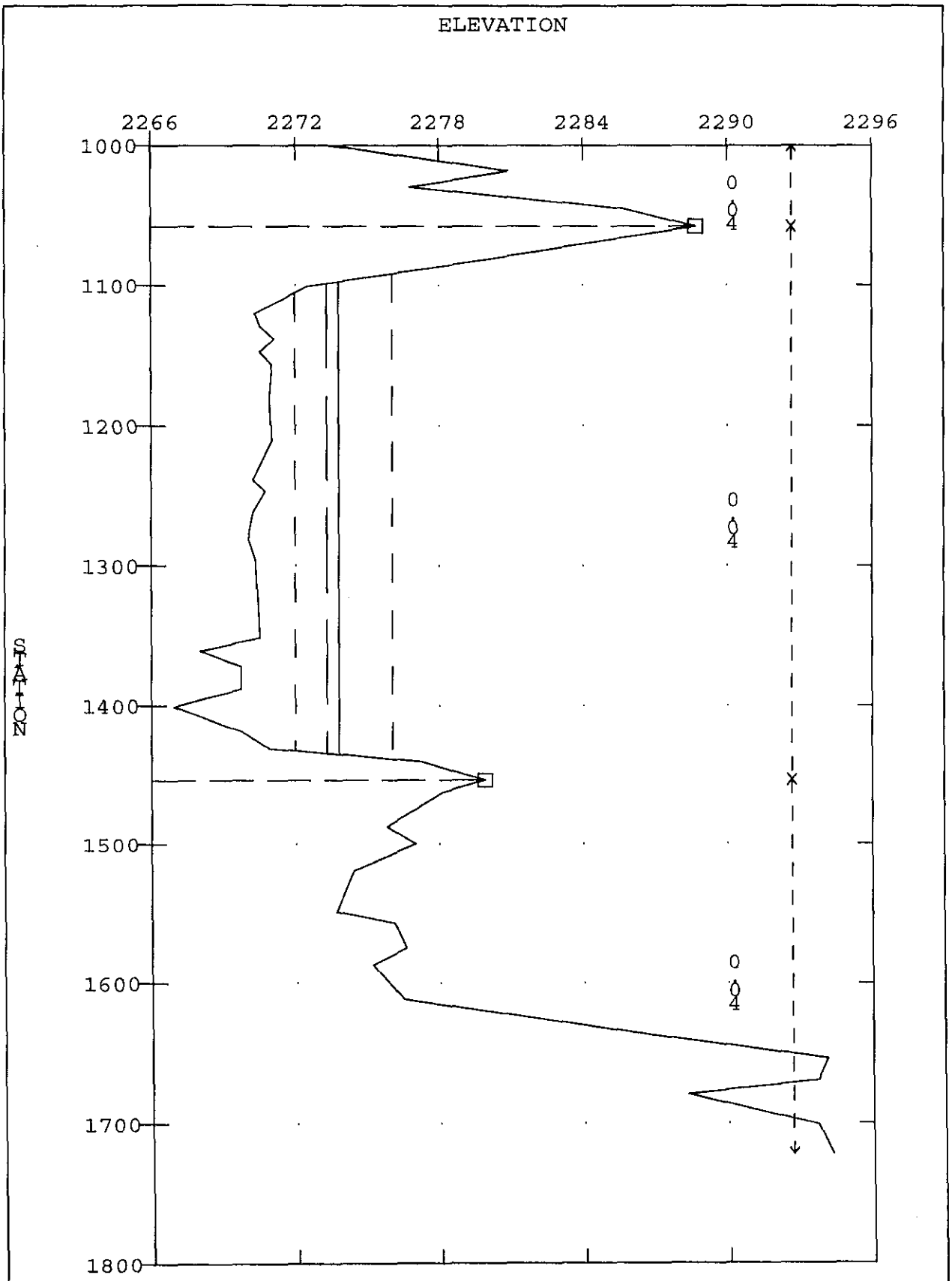
SECTION : 45725

MIDDLE NO. LAS VEGAS WASH



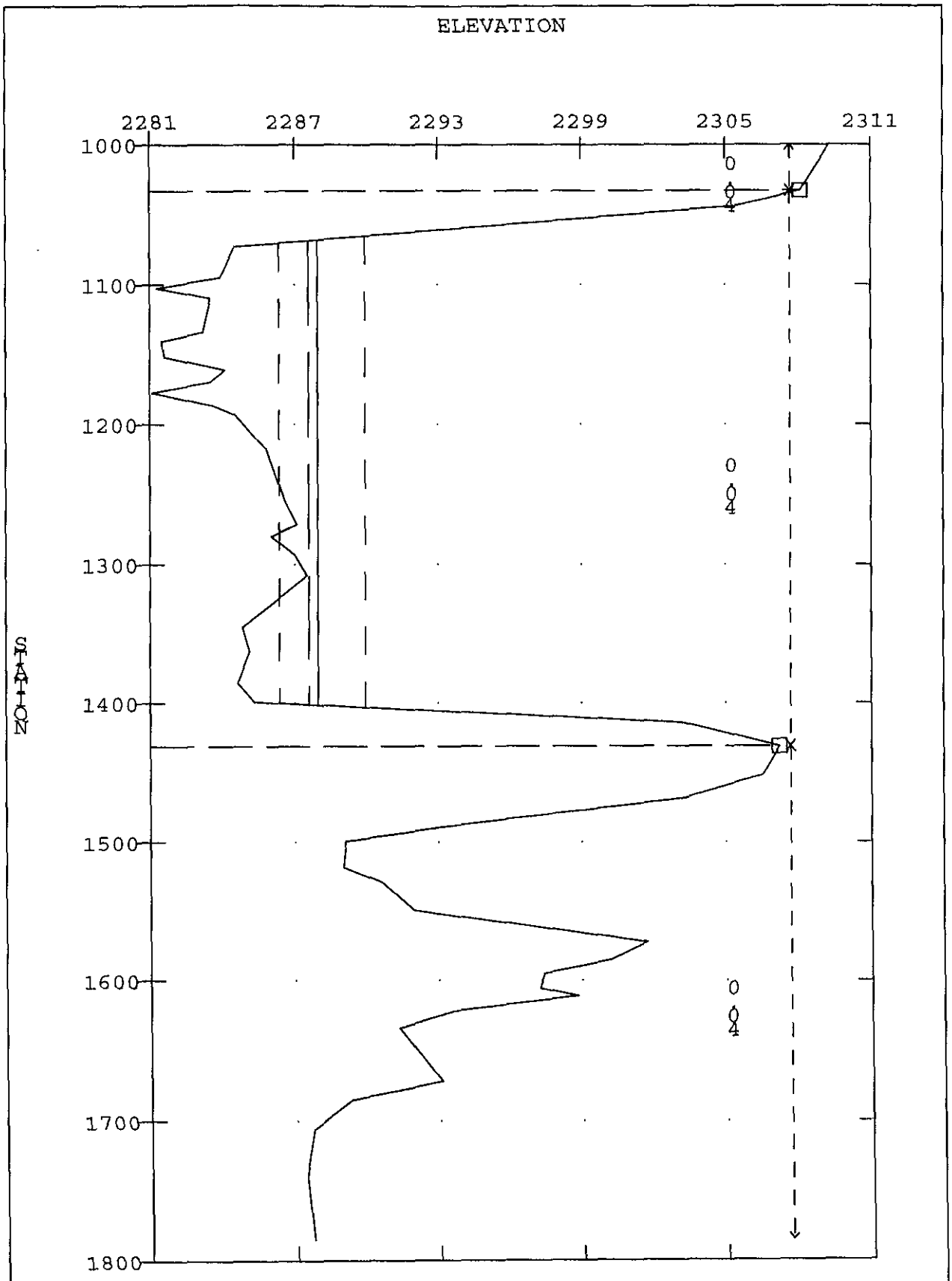
SECTION : 46746

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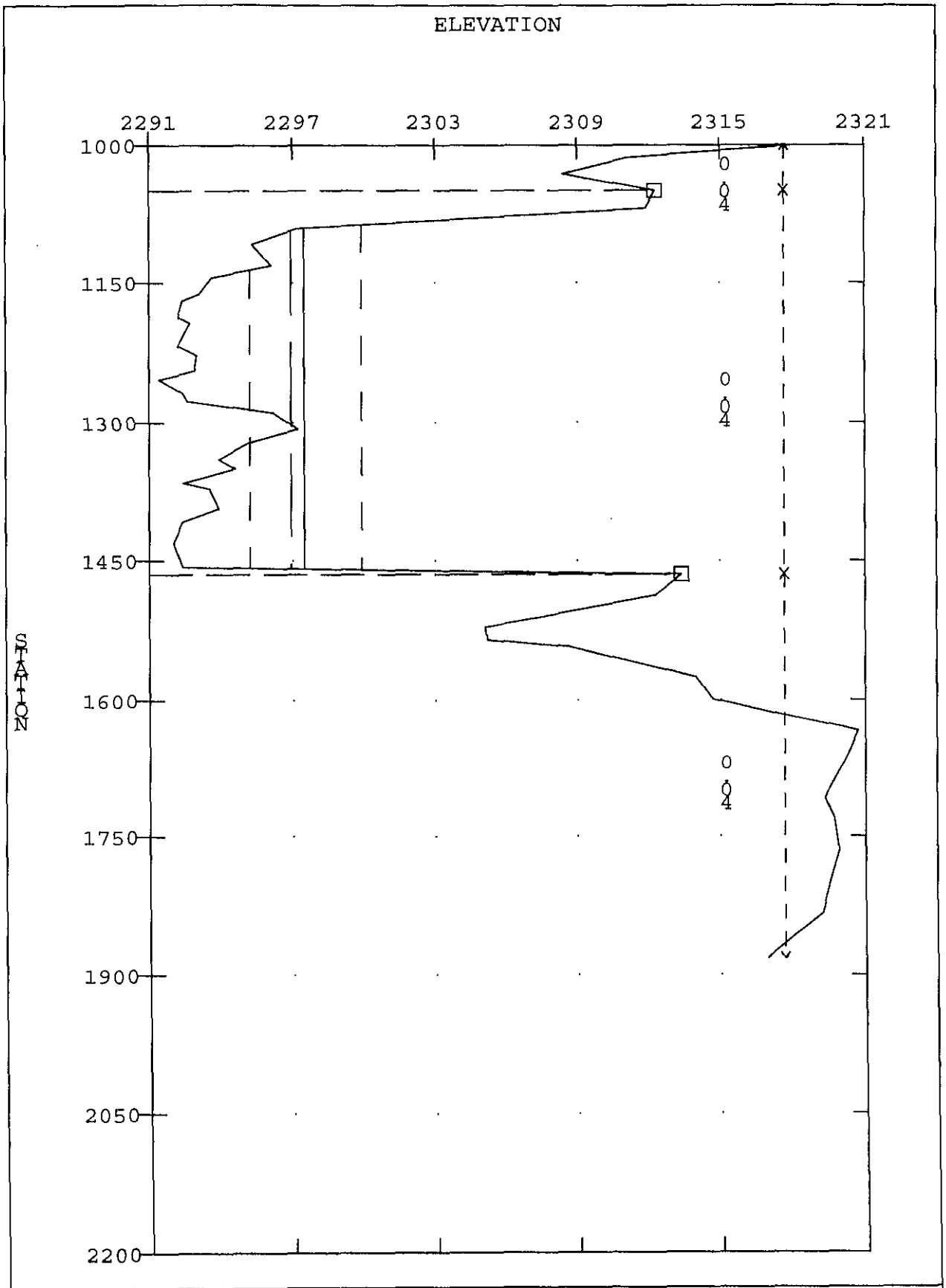
SECTION : 48046

MIDDLE NO. LAS VEGAS WASH



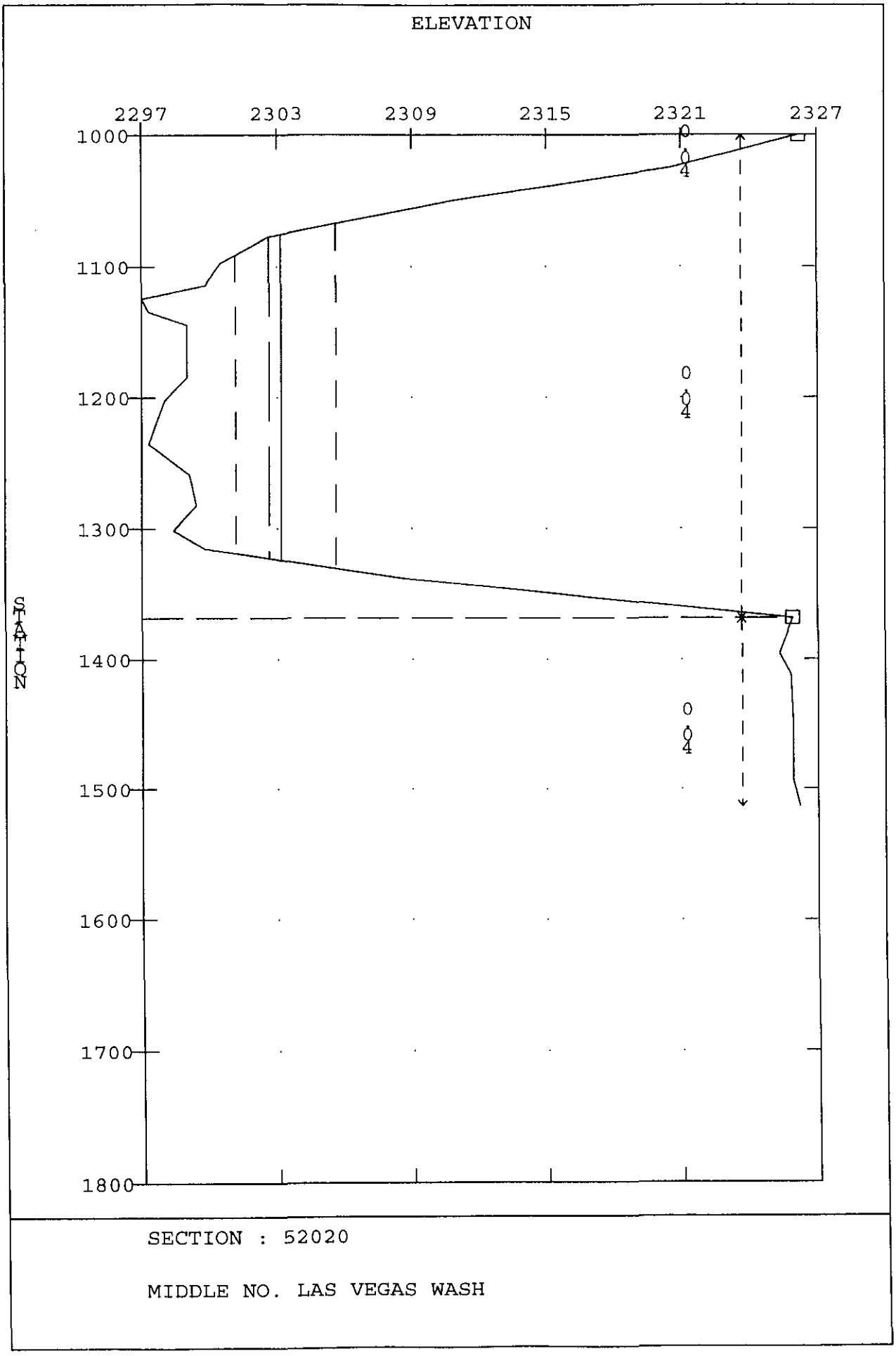
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MIDDLE NO. LAS VEGAS WASH



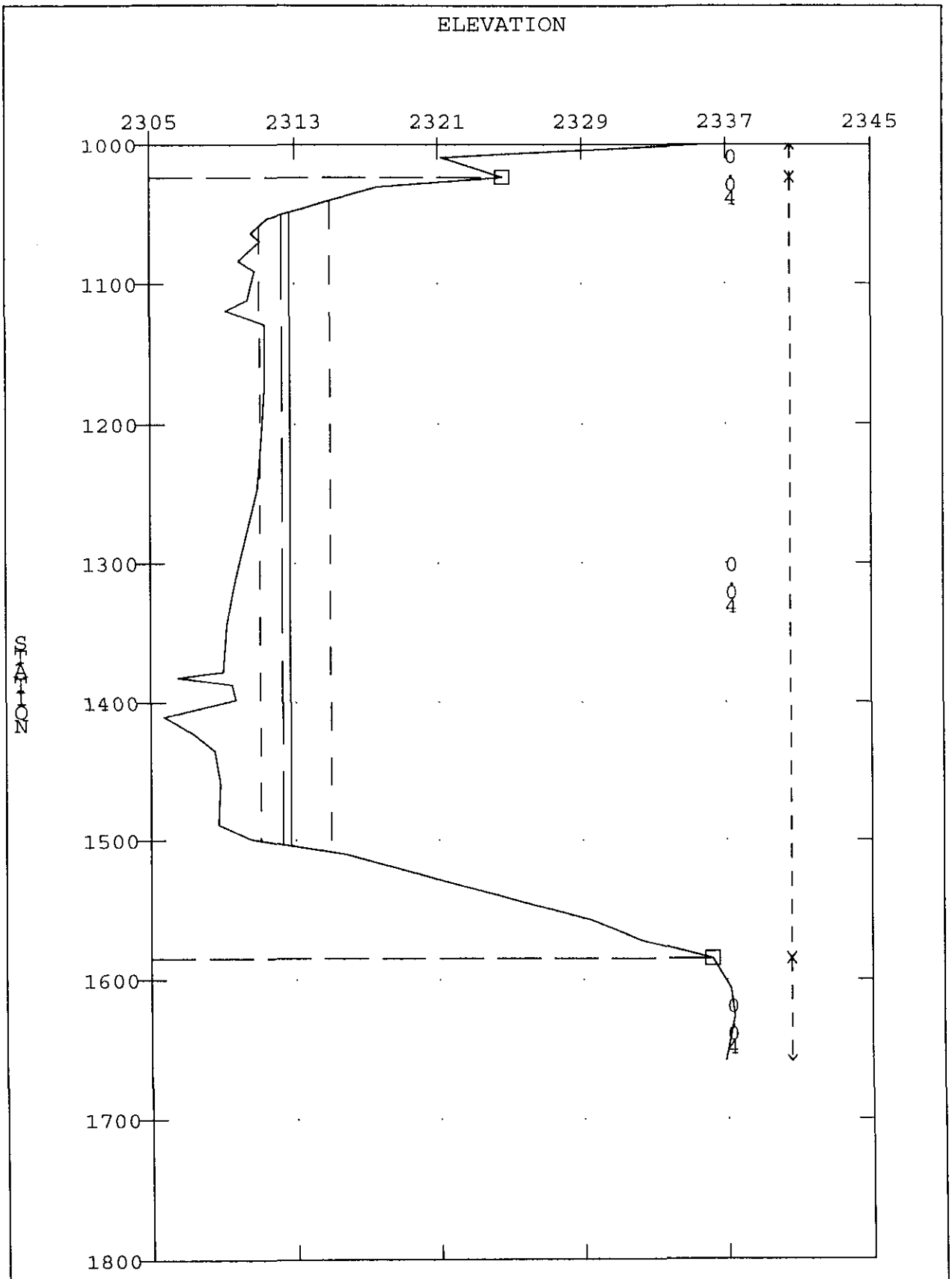
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MIDDLE NO. LAS VEGAS WASH



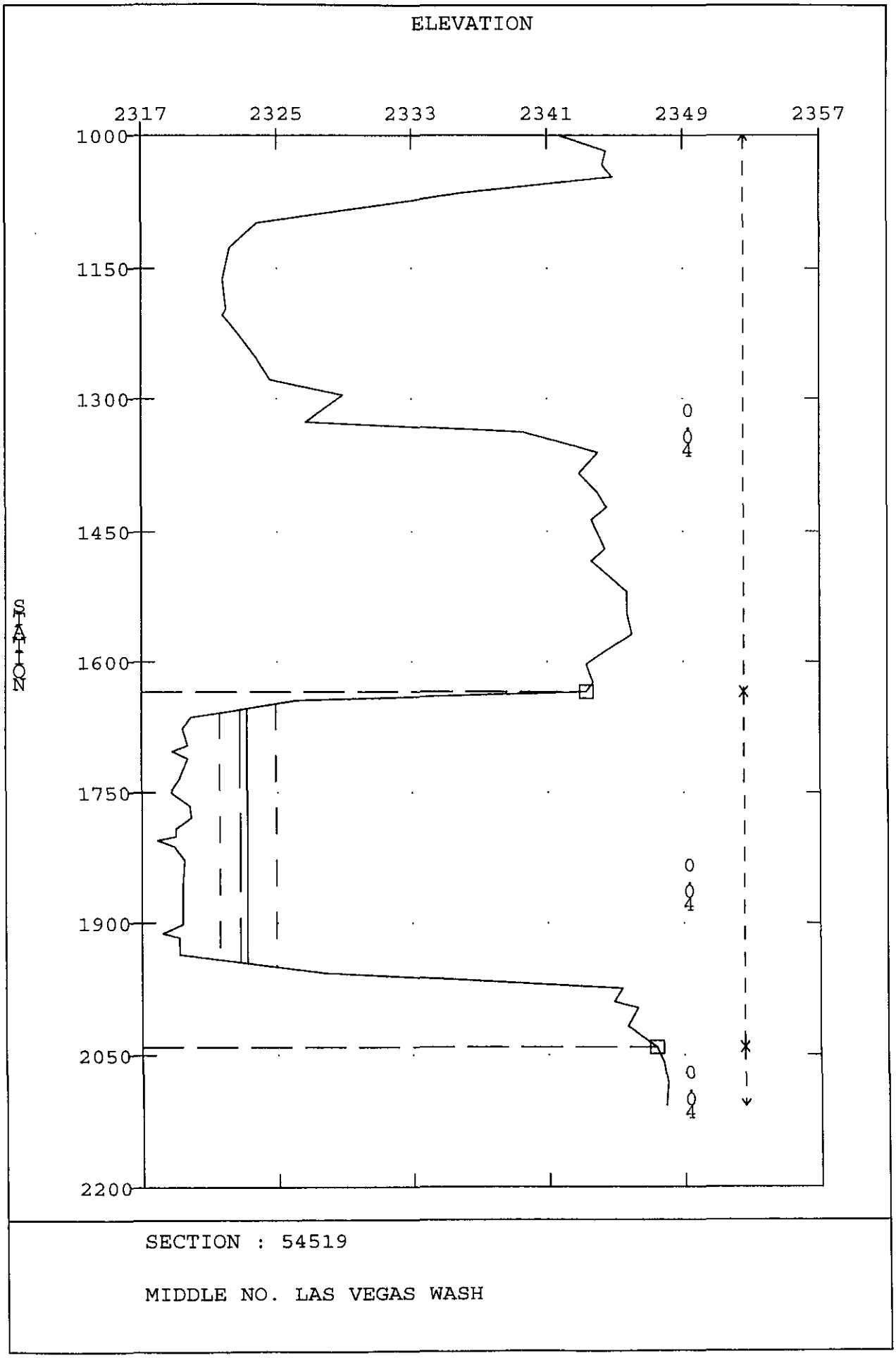
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MIDDLE NO. LAS VEGAS WASH



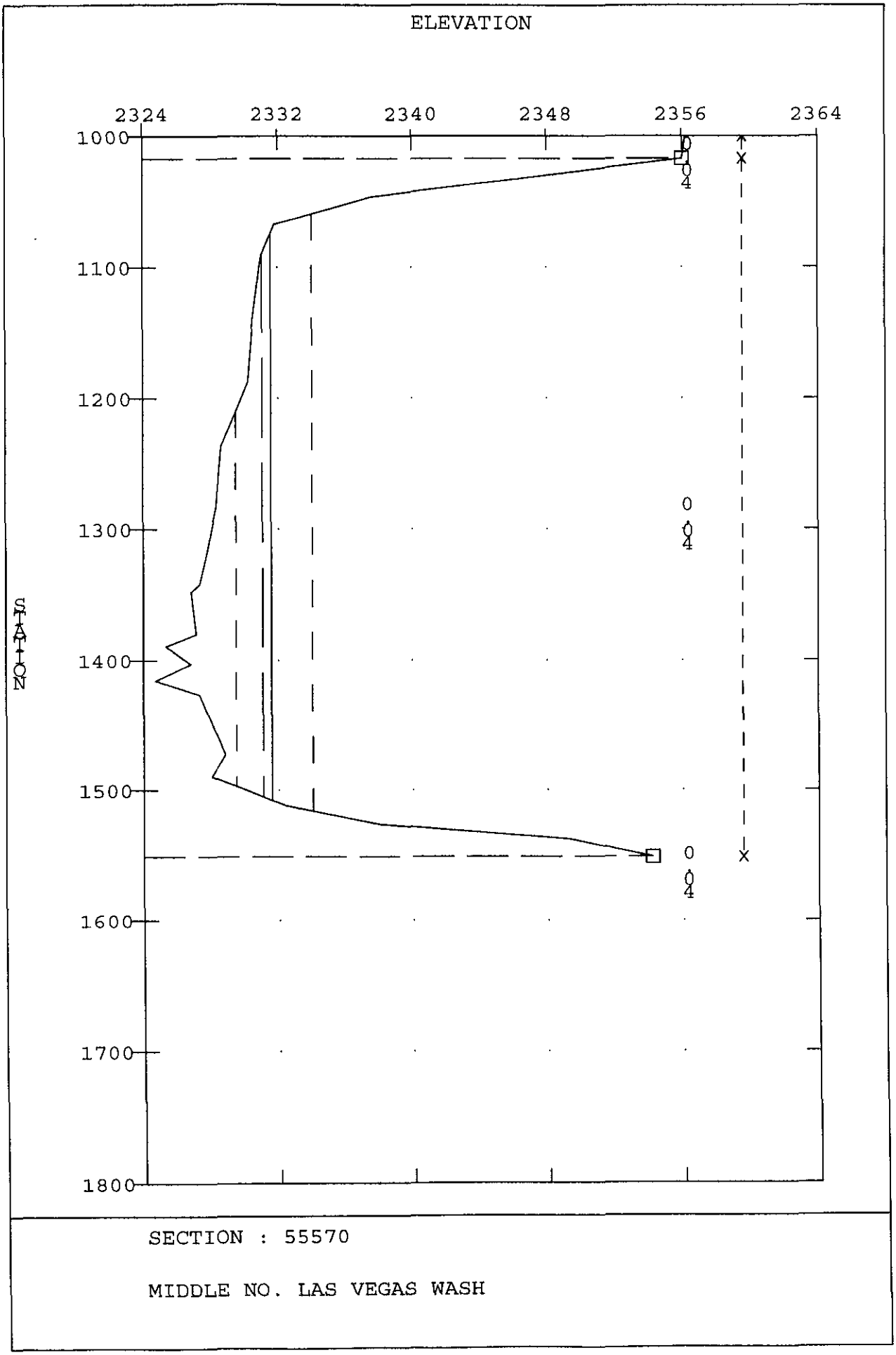
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MIDDLE NO. LAS VEGAS WASH



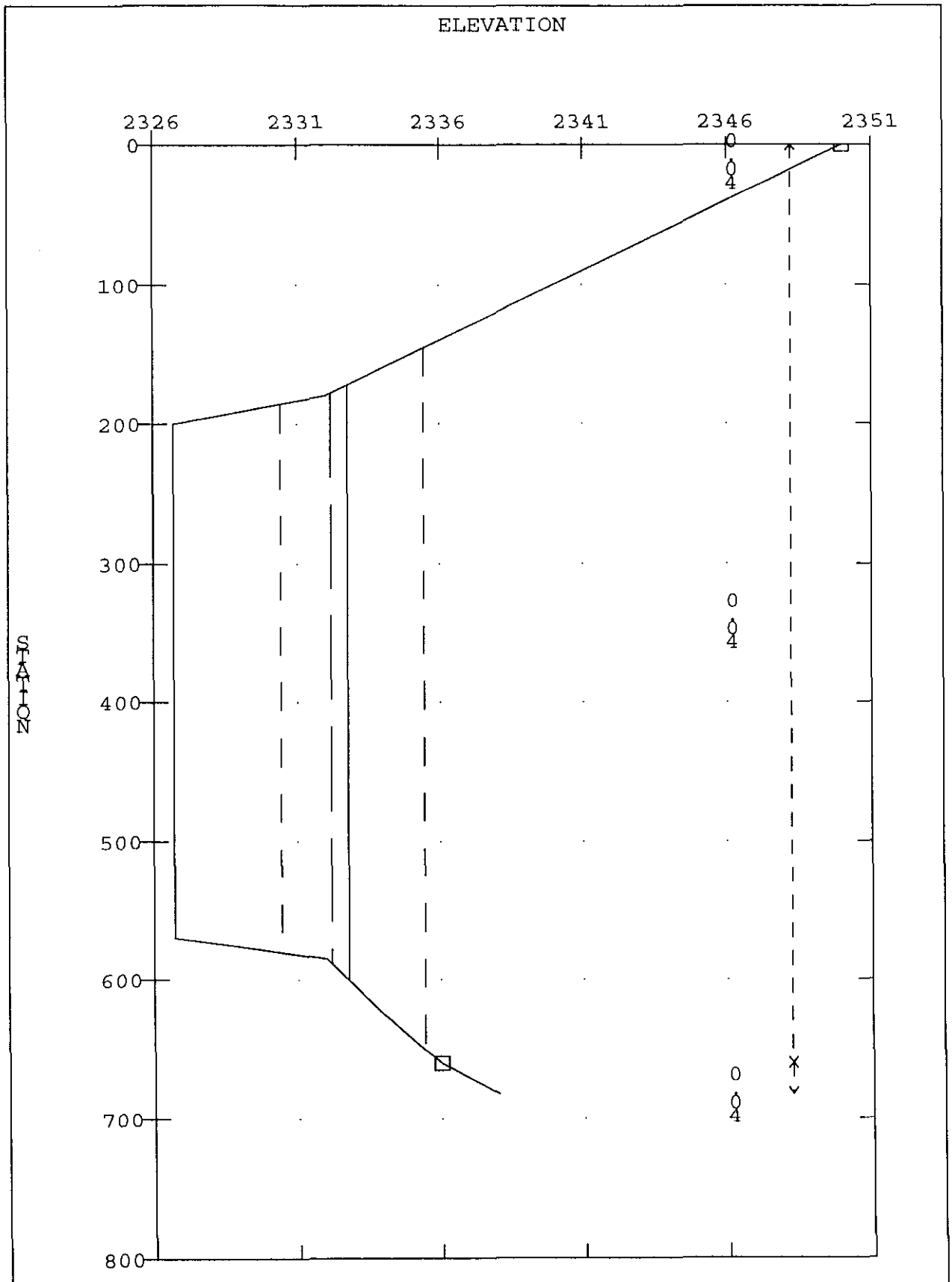
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MIDDLE NO. LAS VEGAS WASH



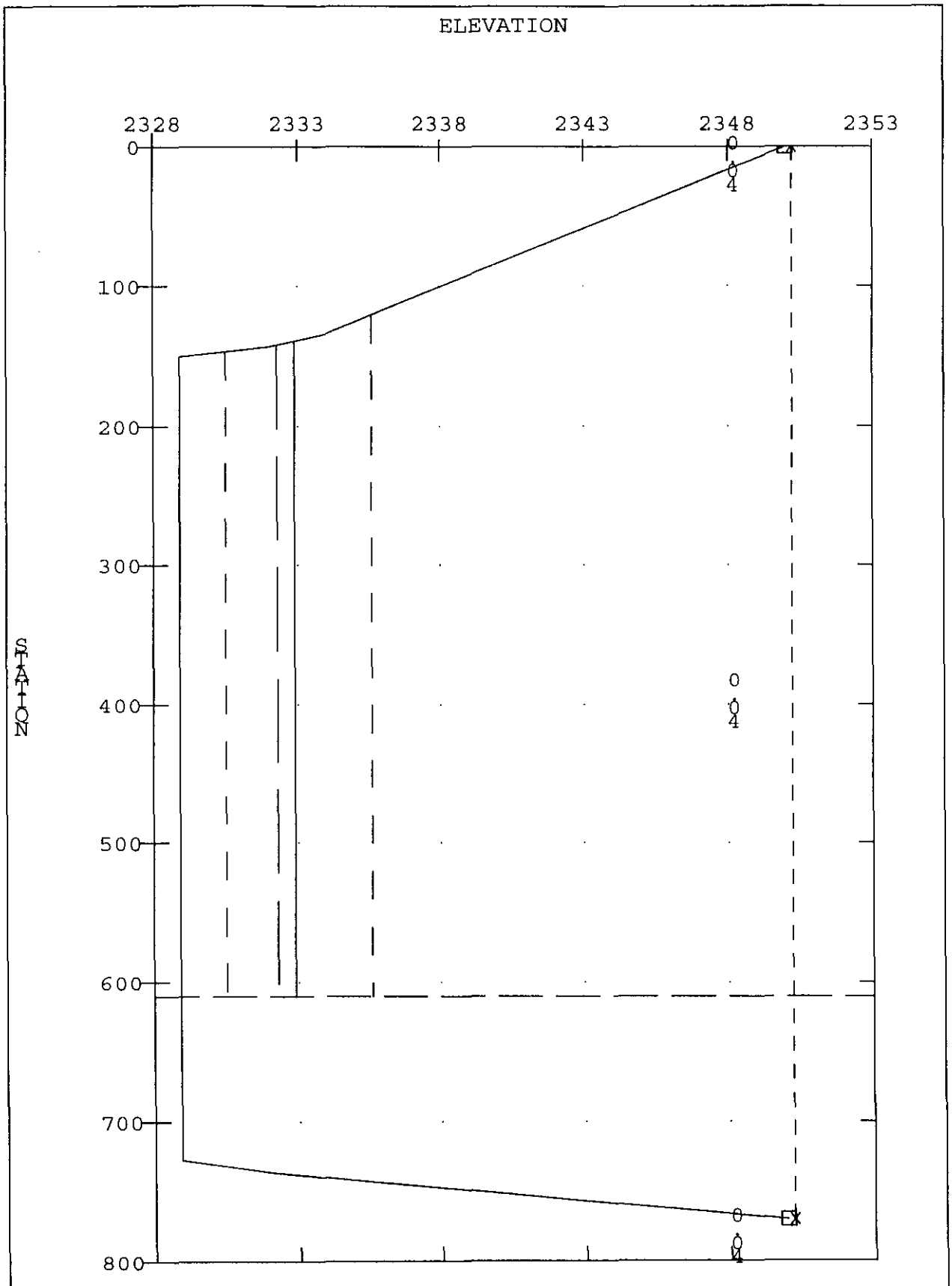
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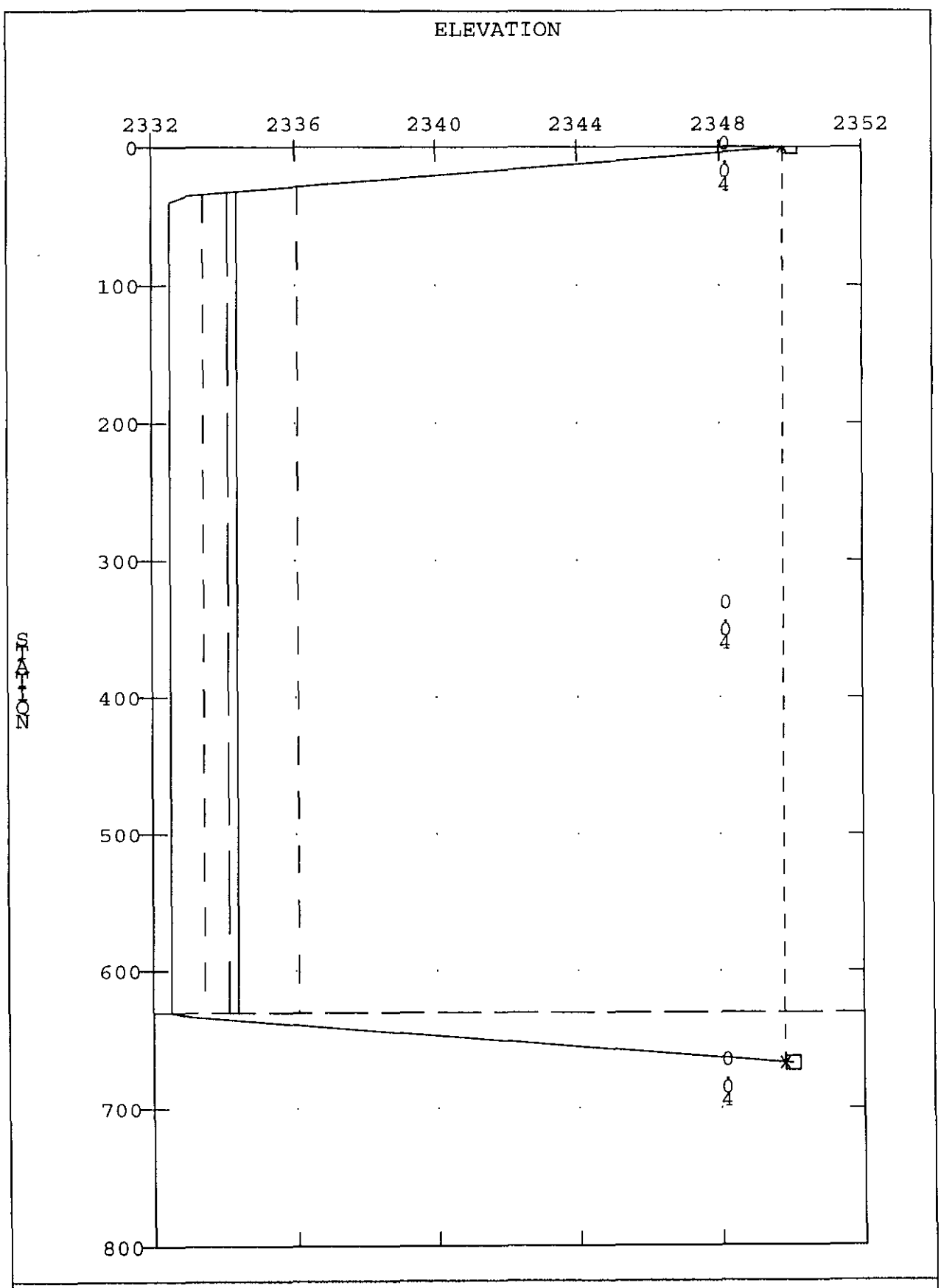
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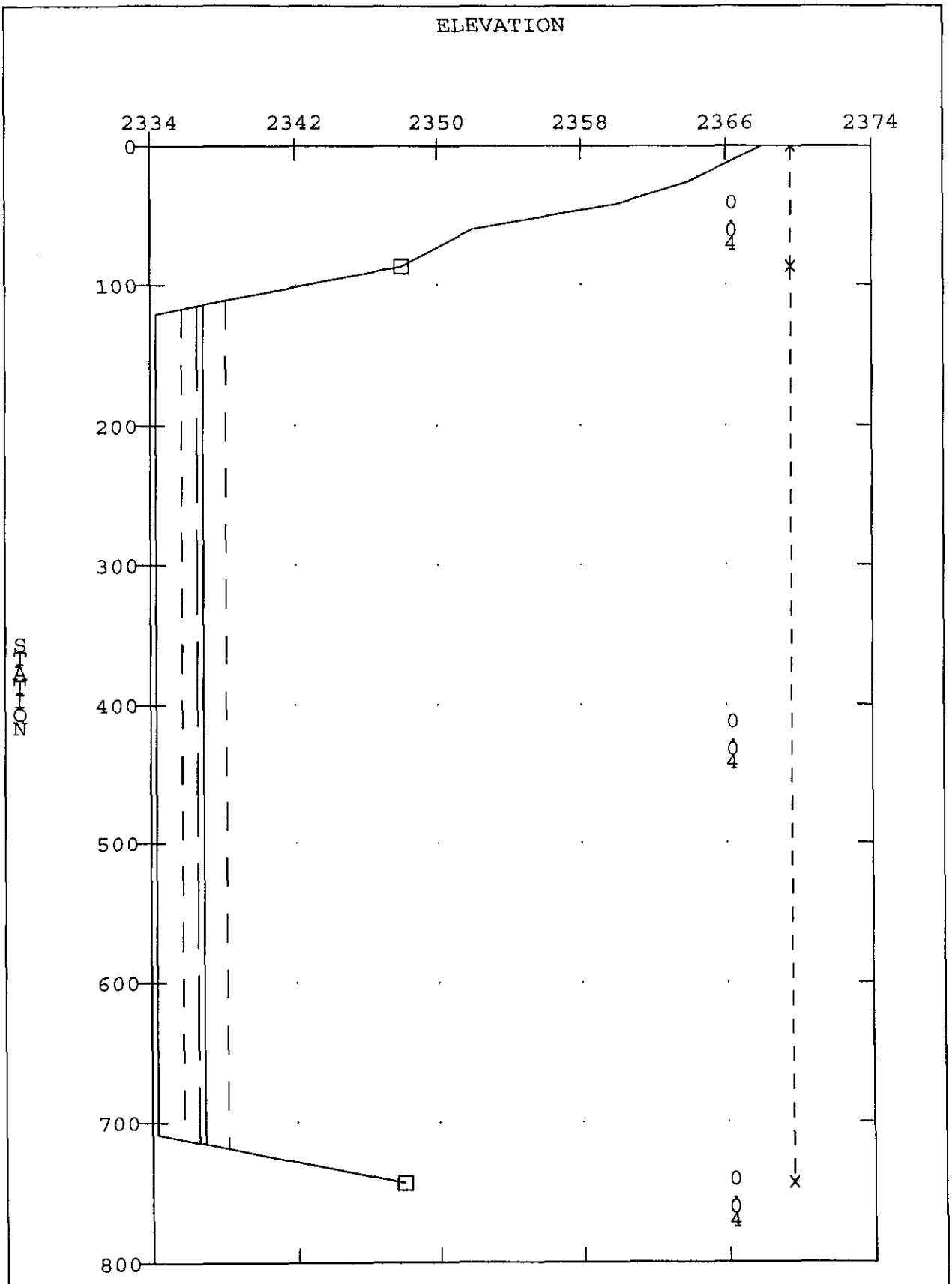
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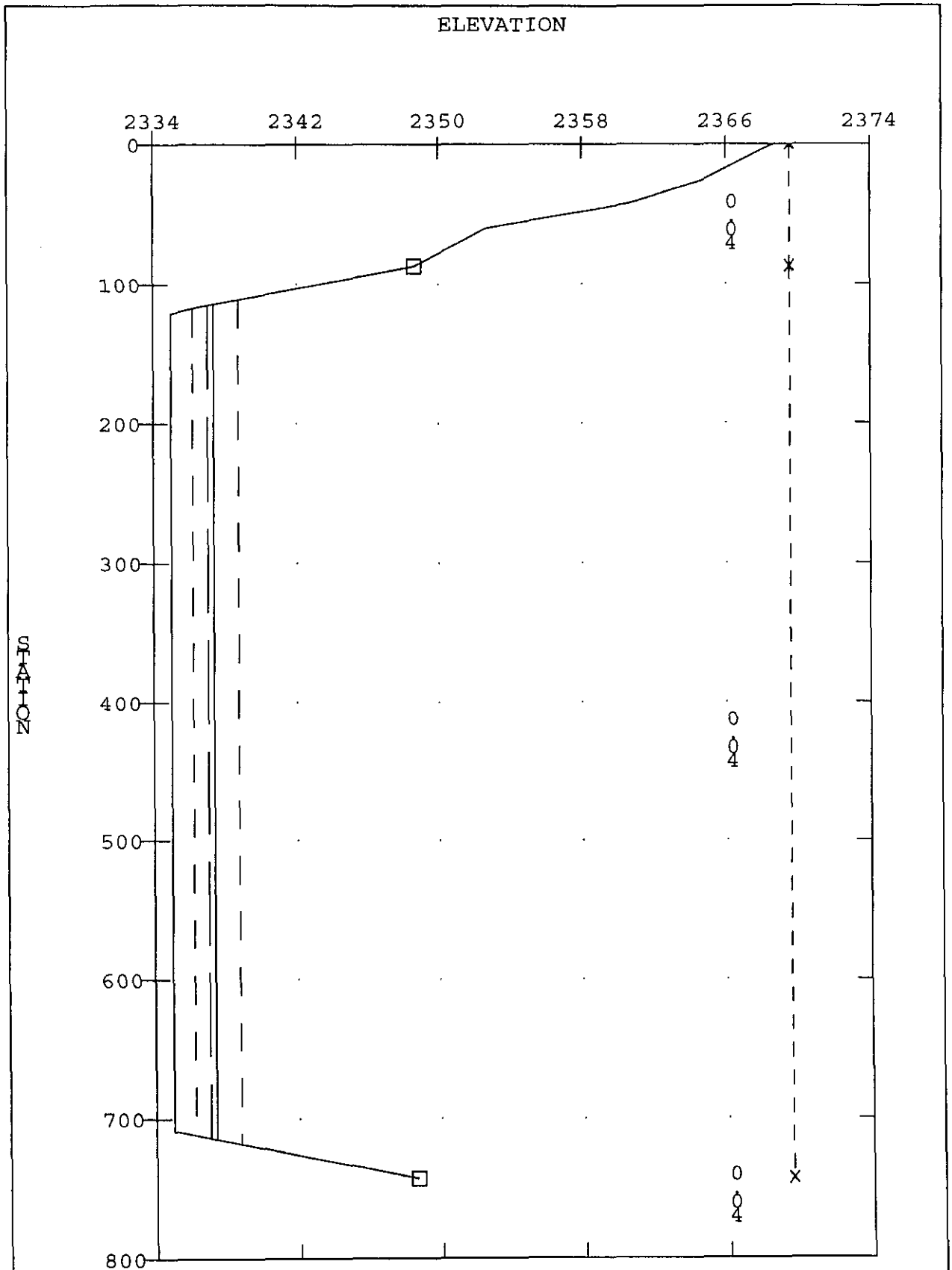
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MIDDLE NO. LAS VEGAS WASH



SECTION : 56420

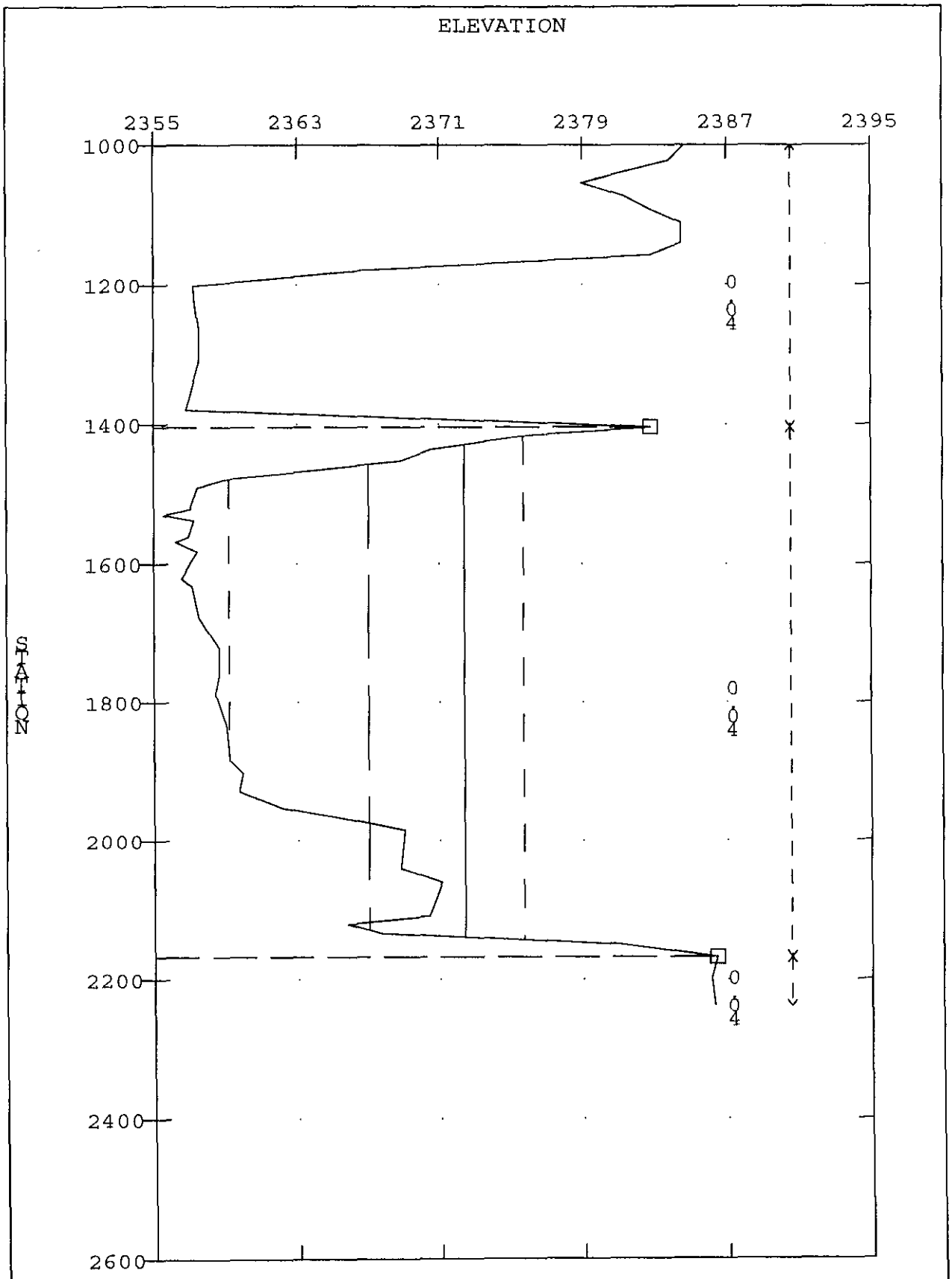
MIDDLE NO. LAS VEGAS WASH



SECTION : 56487

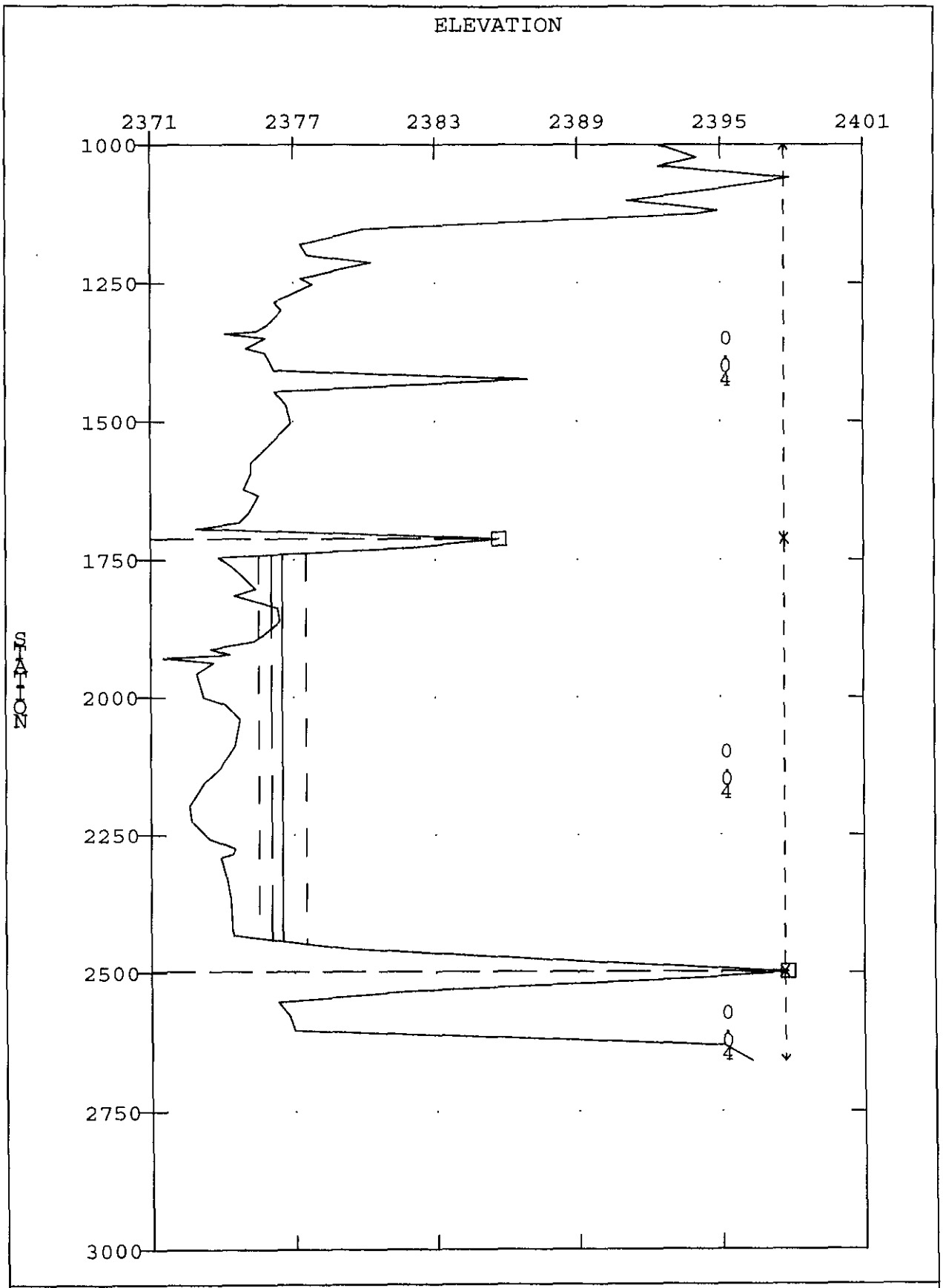
MIDDLE NO. LAS VEGAS WASH

Cross Section Plots
ULCDV5



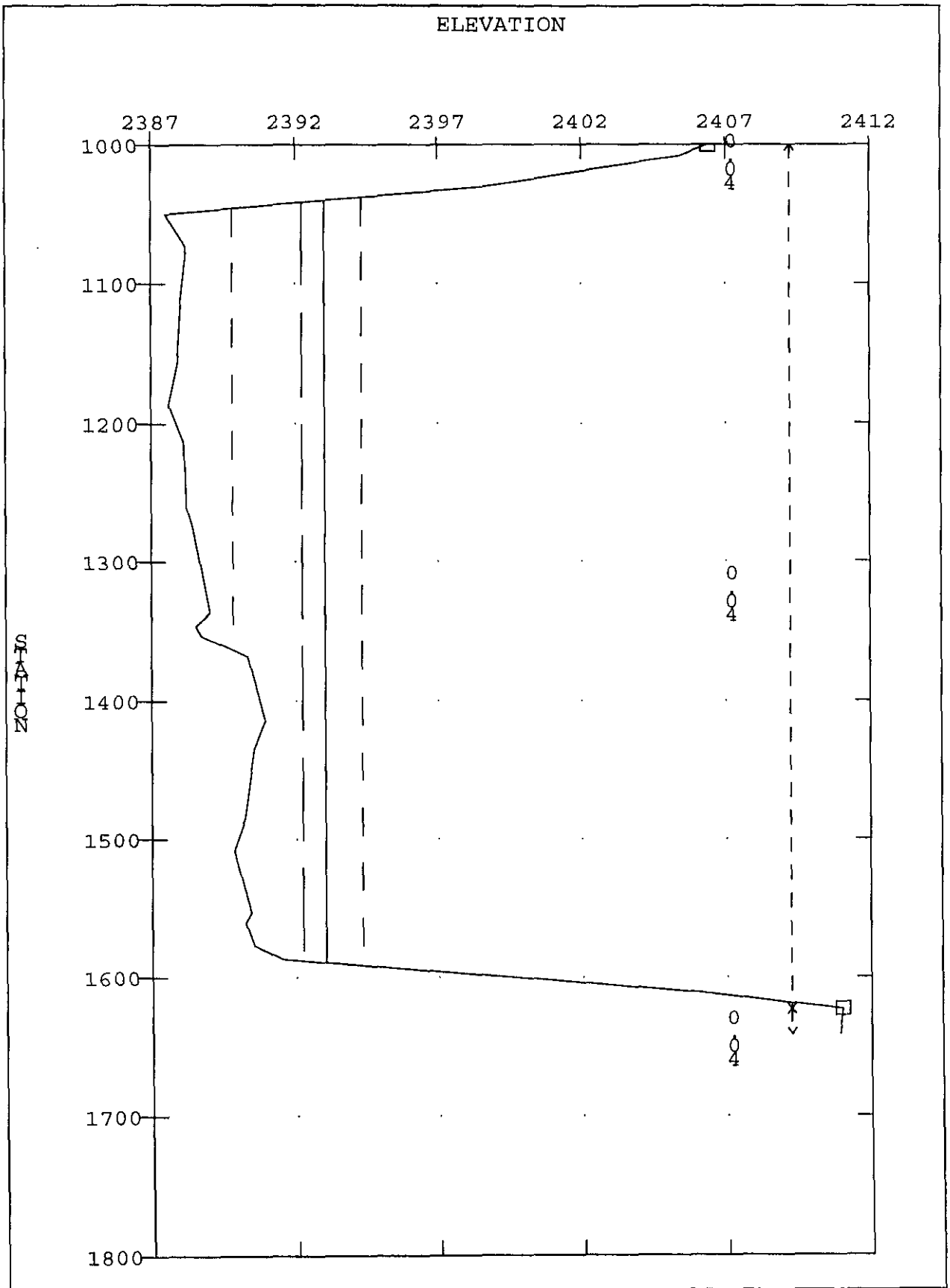
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UPPER NO. LAS VEGAS WASH



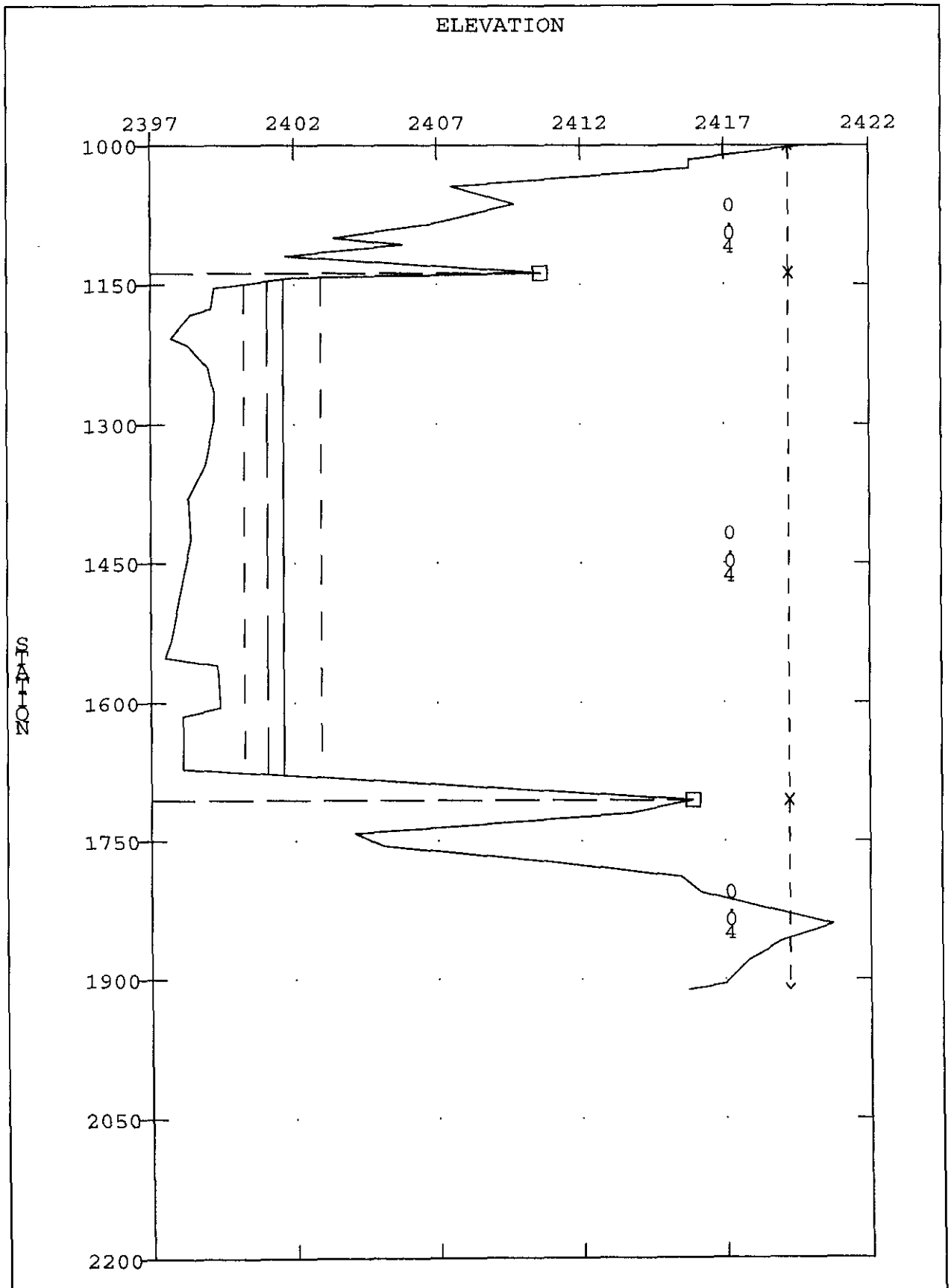
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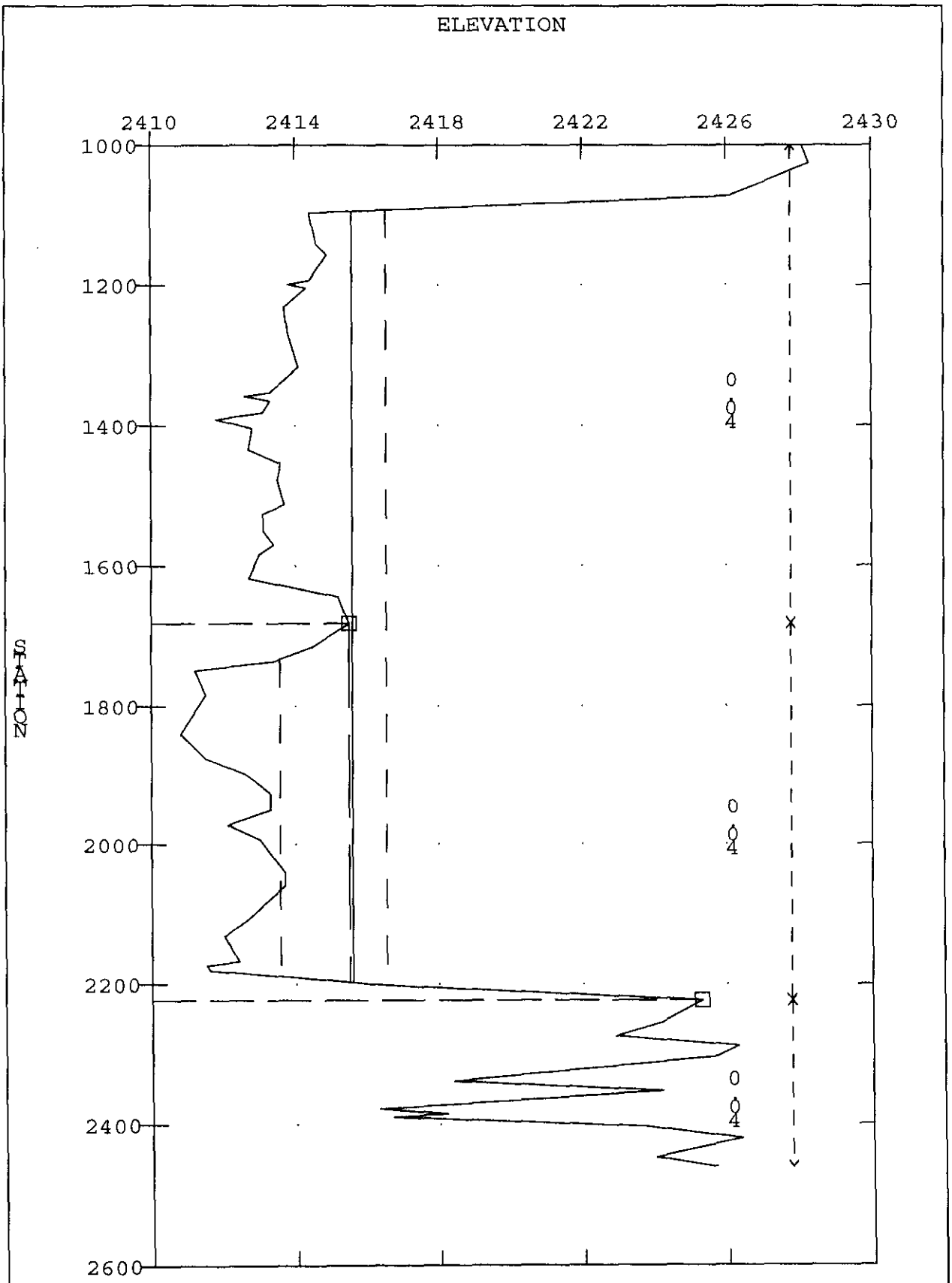
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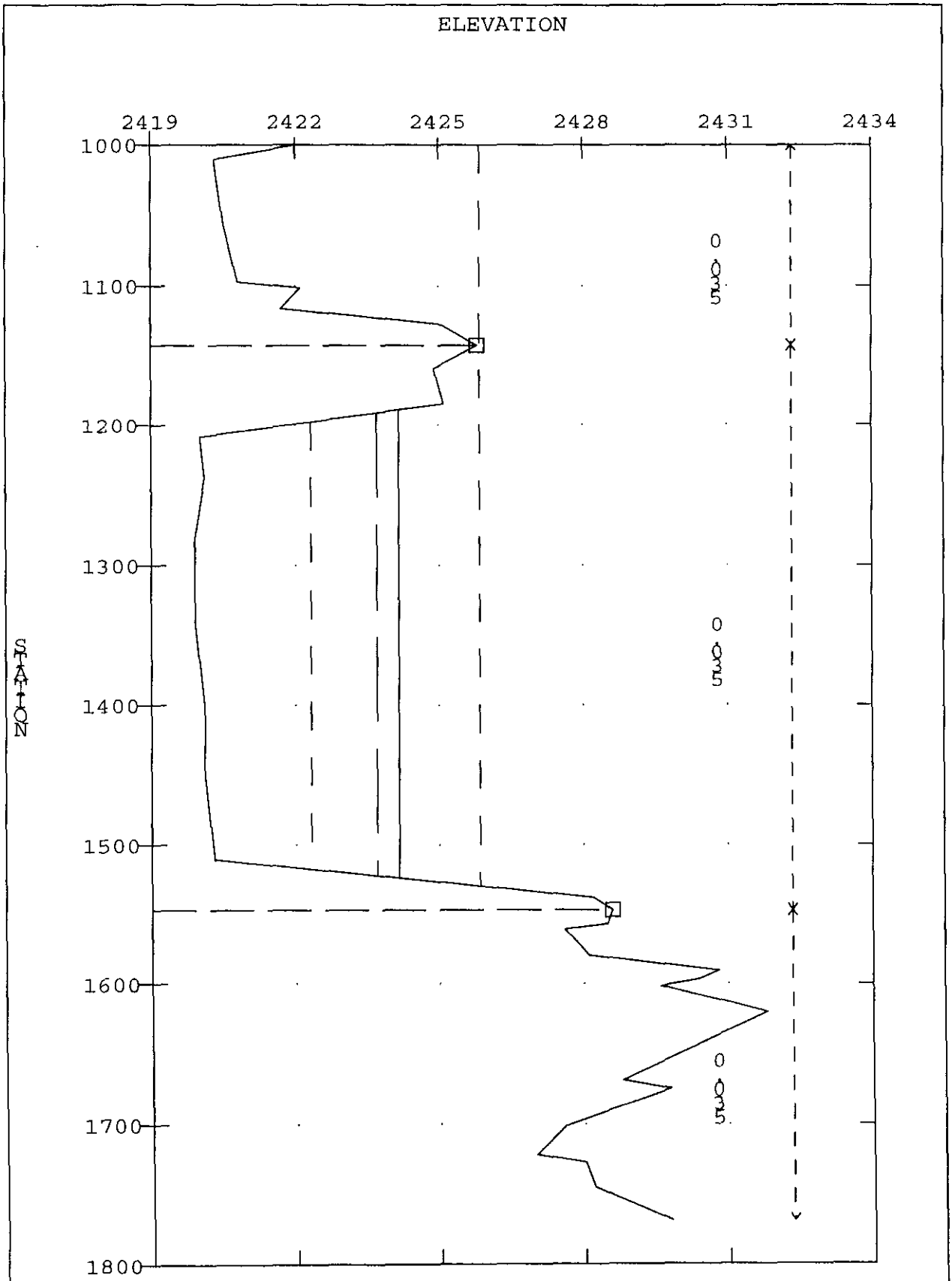
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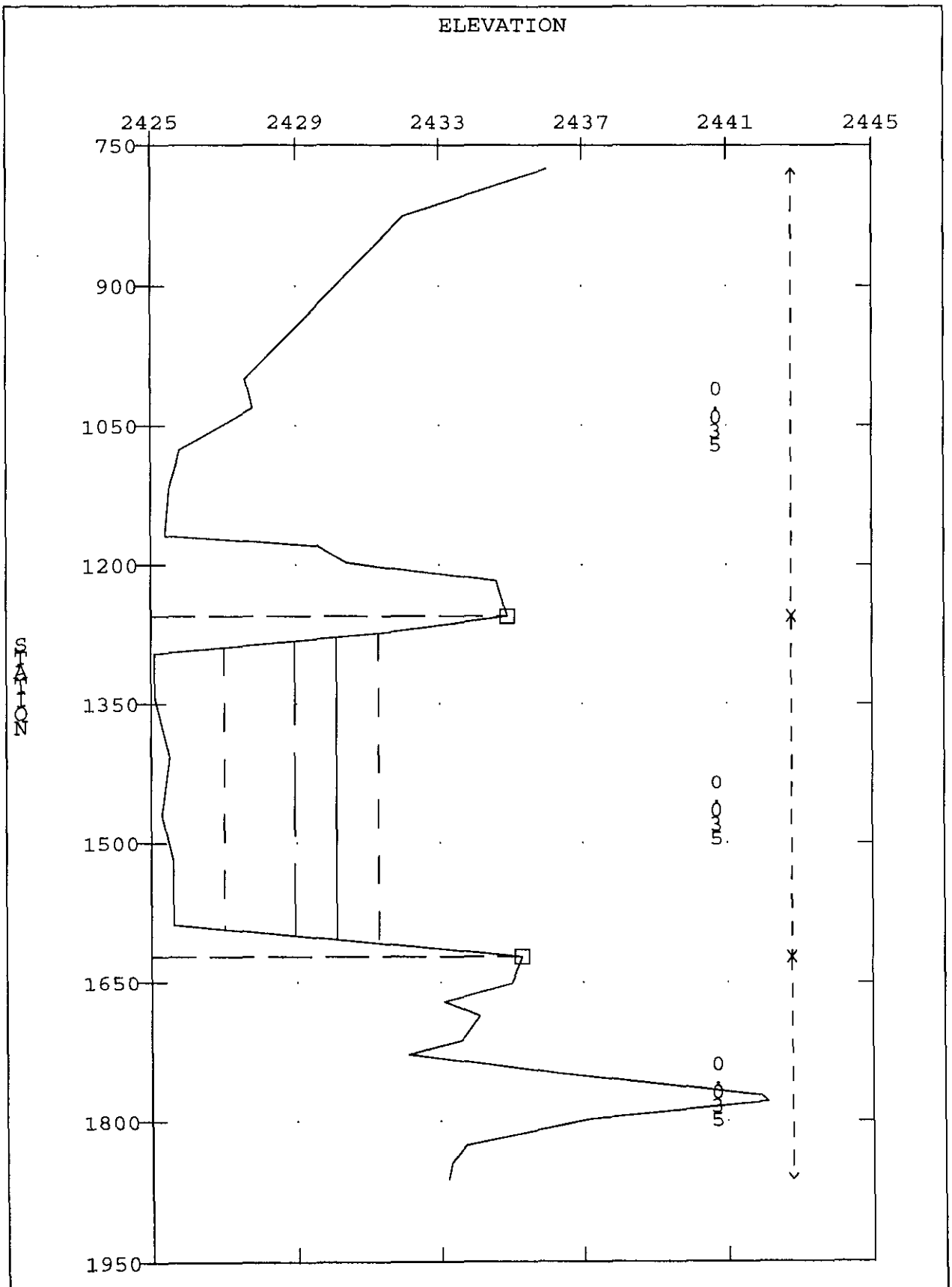
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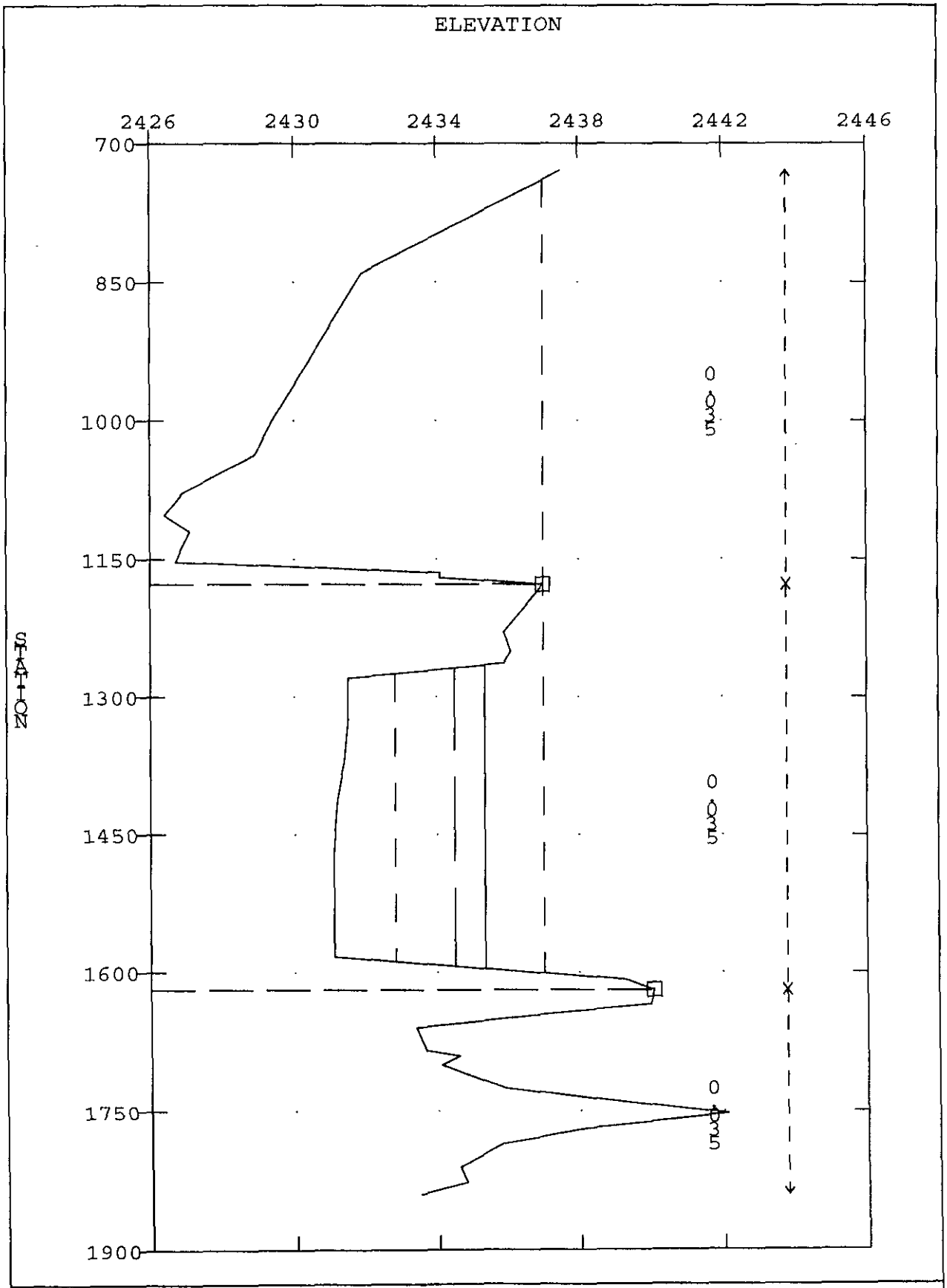
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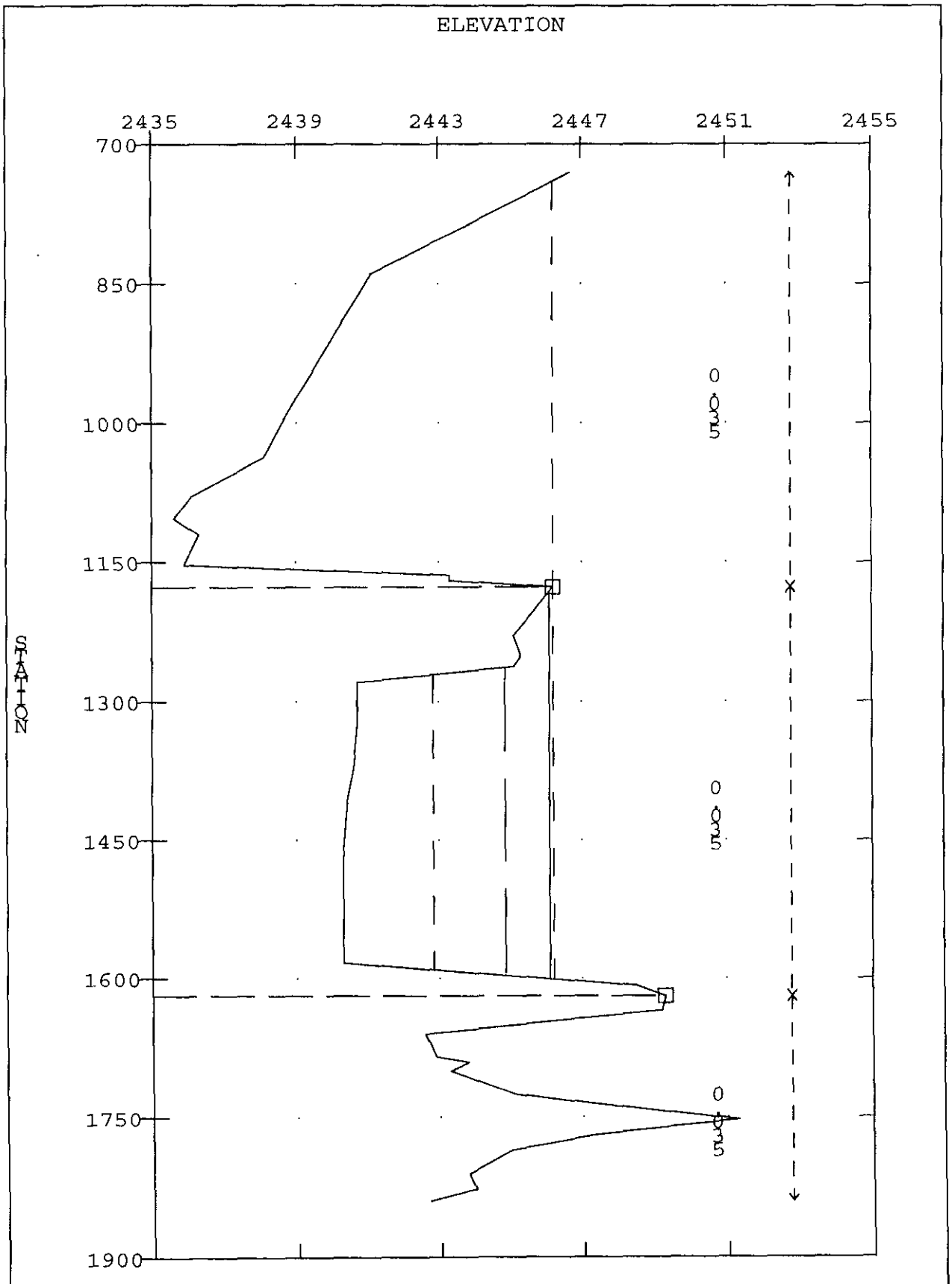
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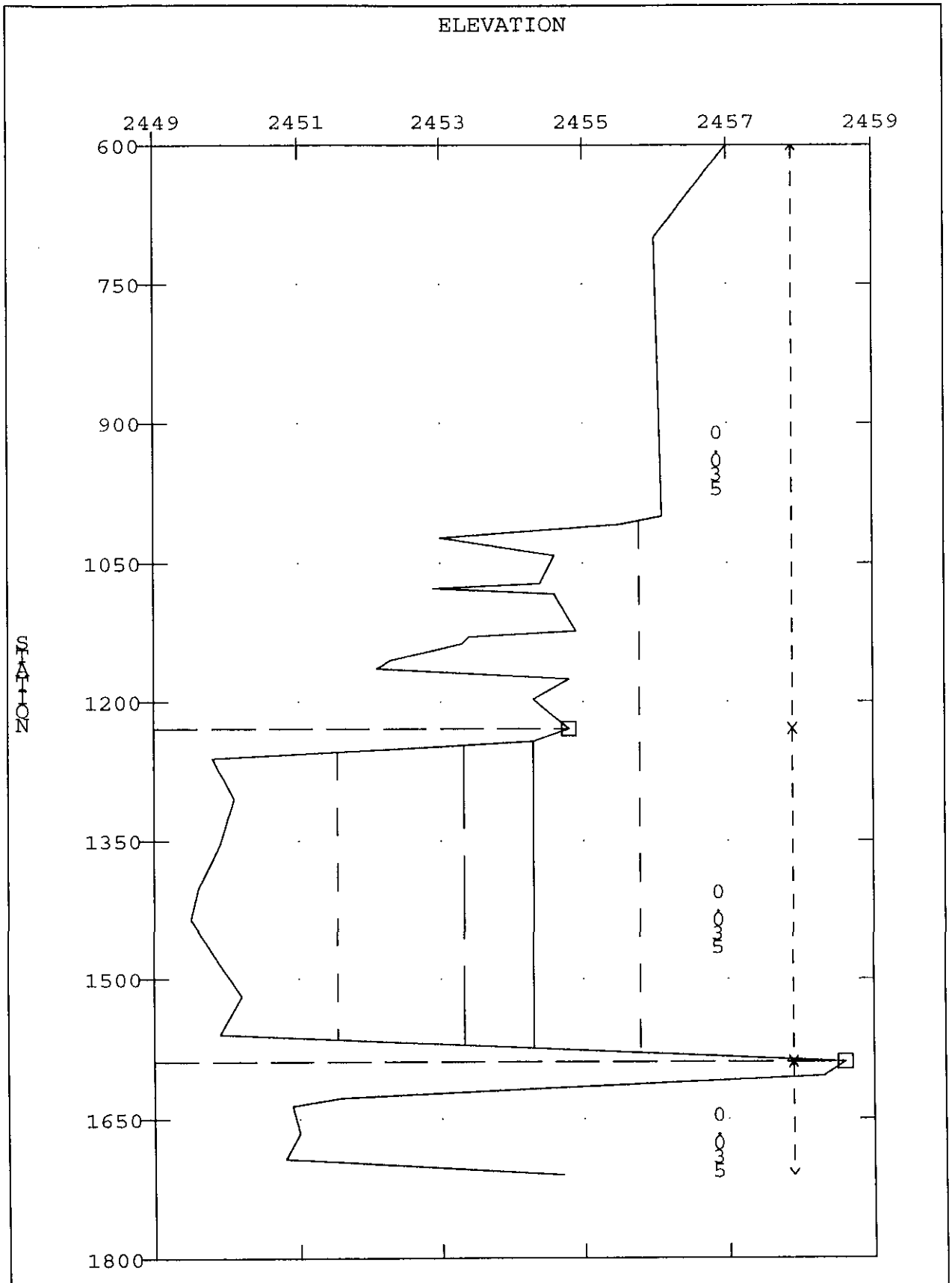
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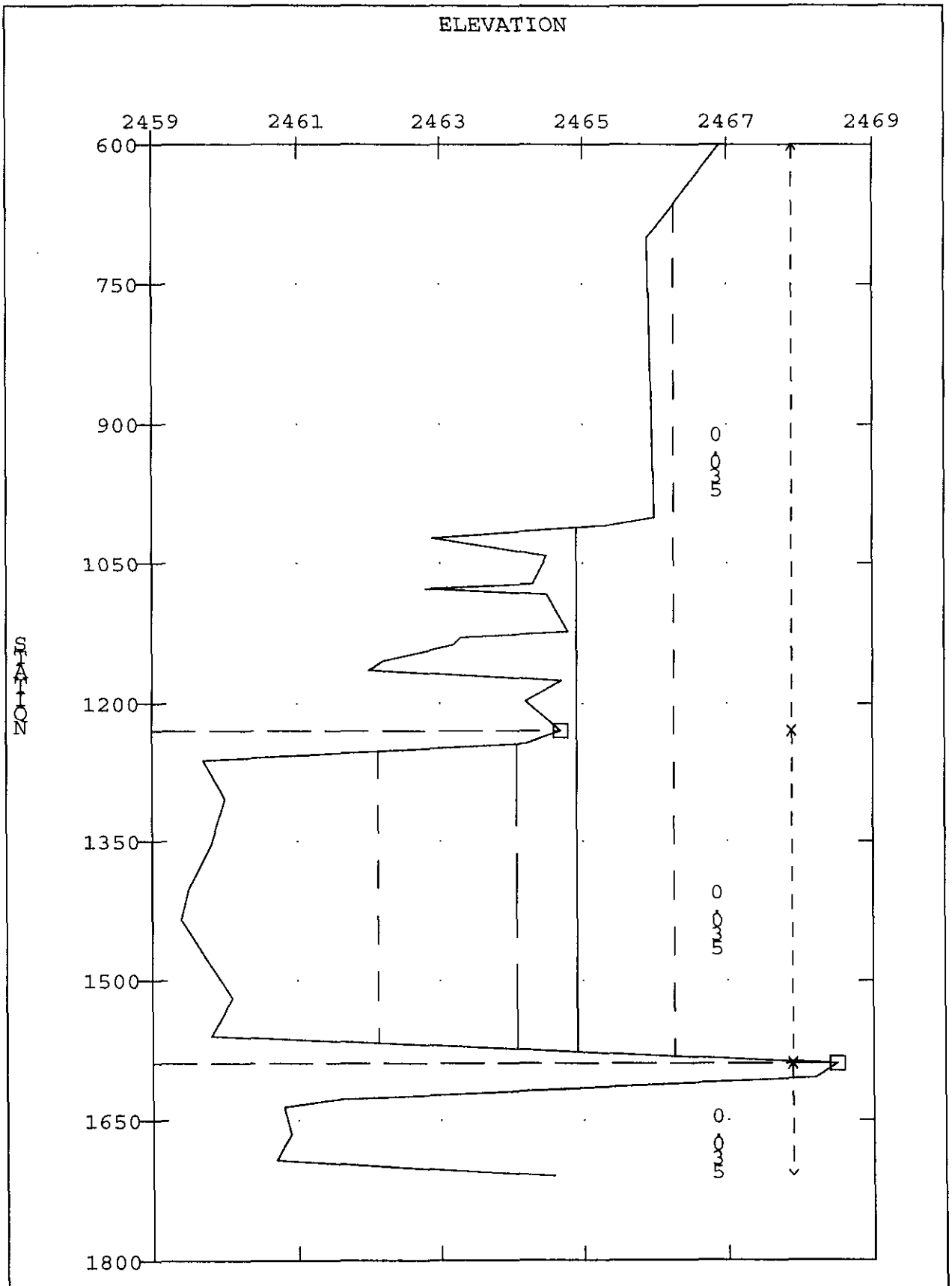
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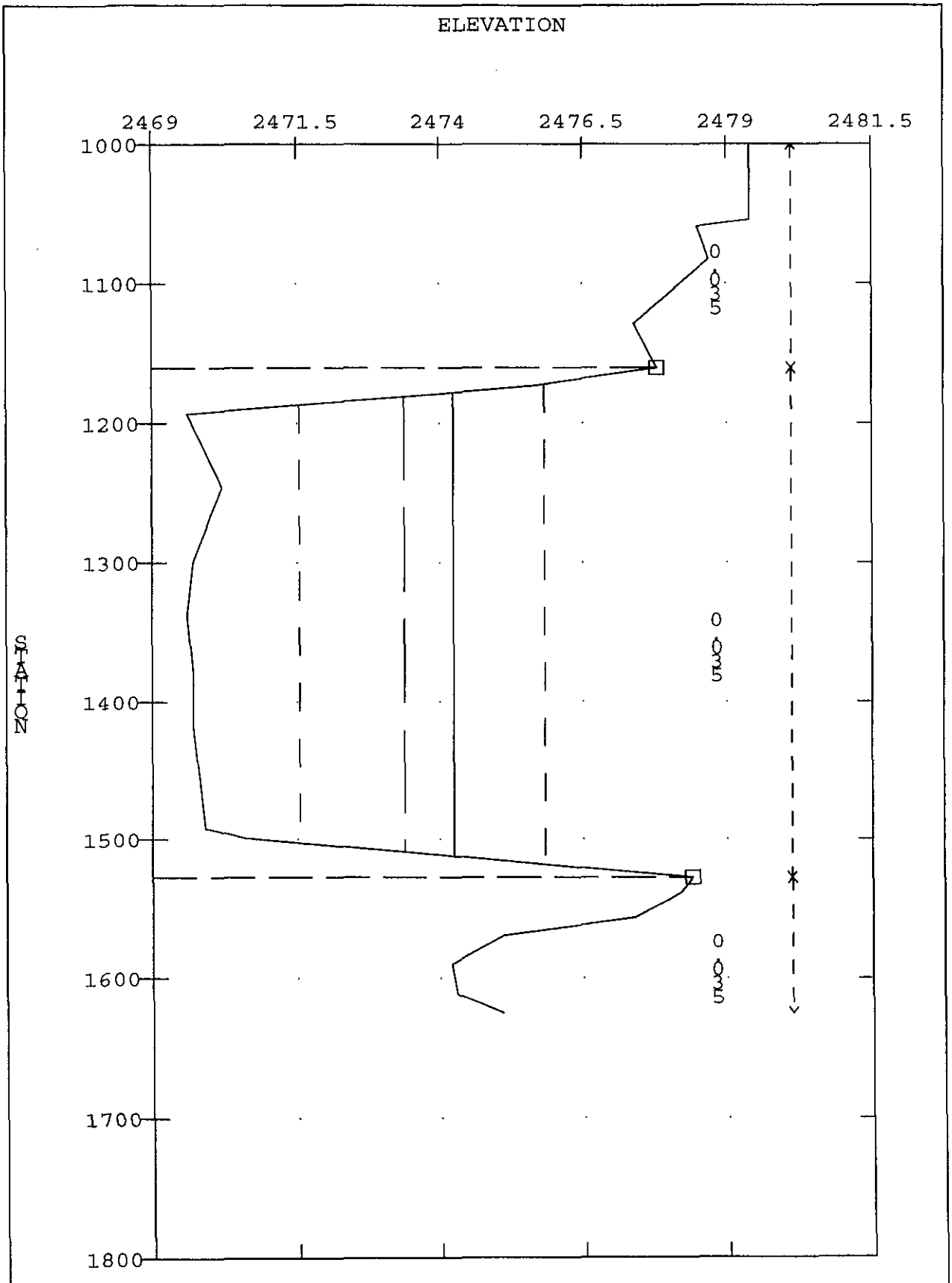
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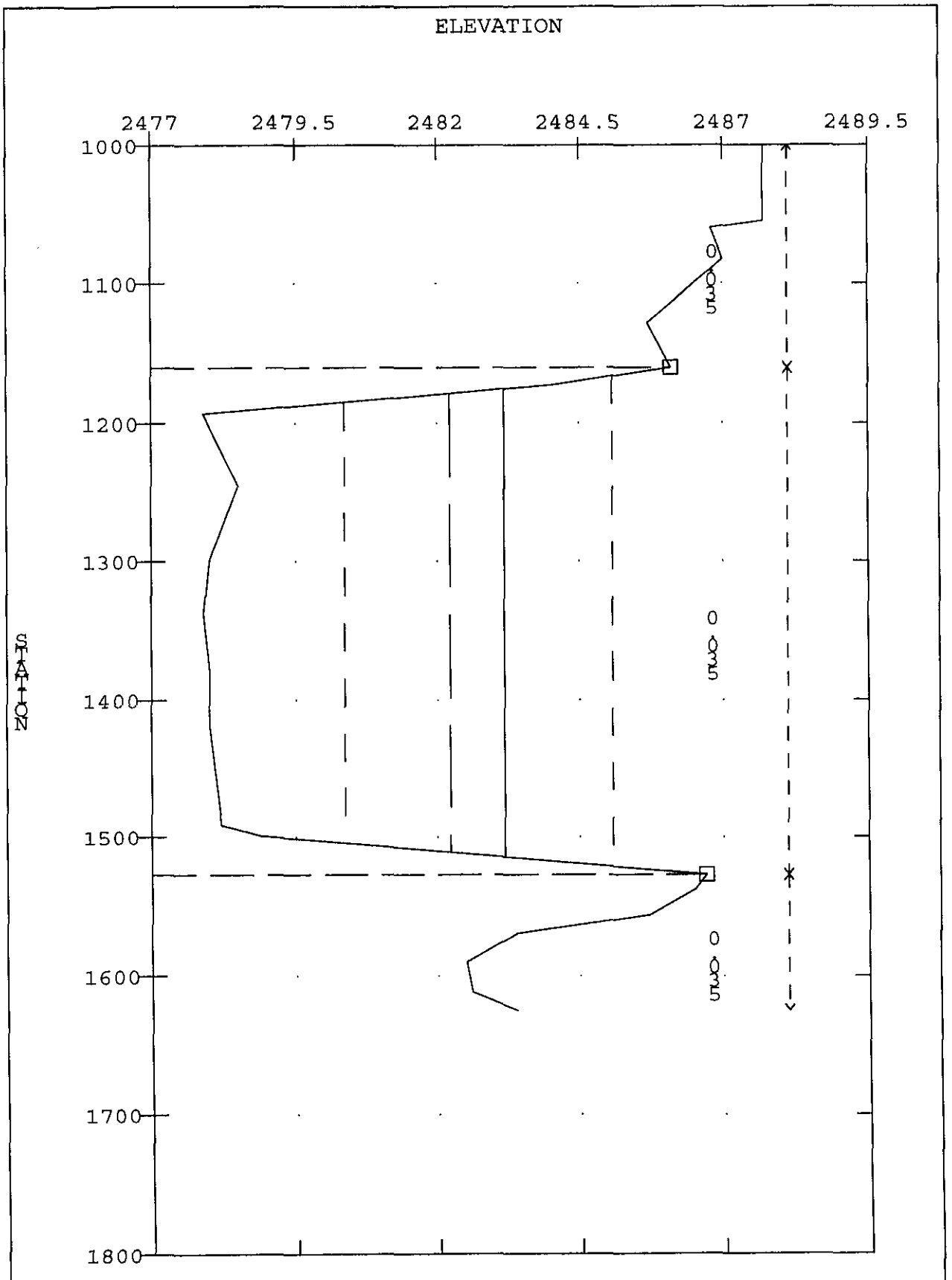
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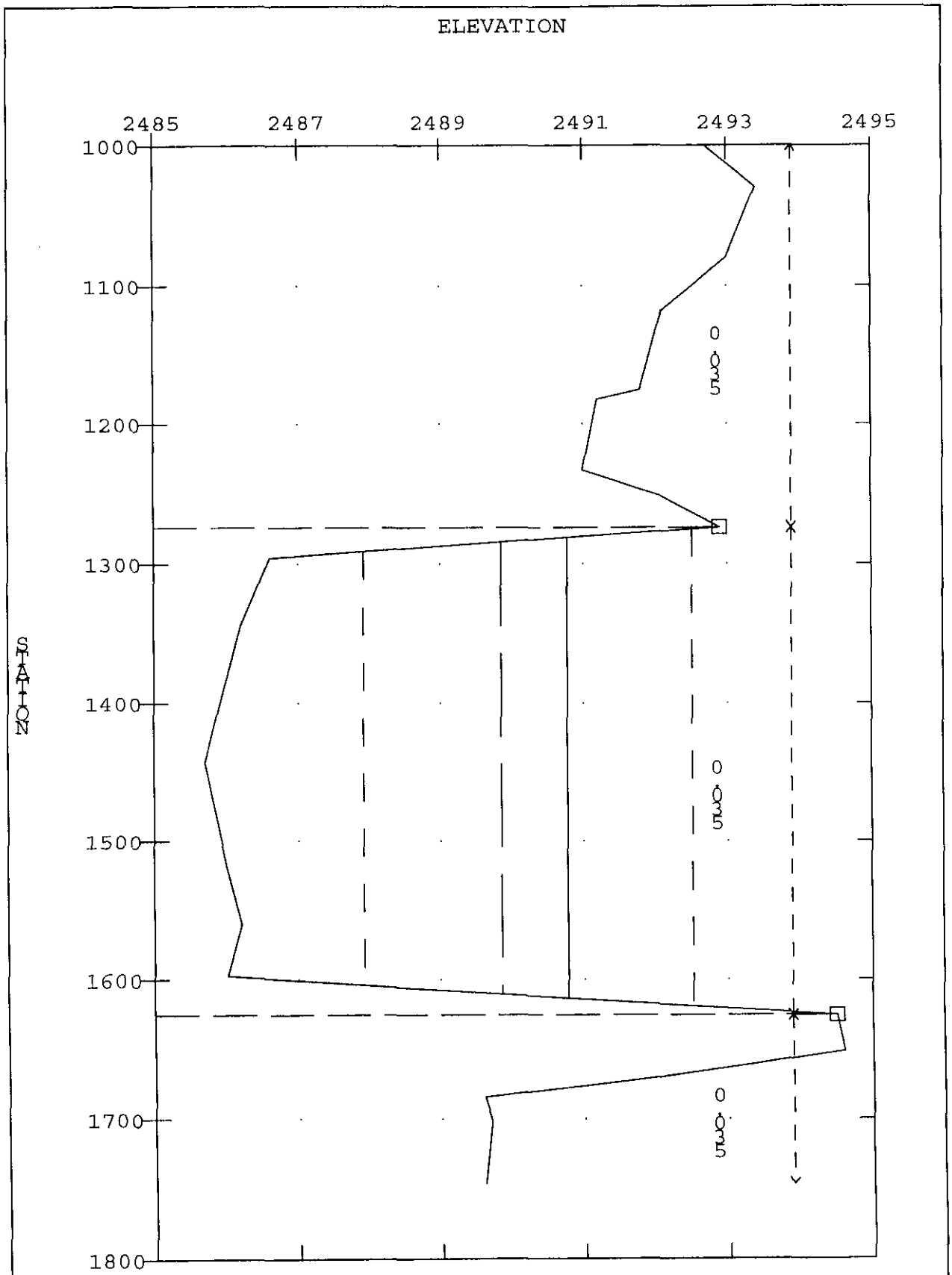
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UPPER NO. LAS VEGAS WASH



SECTION : 73765

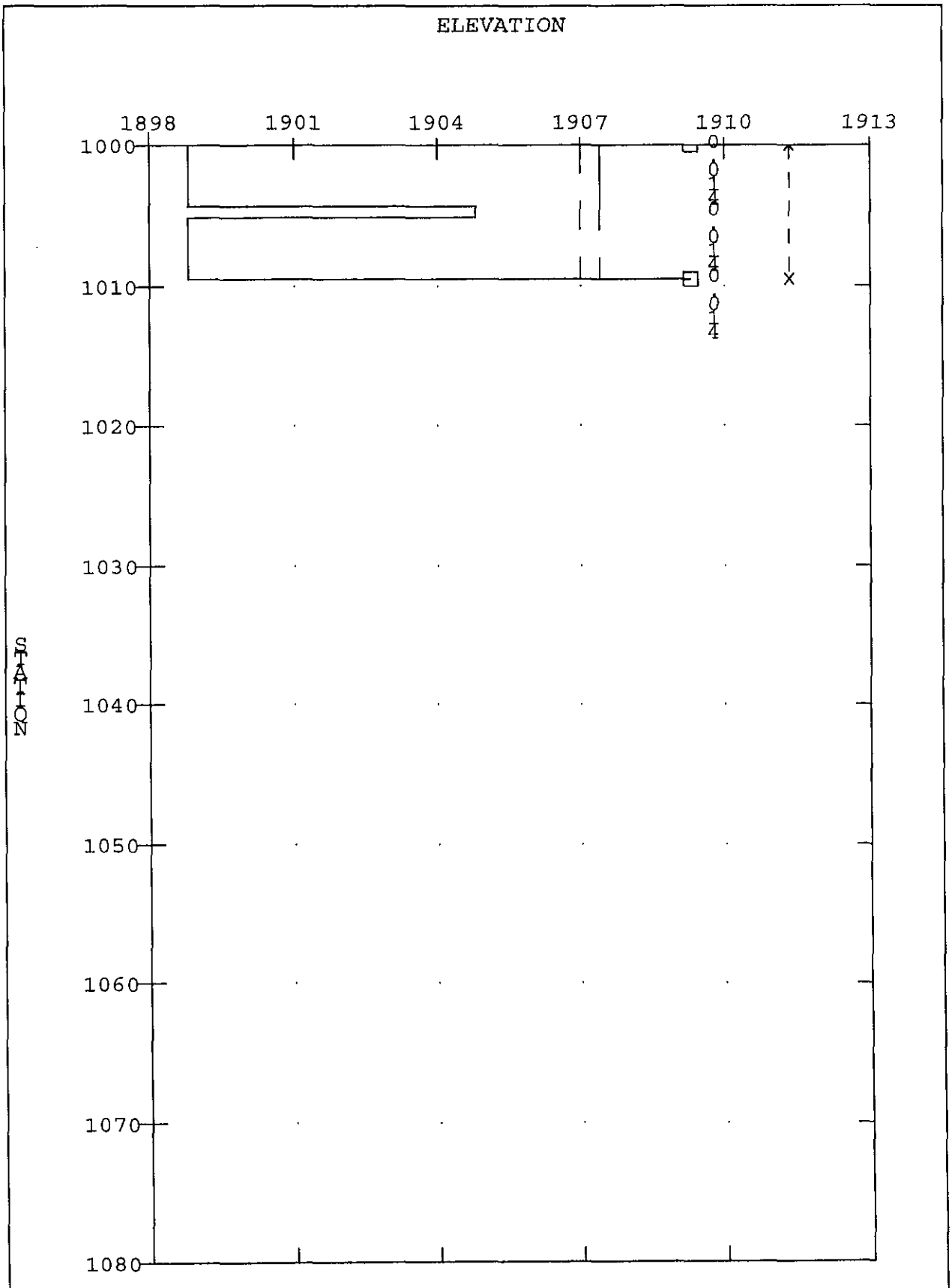
UPPER NO. LAS VEGAS WASH



SECTION : 74997

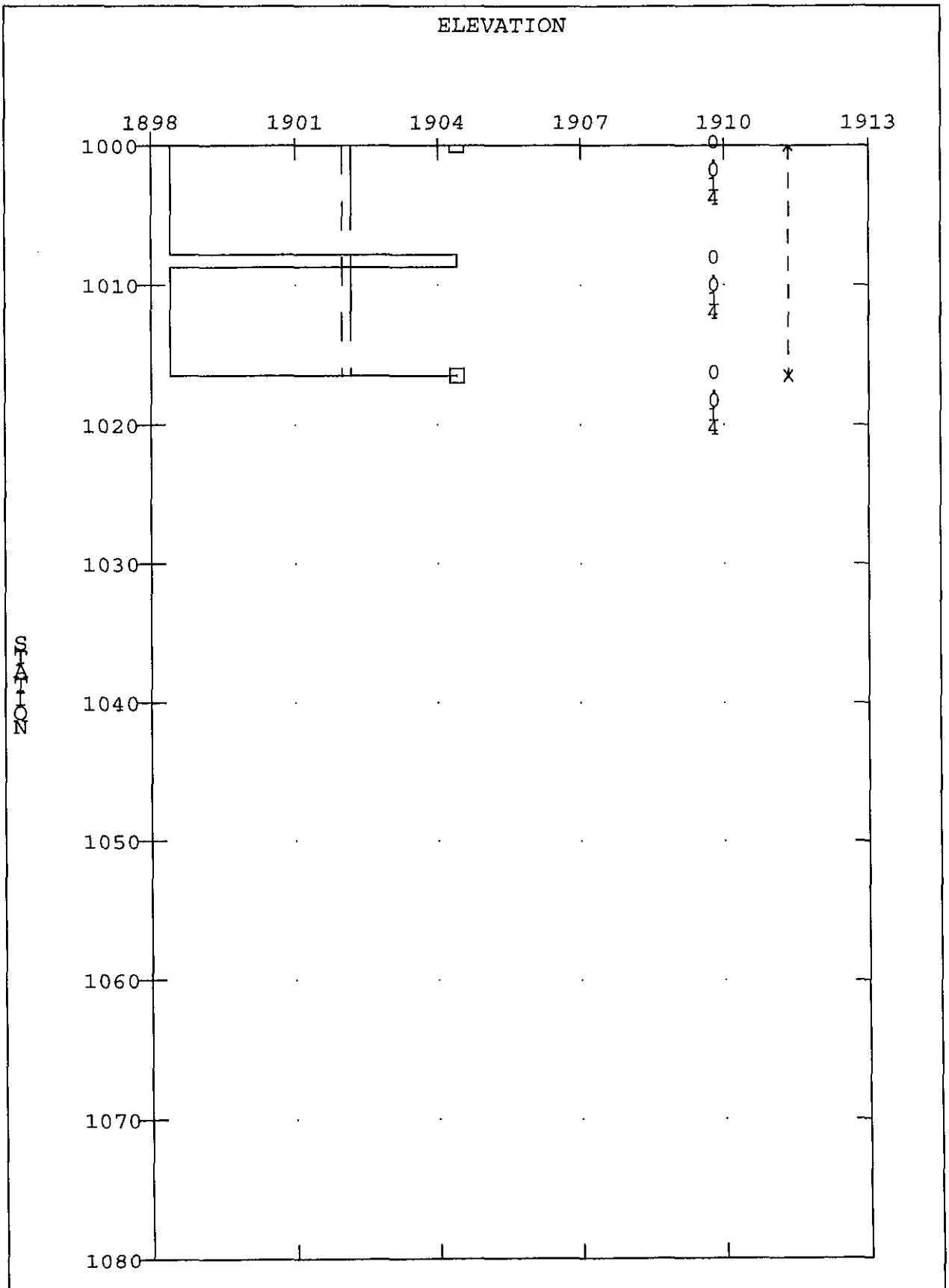
UPPER NO. LAS VEGAS WASH

Cross Section Plots
NCHSPWOB



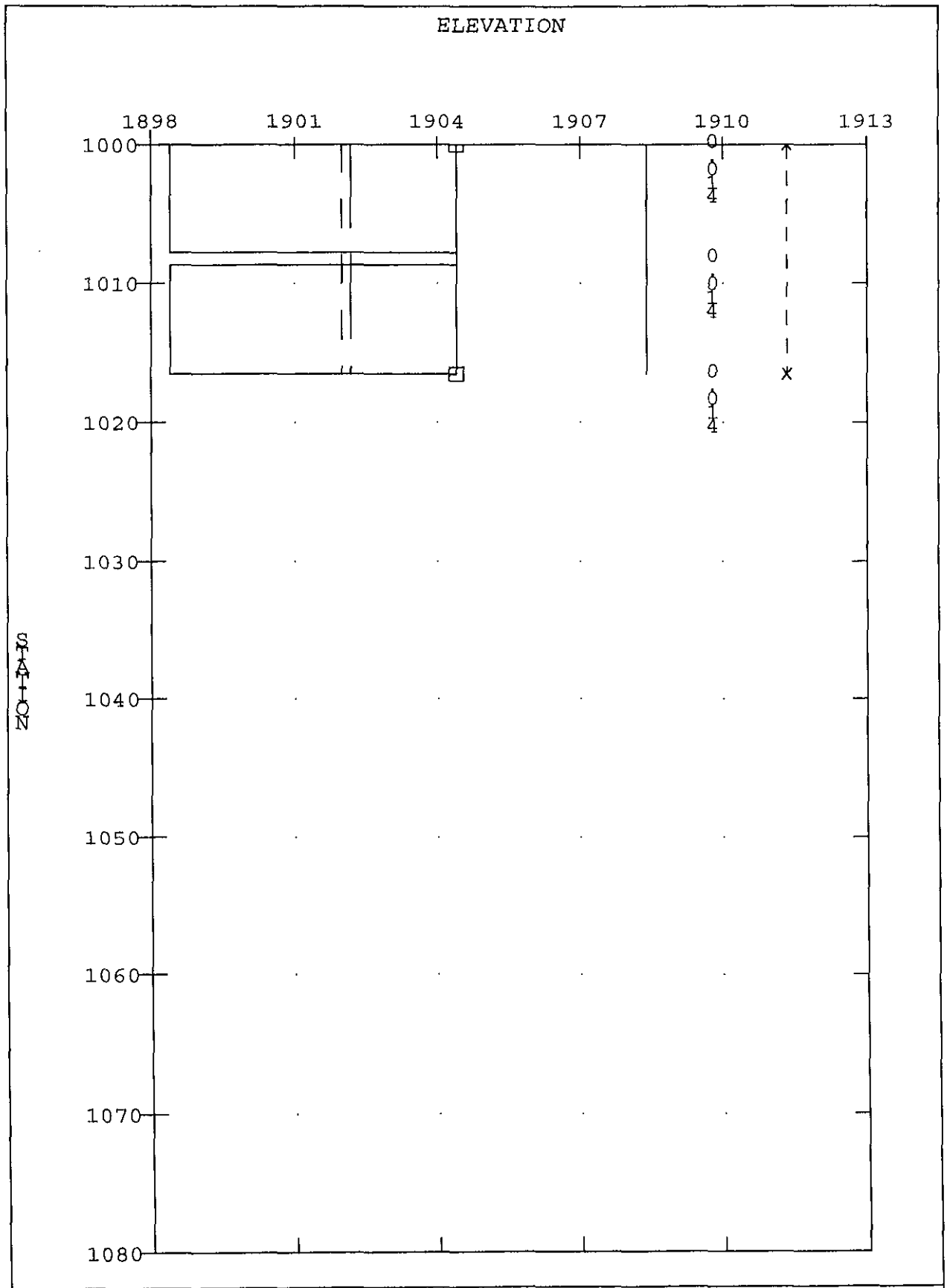
SECTION : 707.6

N CHANNEL W/O DIVERSION AT NLVDB



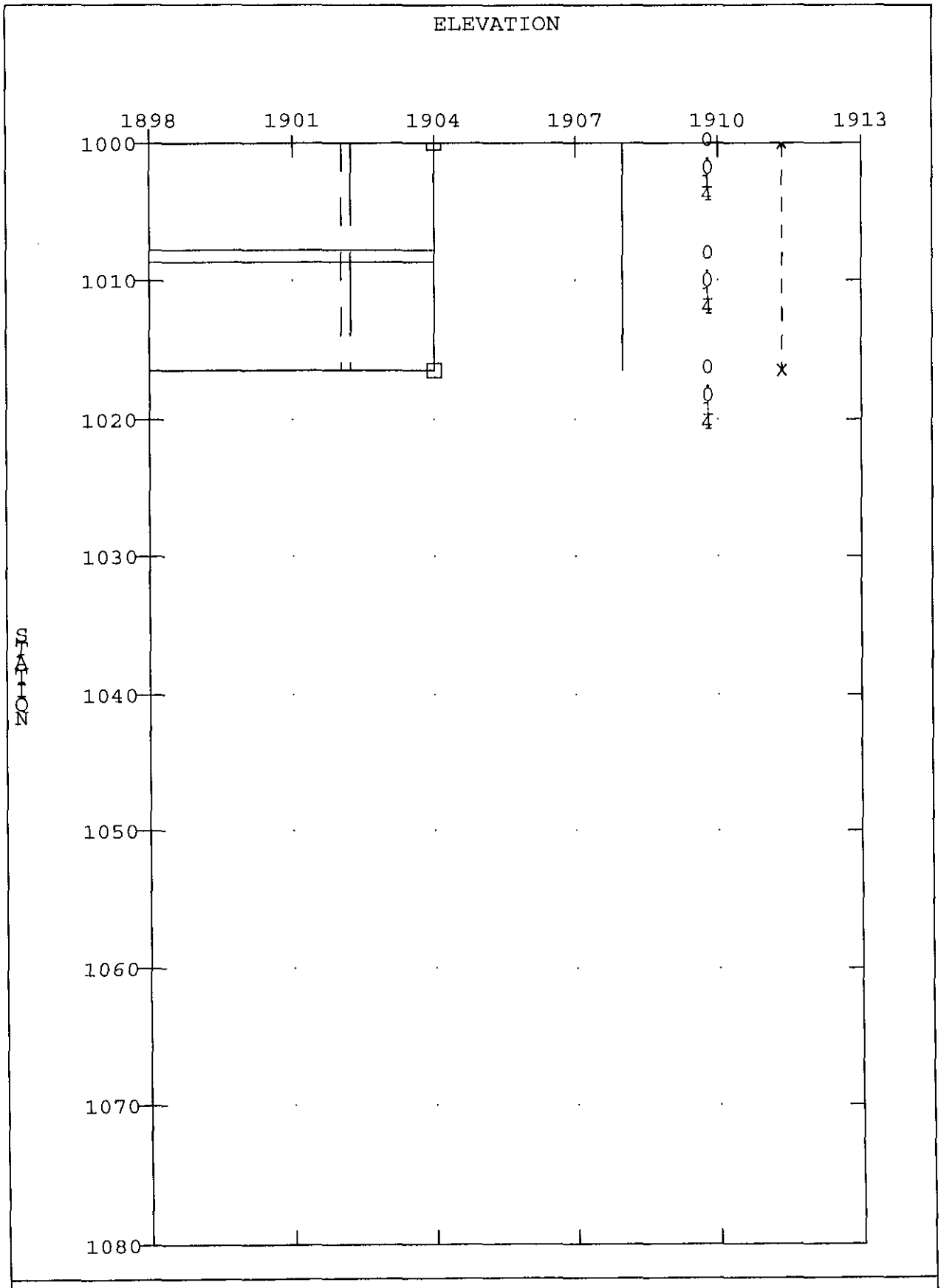
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N CHANNEL W/O DIVERSION AT NLVDB



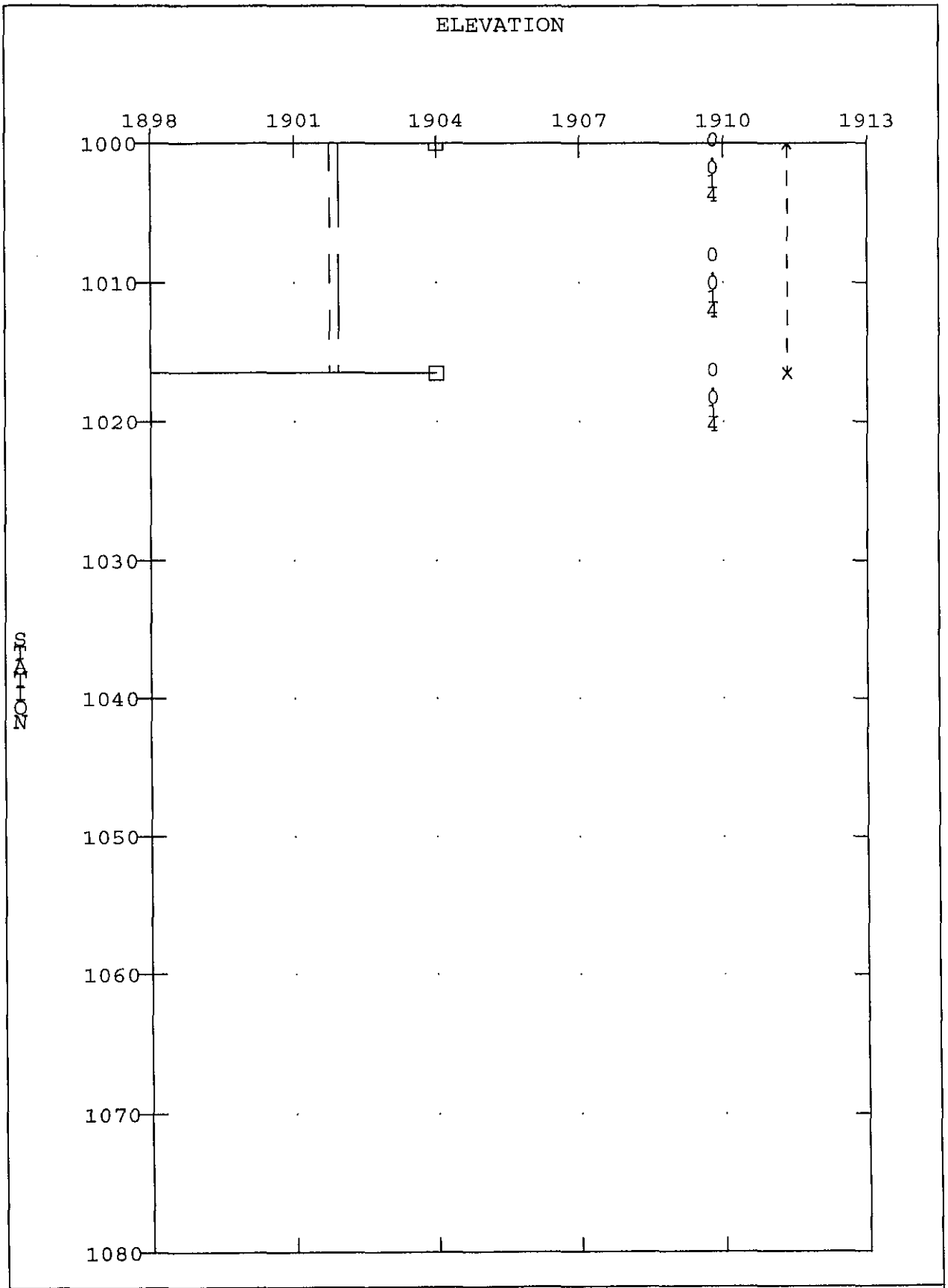
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N CHANNEL W/O DIVERSION AT NLVDB



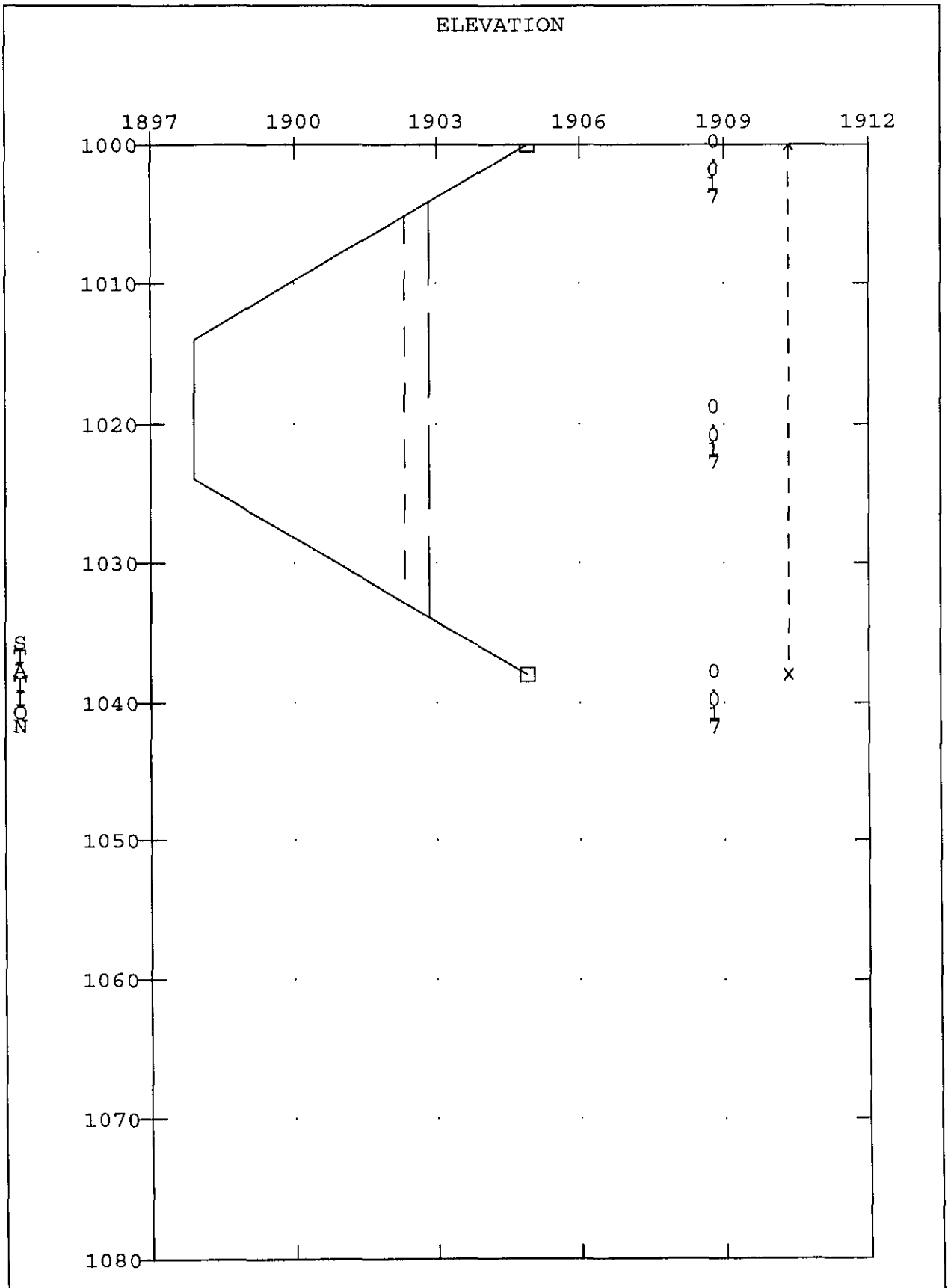
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N CHANNEL W/O DIVERSION AT NLVDB



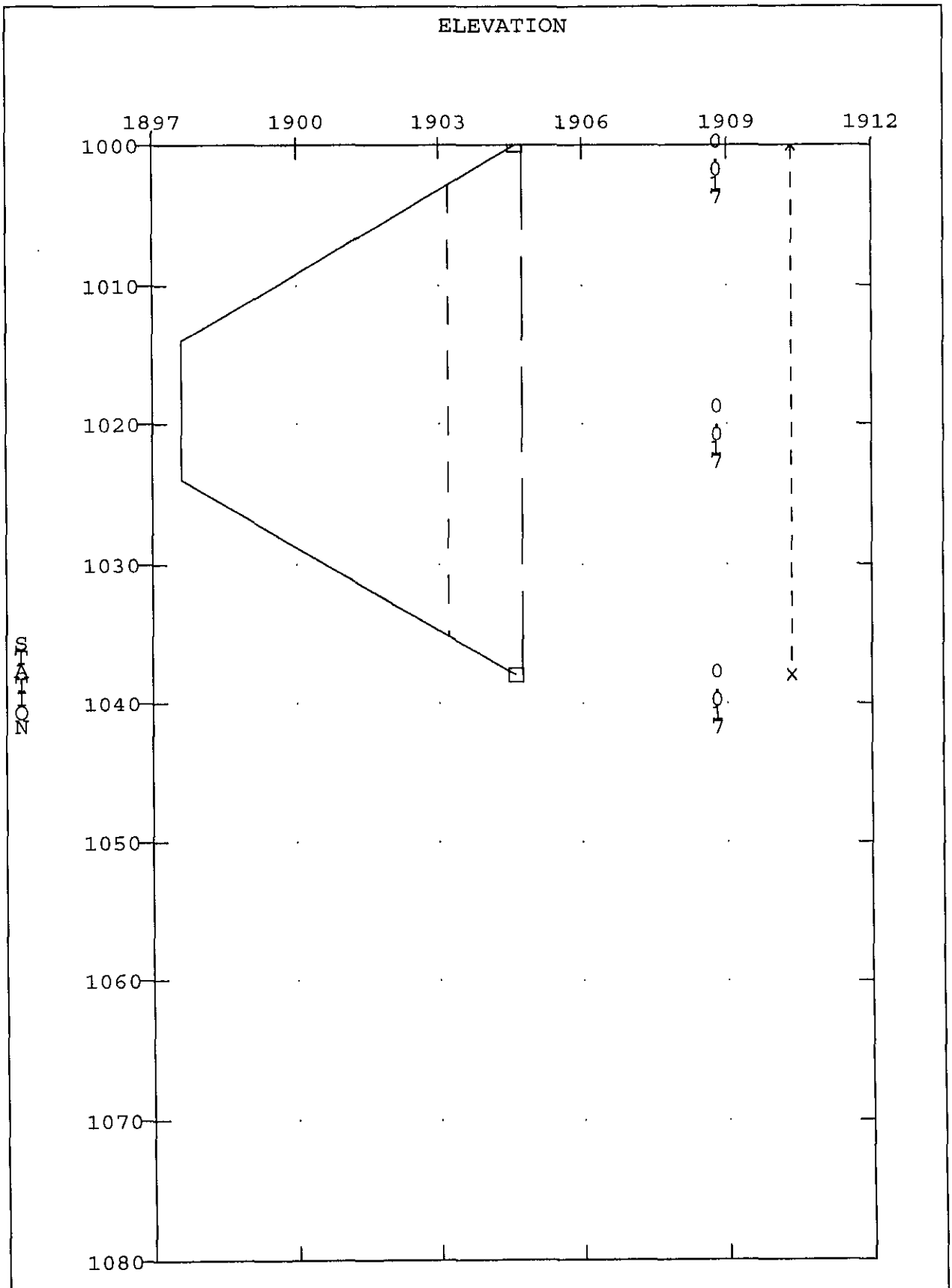
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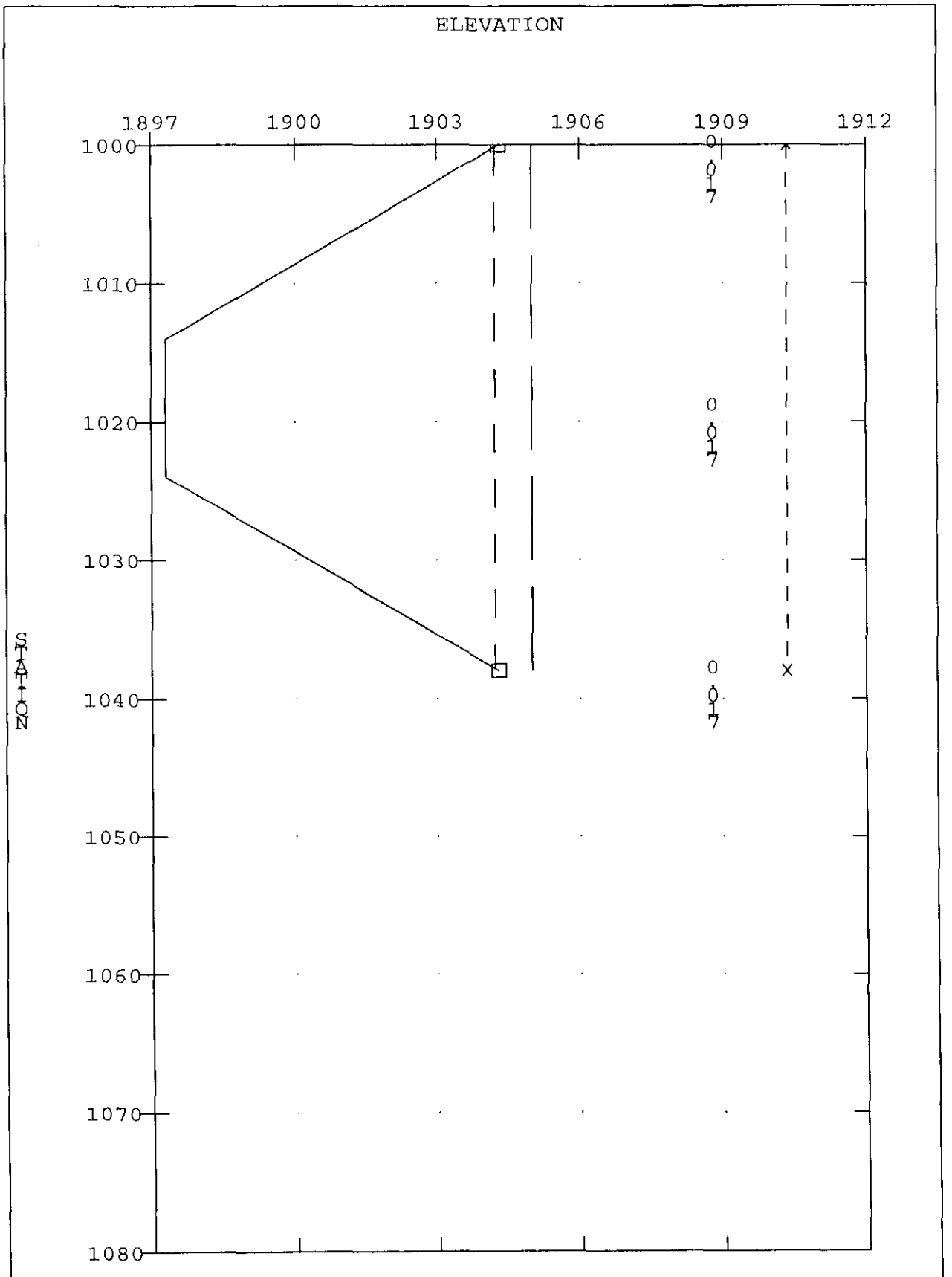
SECTION : 546.2

N CHANNEL W/O DIVERSION AT NLVDB



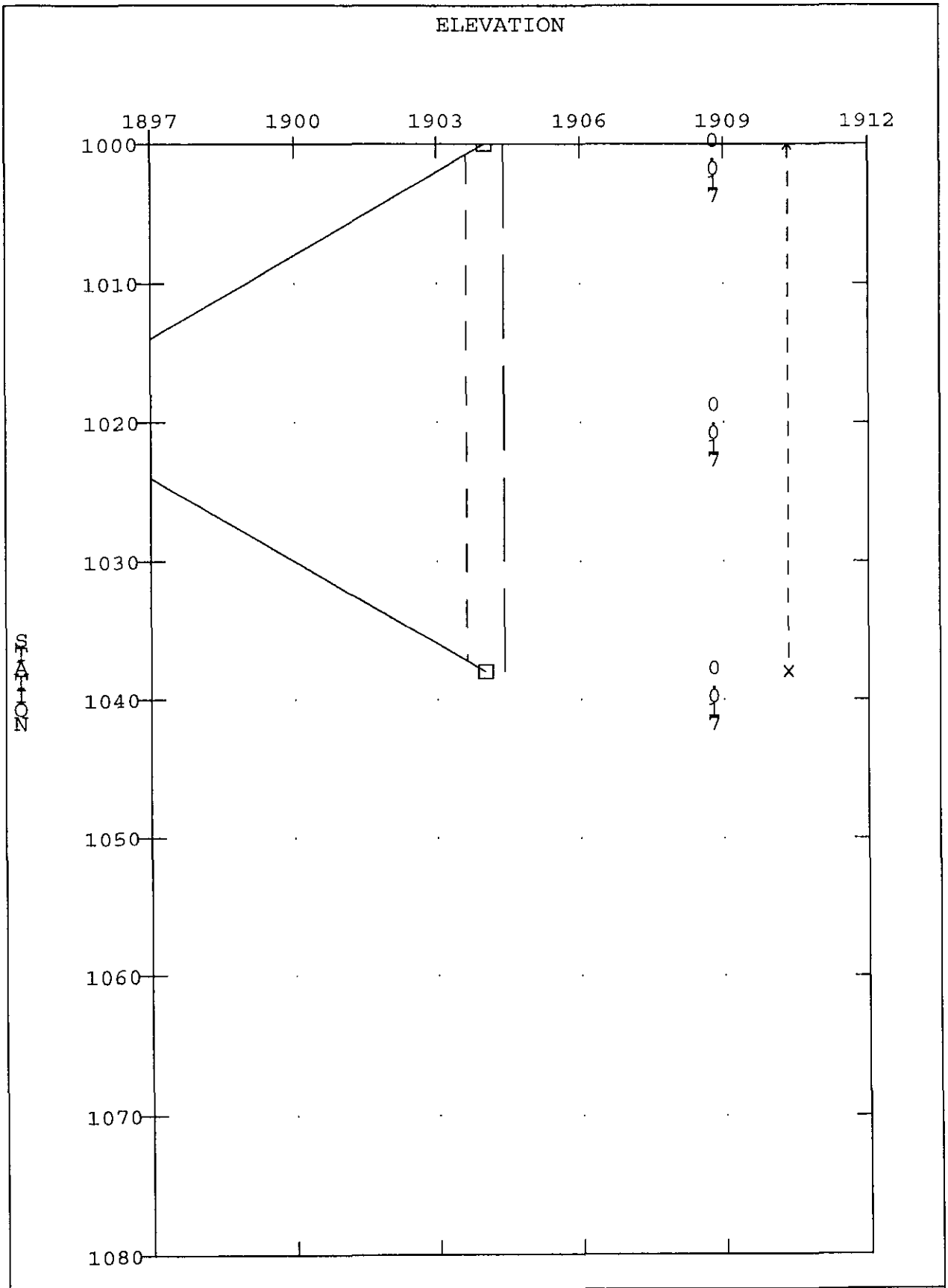
SECTION : 496.2

N CHANNEL W/O DIVERSION AT NLVDB



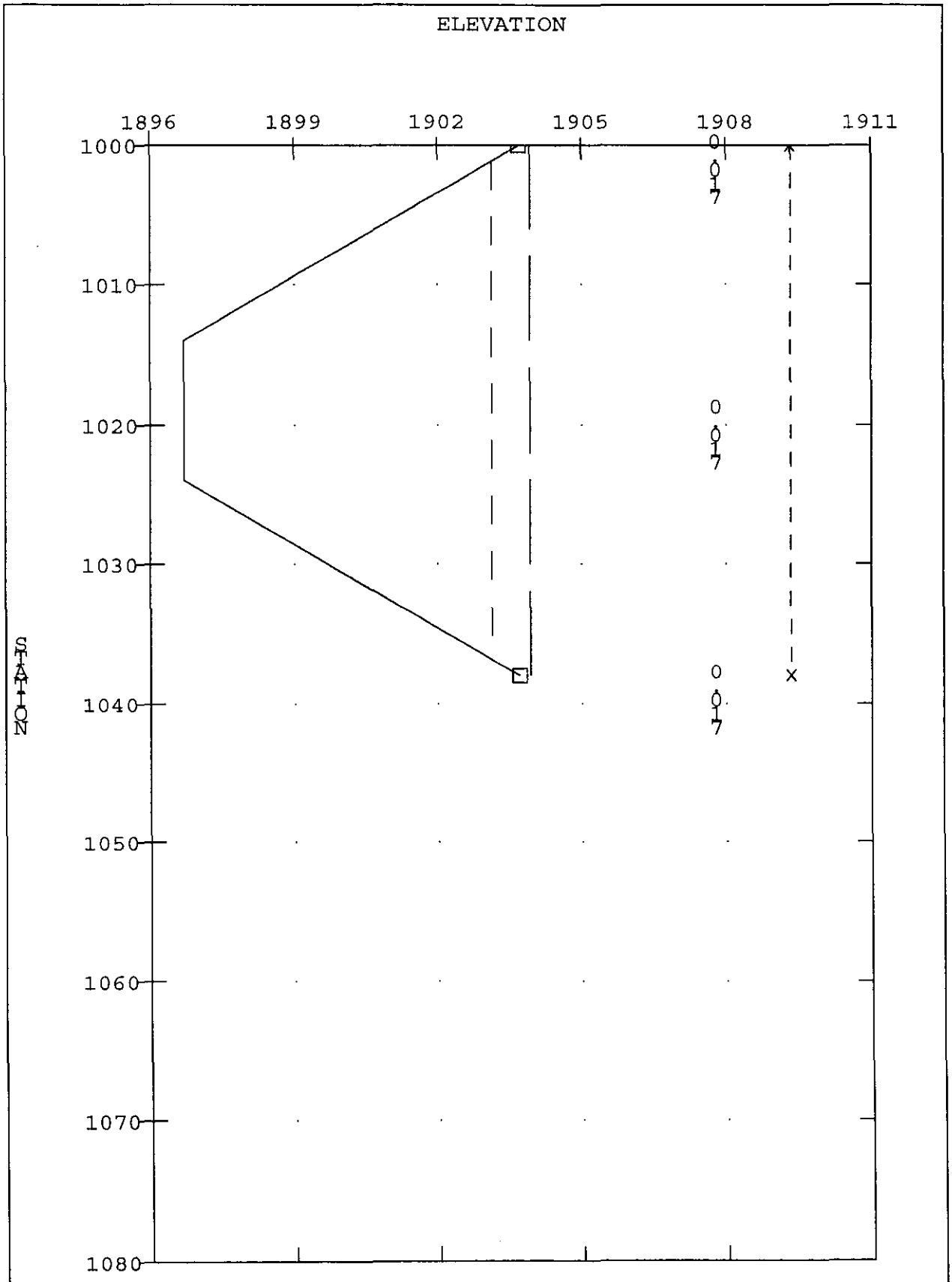
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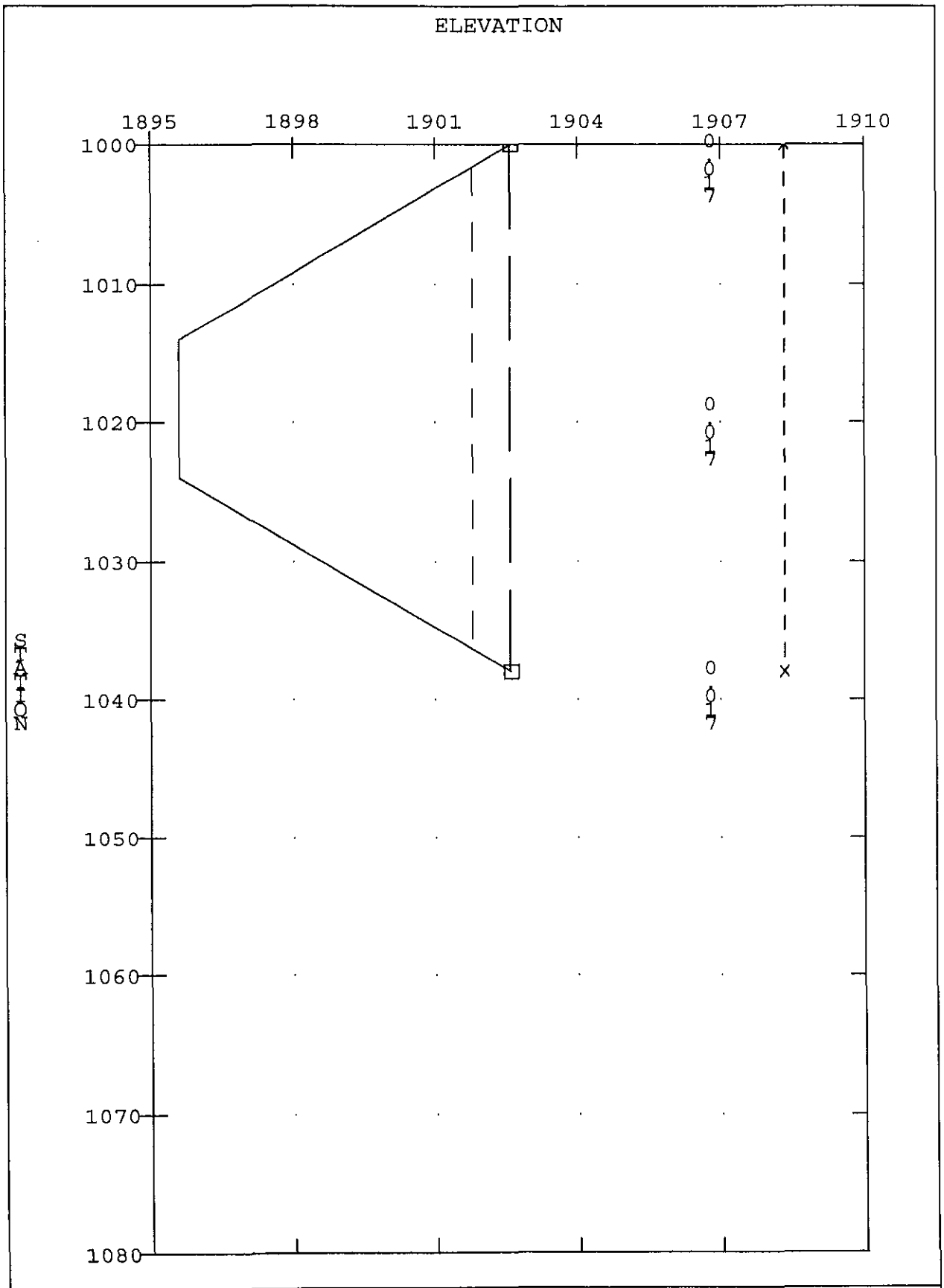
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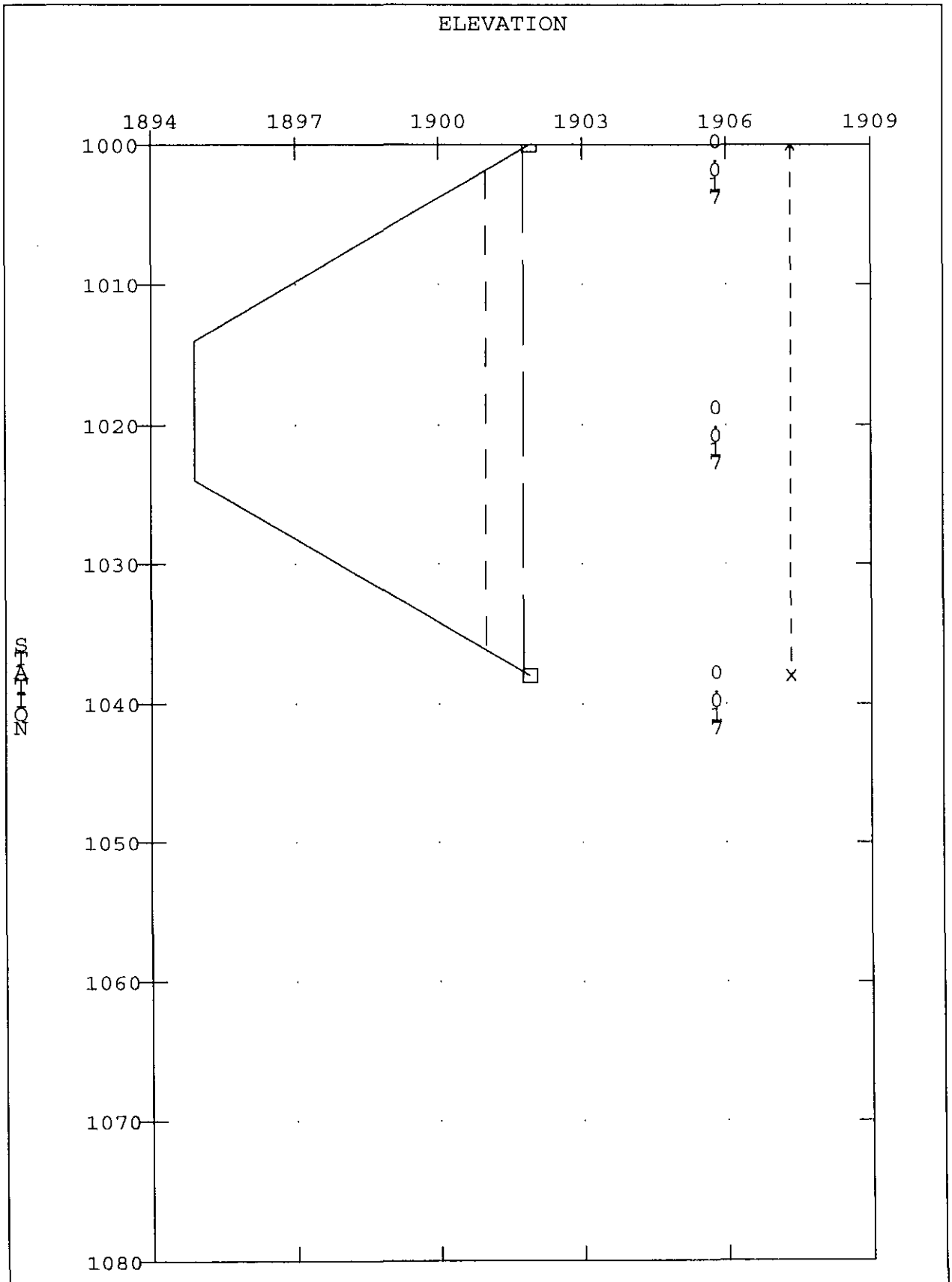
SECTION : 346.2

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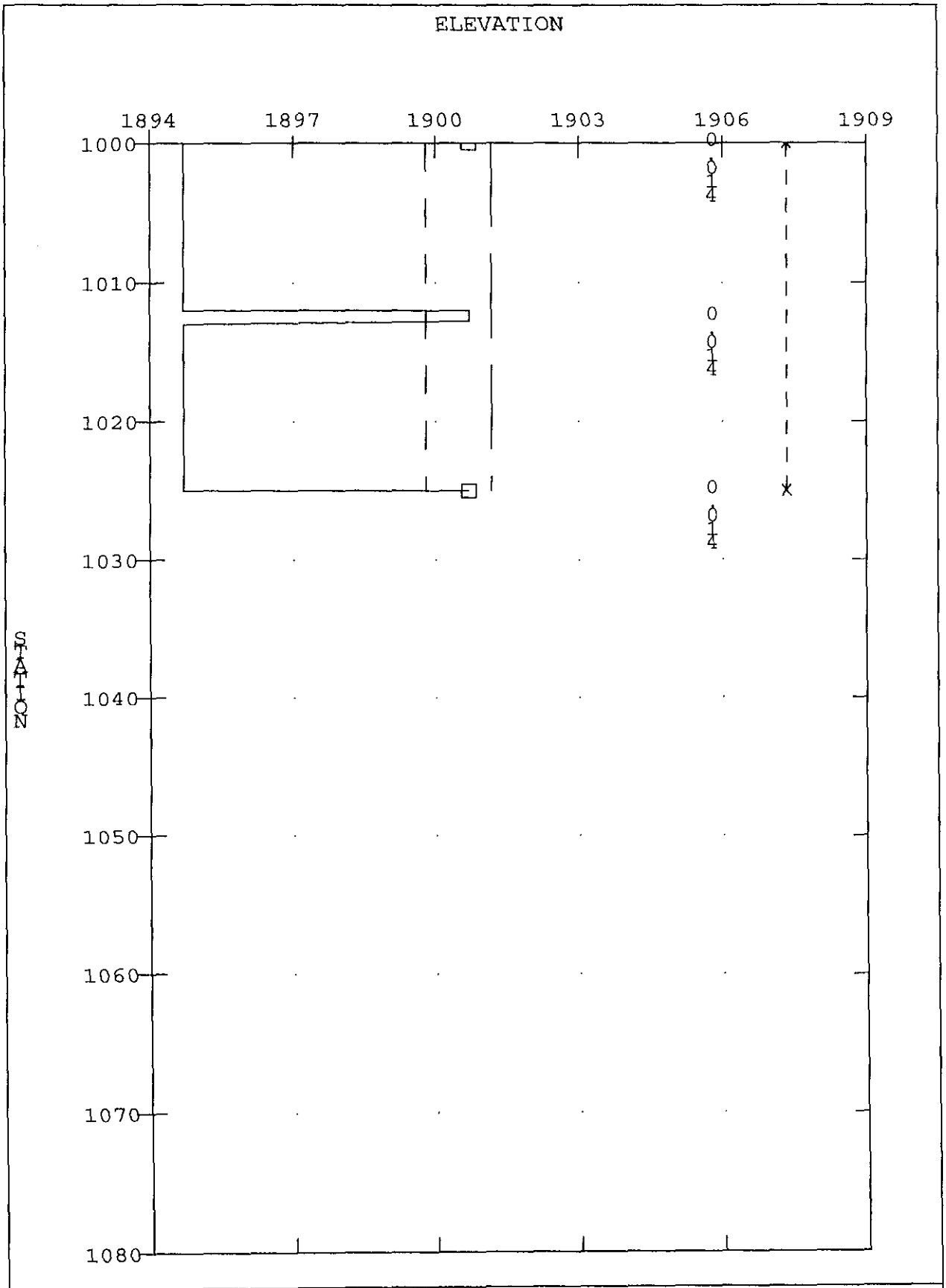
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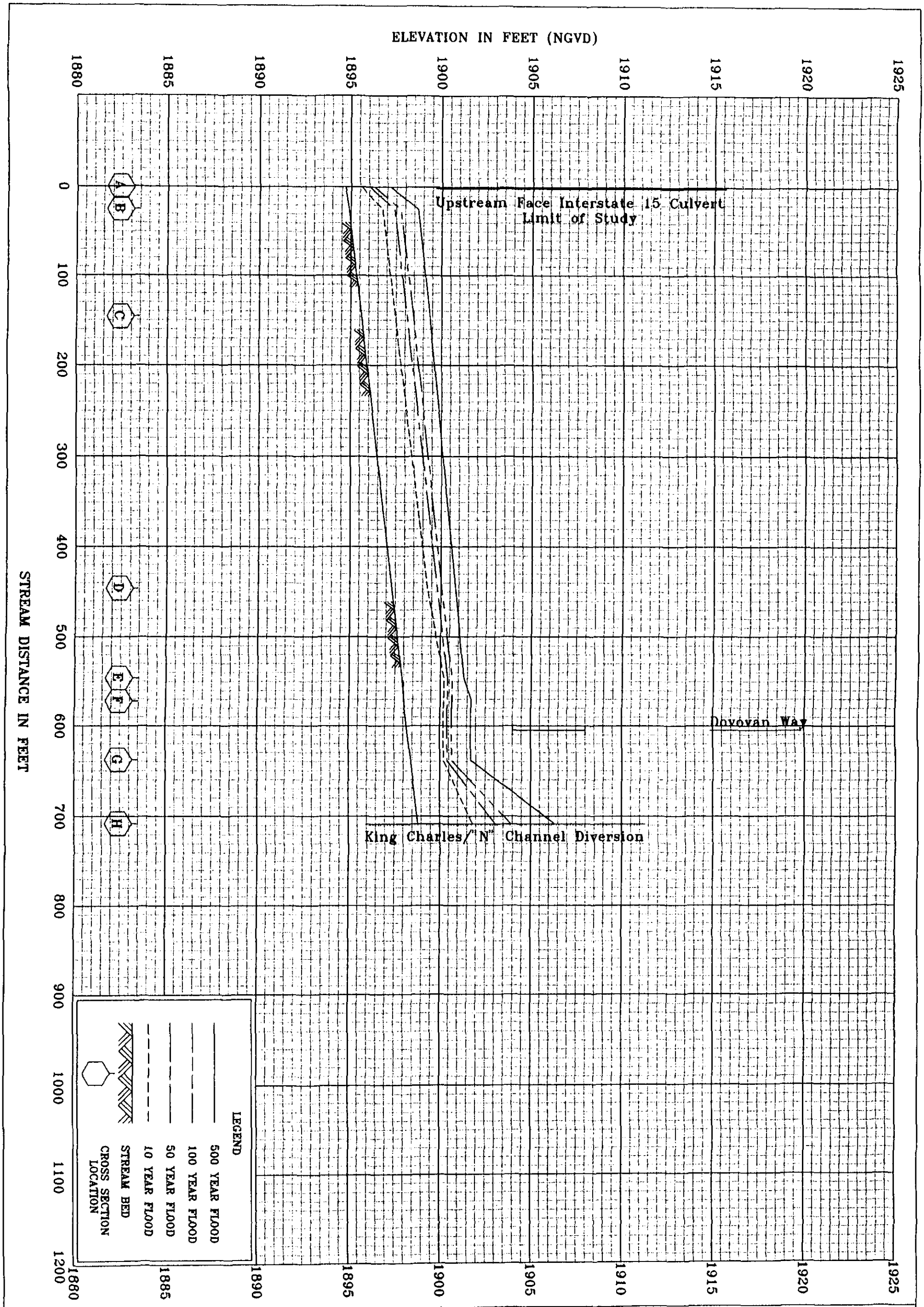
SECTION : 25

N CHANNEL W/O DIVERSION AT NLVDB



SECTION : 1

N CHANNEL W/O DIVERSION AT NLVDB



1P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

"N" Channel

1P

FEDERAL EMERGENCY MANAGEMENT AGENCY

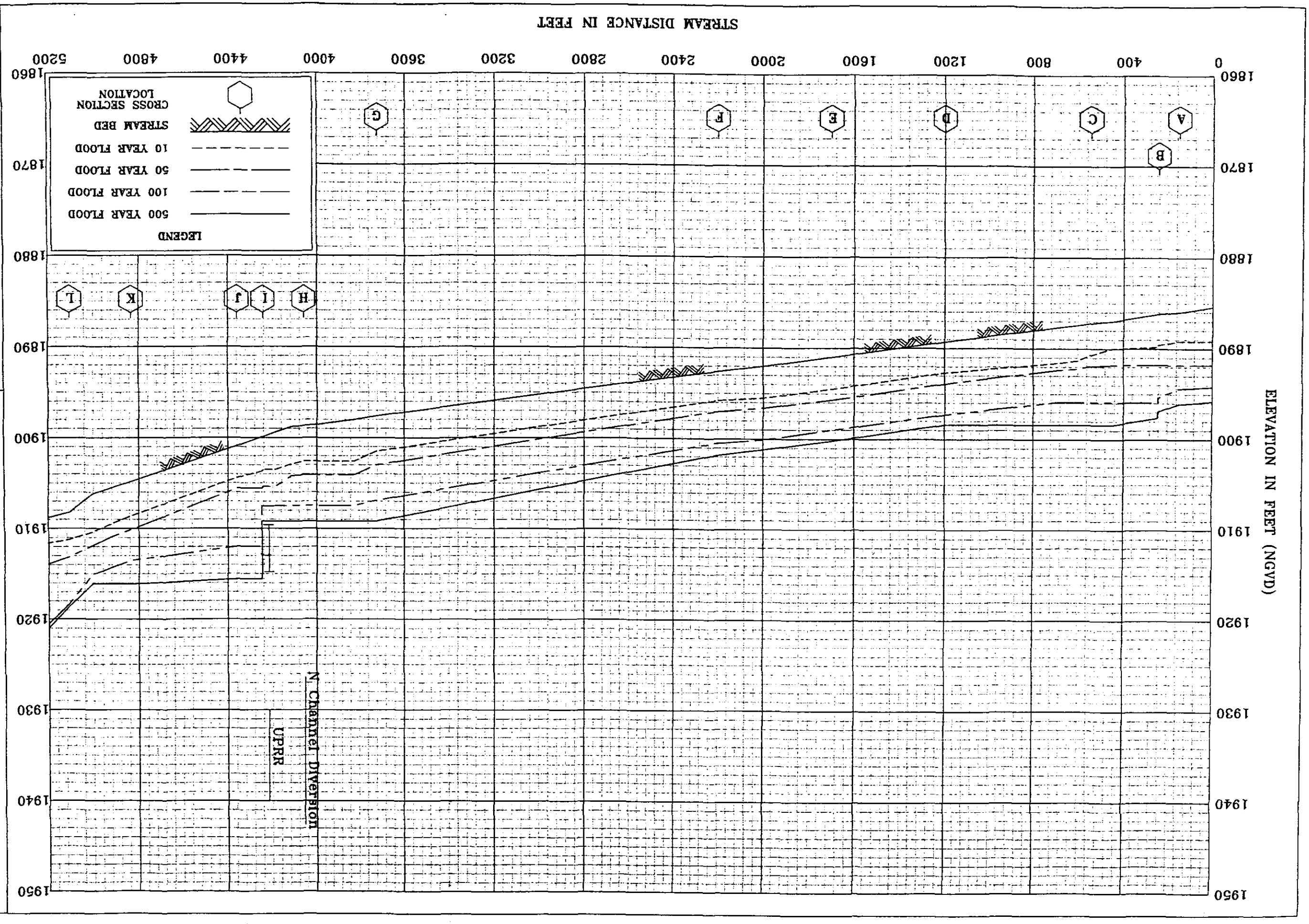
City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

Without North Las Vegas Detention Basin Diversion

UPPER LAS VEGAS WASH

FLOOD PROFILES



FEDERAL EMERGENCY MANAGEMENT AGENCY

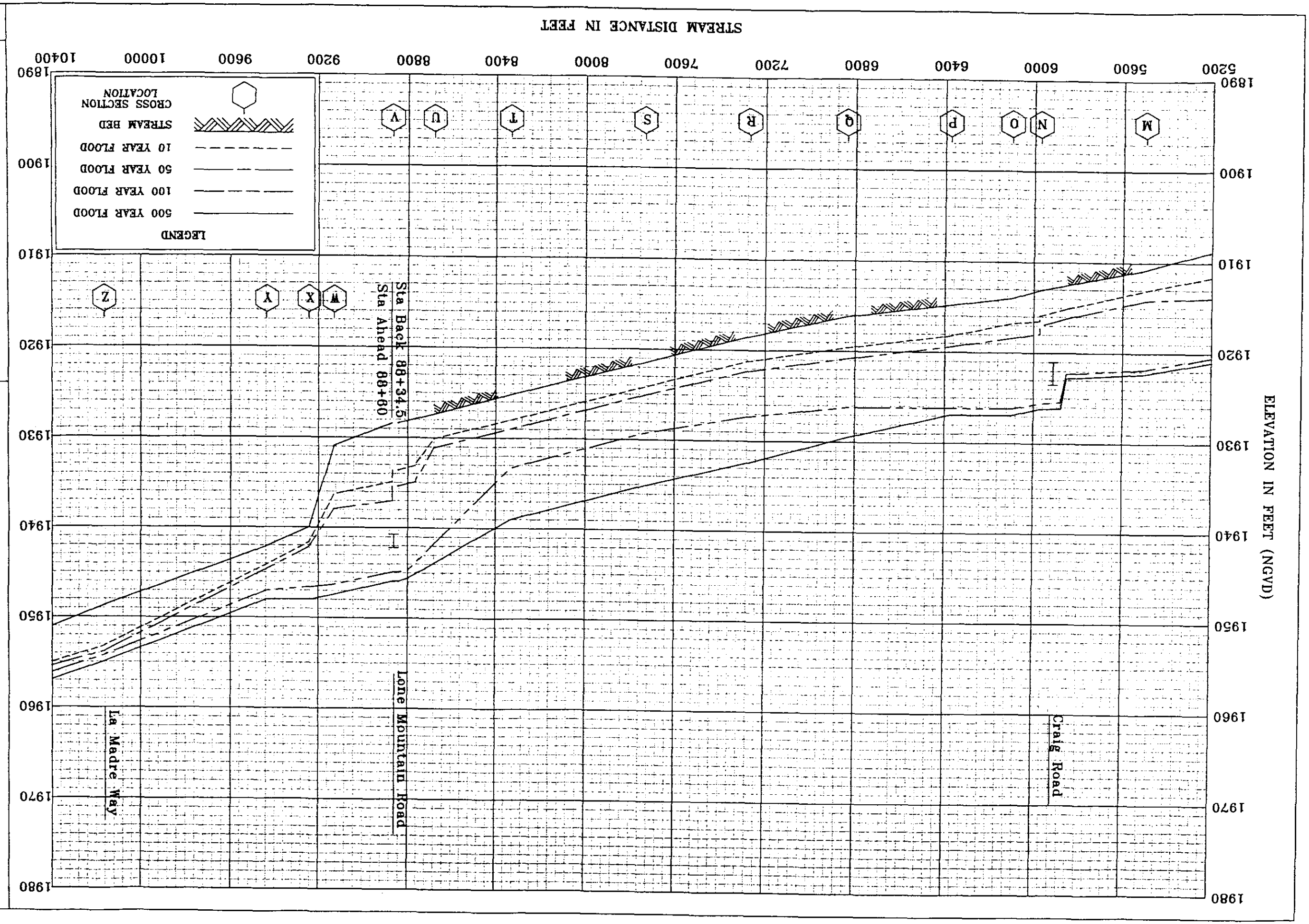
City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FLOOD PROFILES



2P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

STREAM DISTANCE IN FEET

ELEVATION IN FEET (NGVD)

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

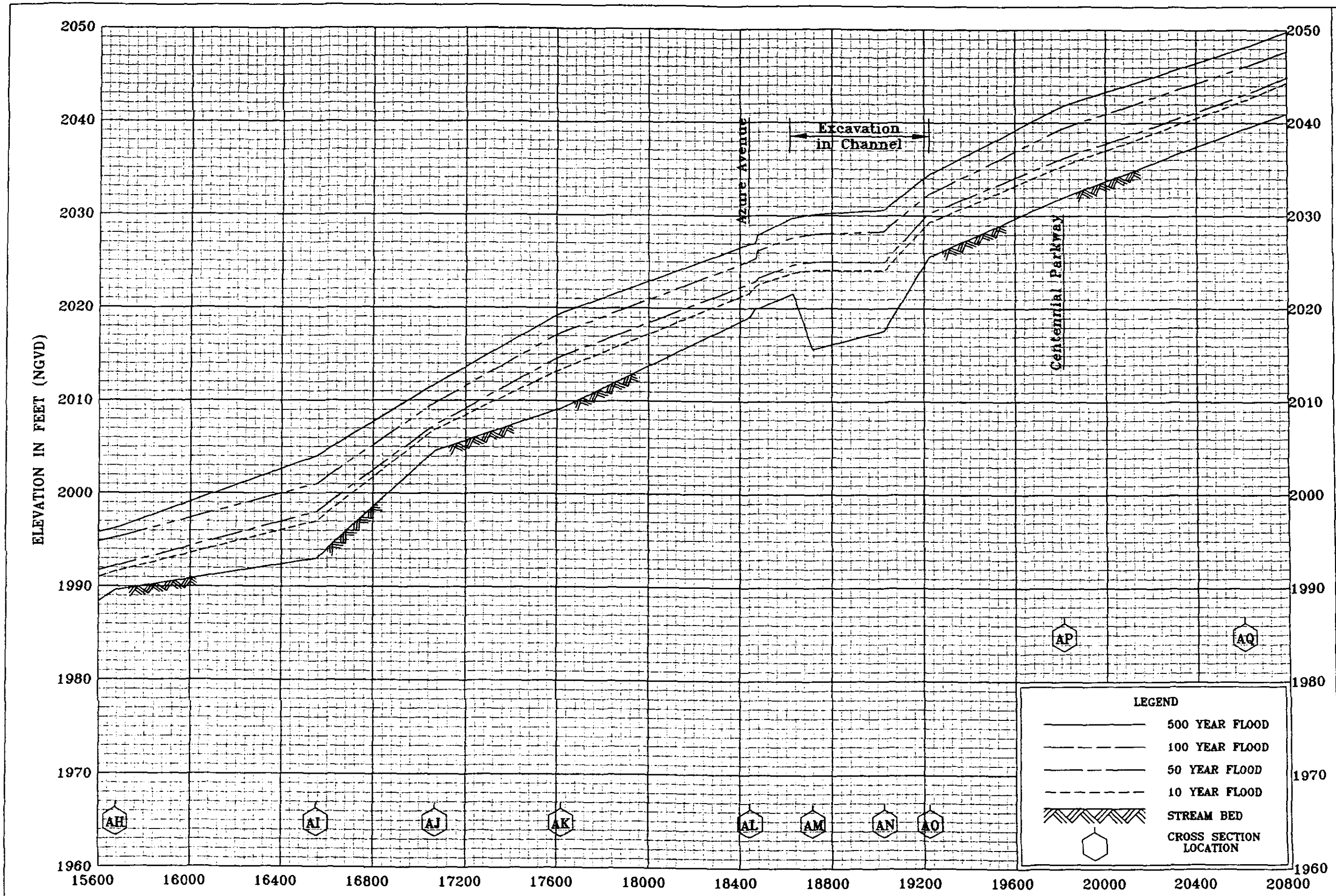
STREAM BED

CROSS SECTION LOCATION

AA AB AC AD AE AF AG

Losee Road

Washburn Road



FLOOD PROFILES

UPPER LAS VEGAS WASH

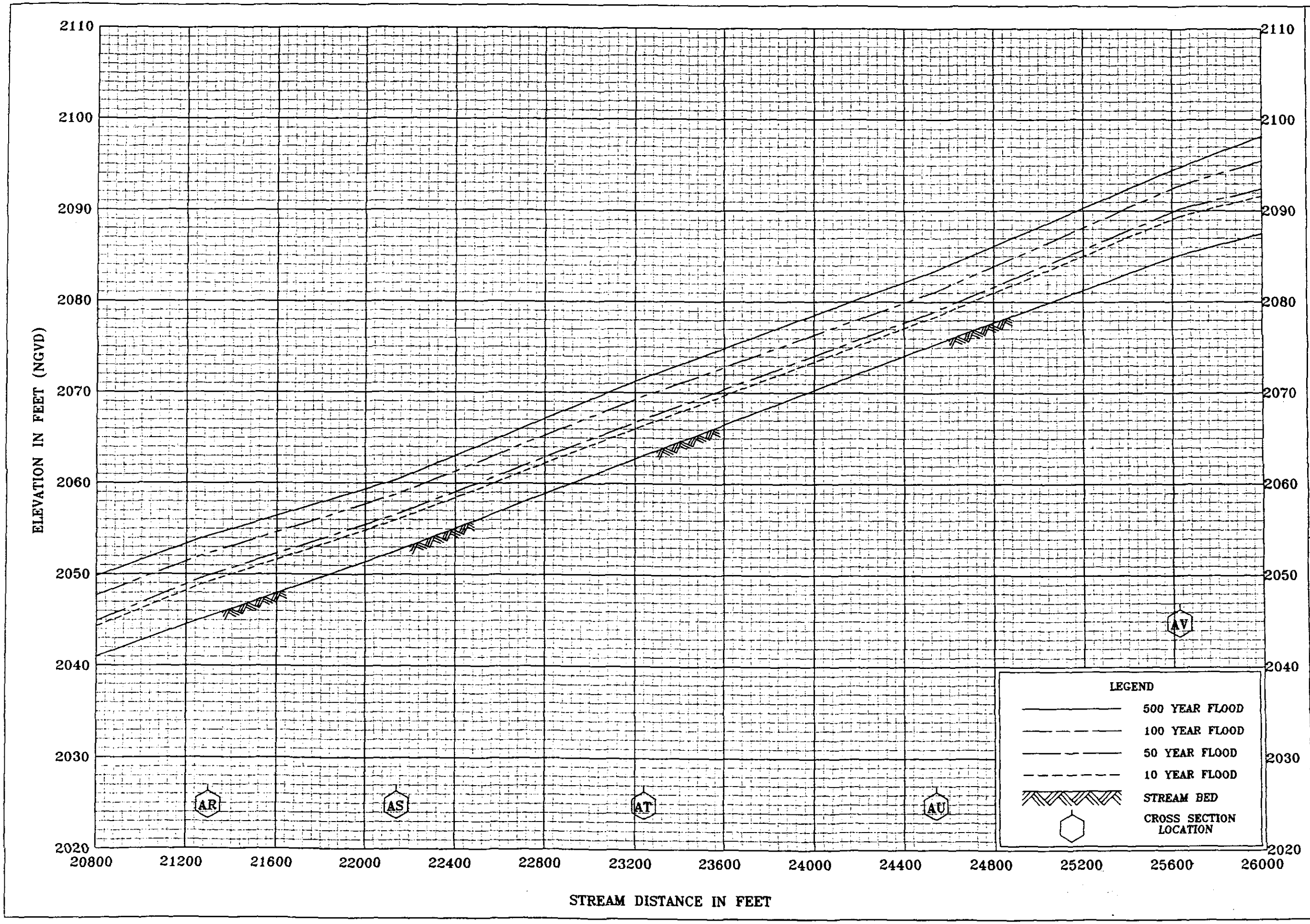
Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

4P



FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

5P

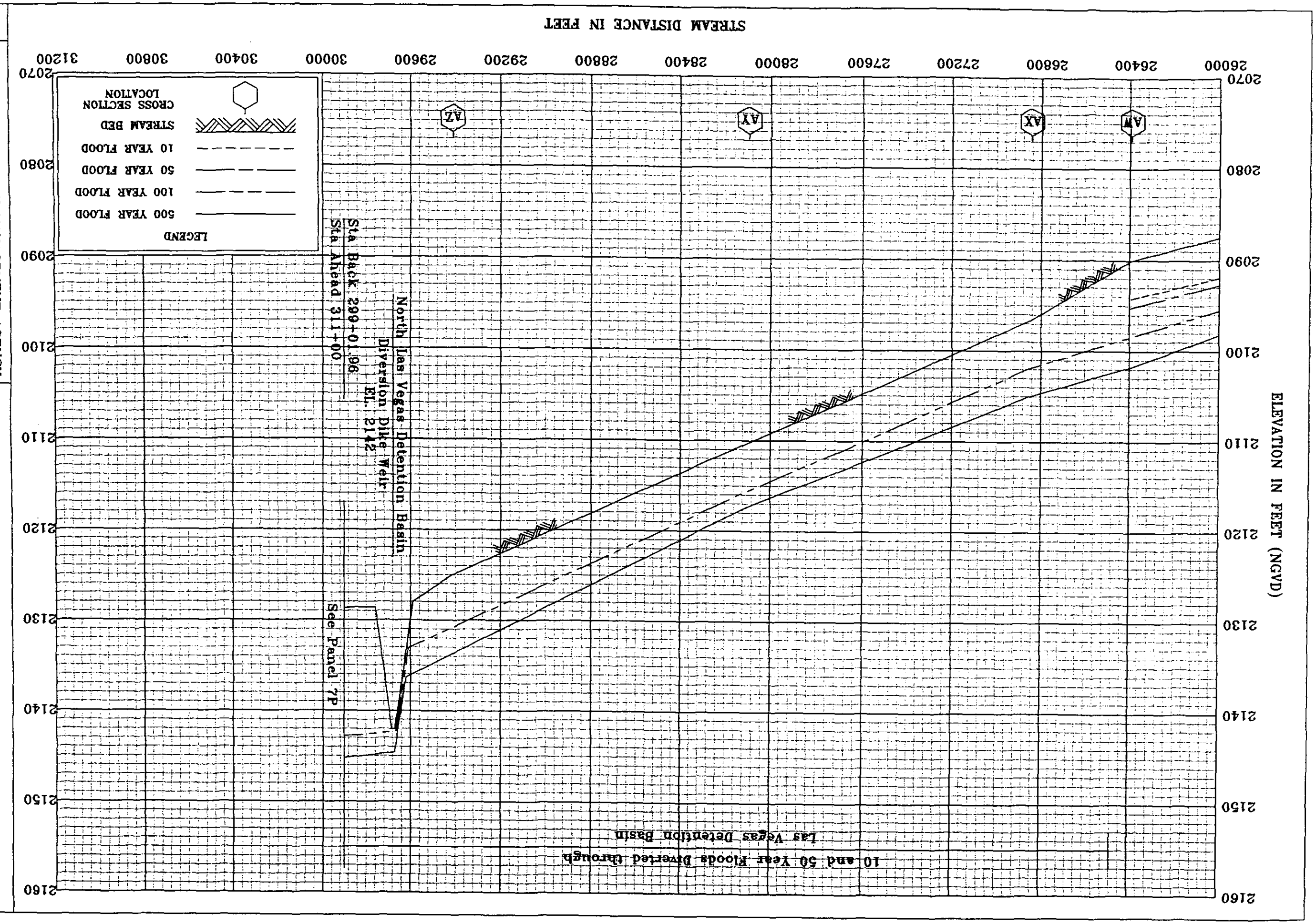
FEDERAL EMERGENCY MANAGEMENT AGENCY

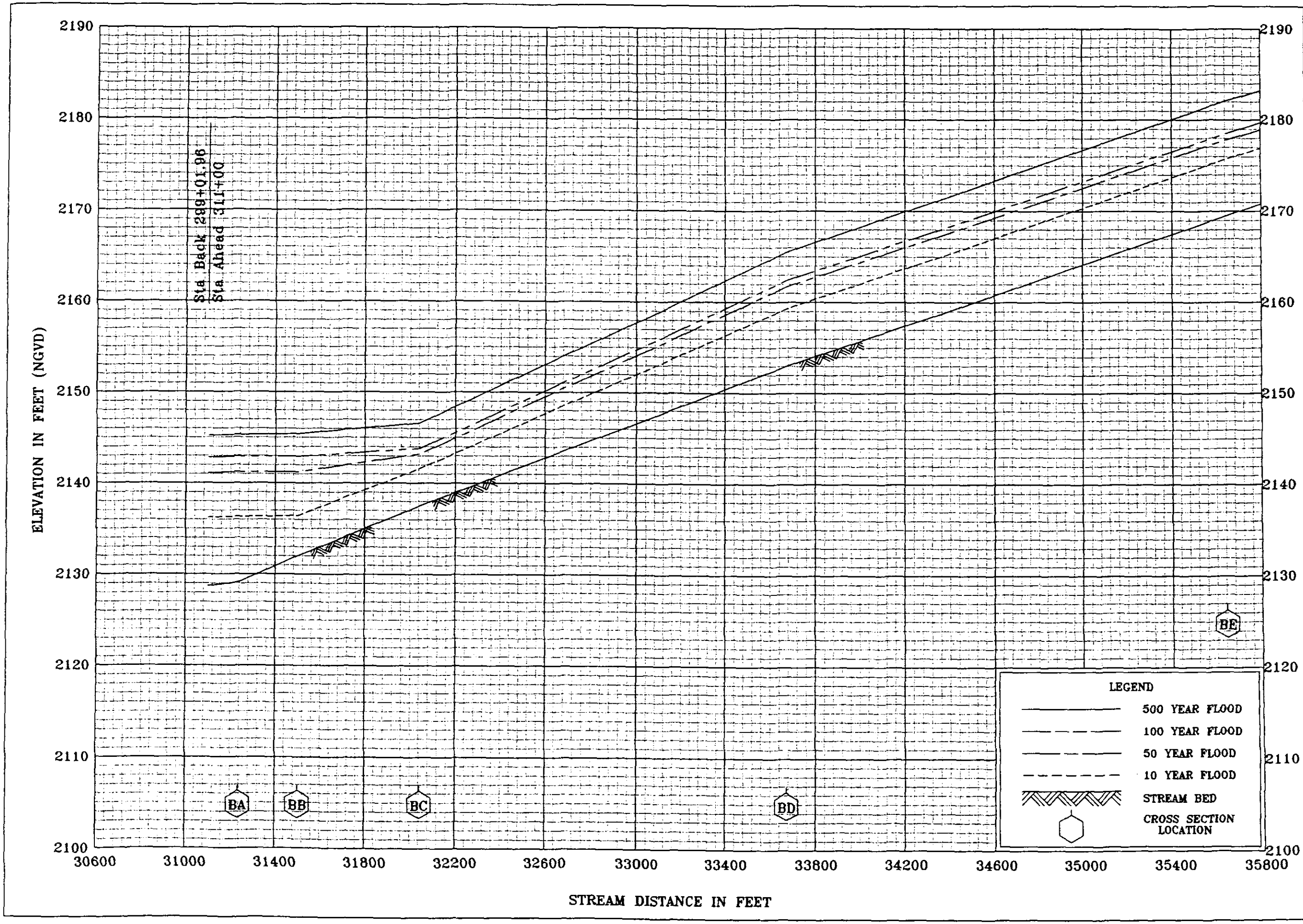
City of North Las Vegas,City of Las Vegas and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion





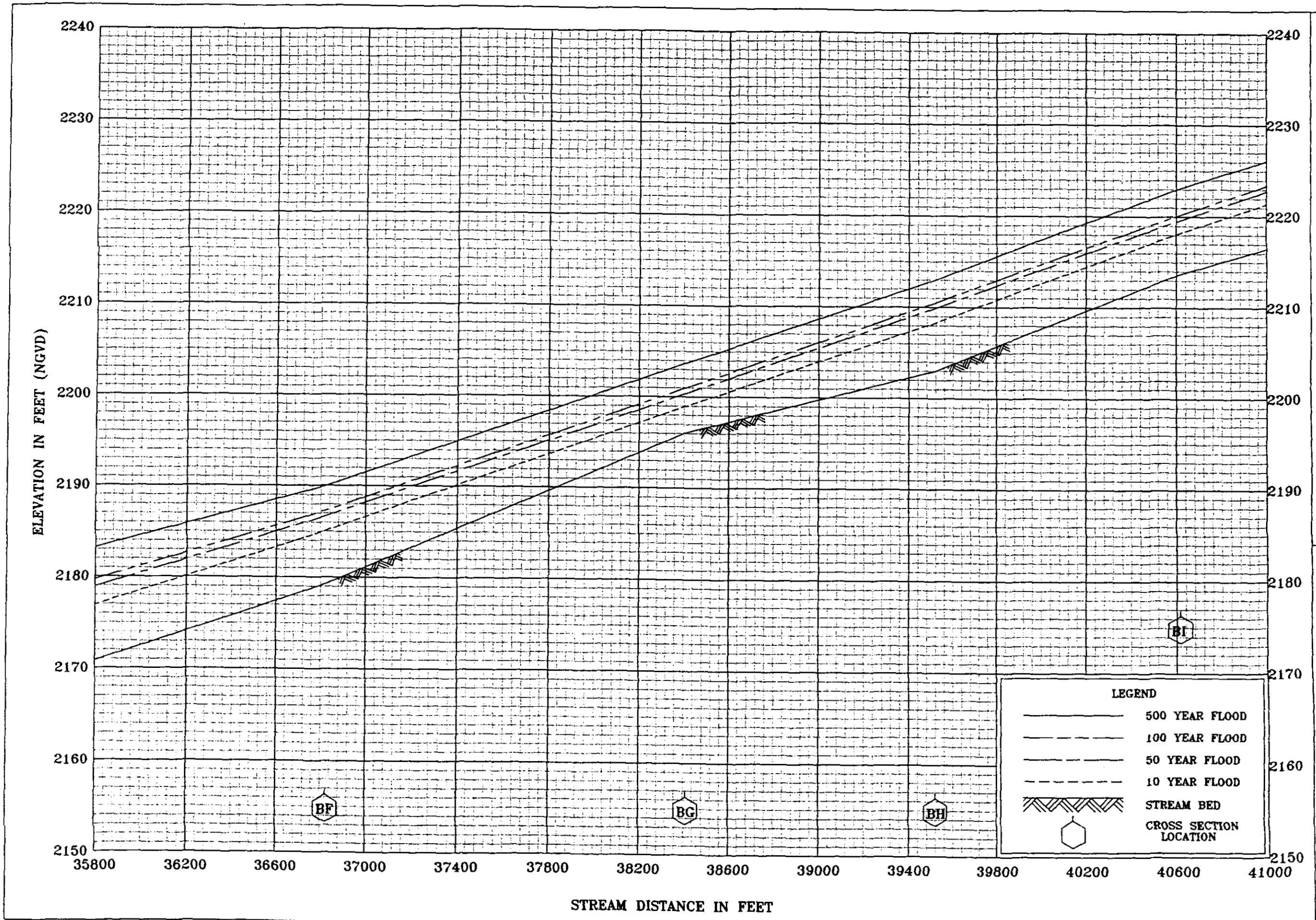
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas and Clark Co., NV
CLARK COUNTY

7P



FLOOD PROFILES

UPPER LAS VEGAS WASH

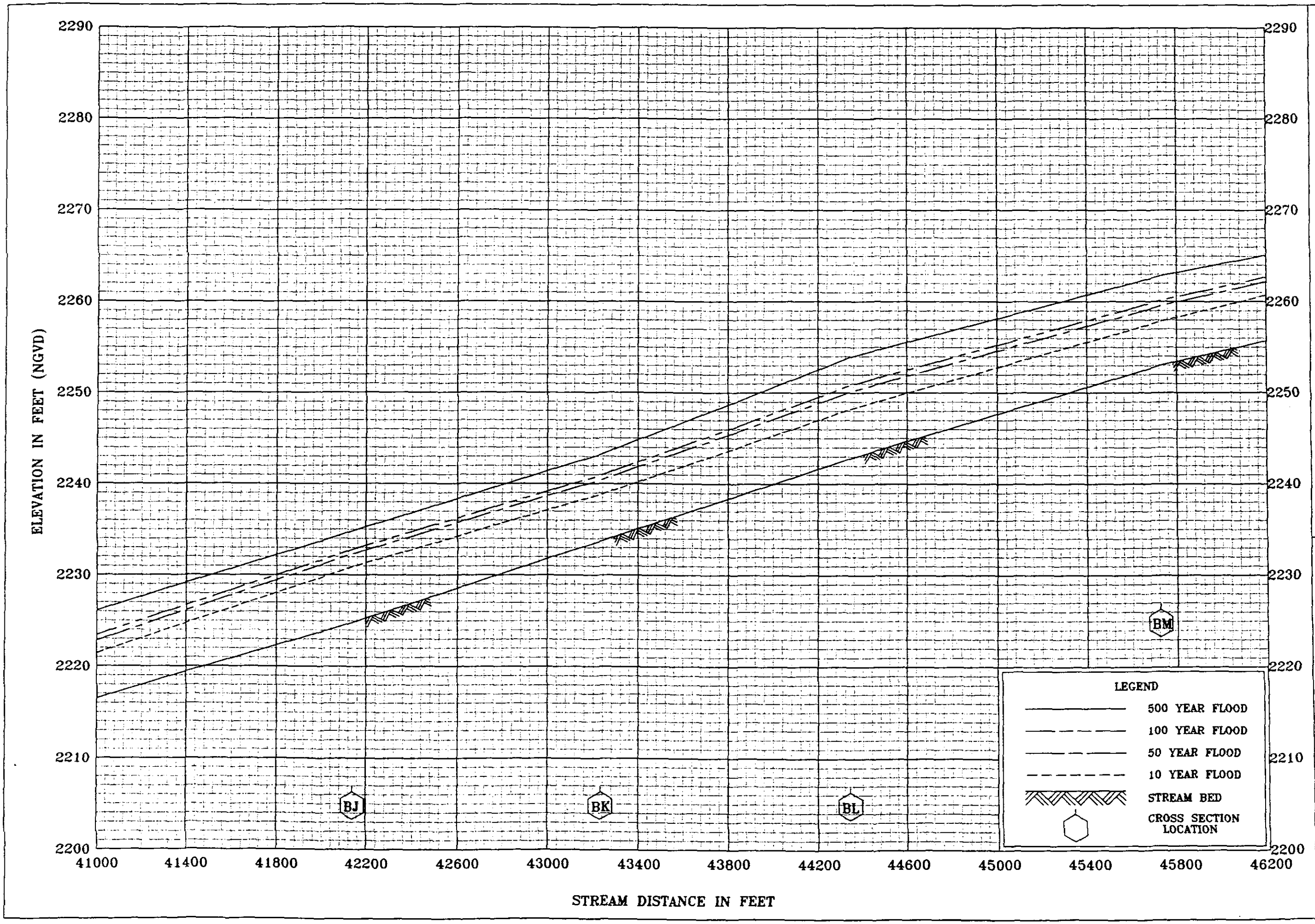
Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

8P



FLOOD PROFILES

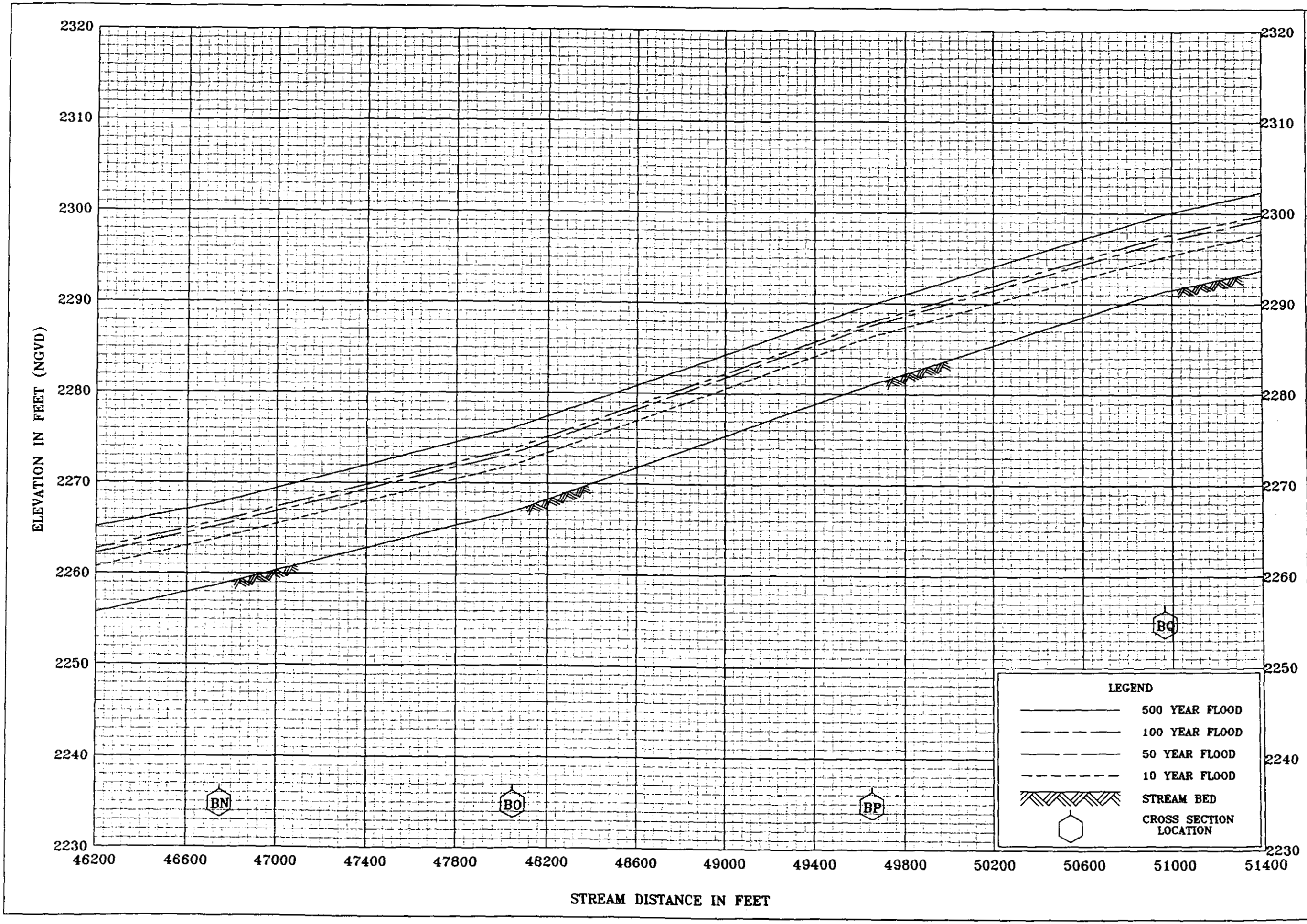
UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

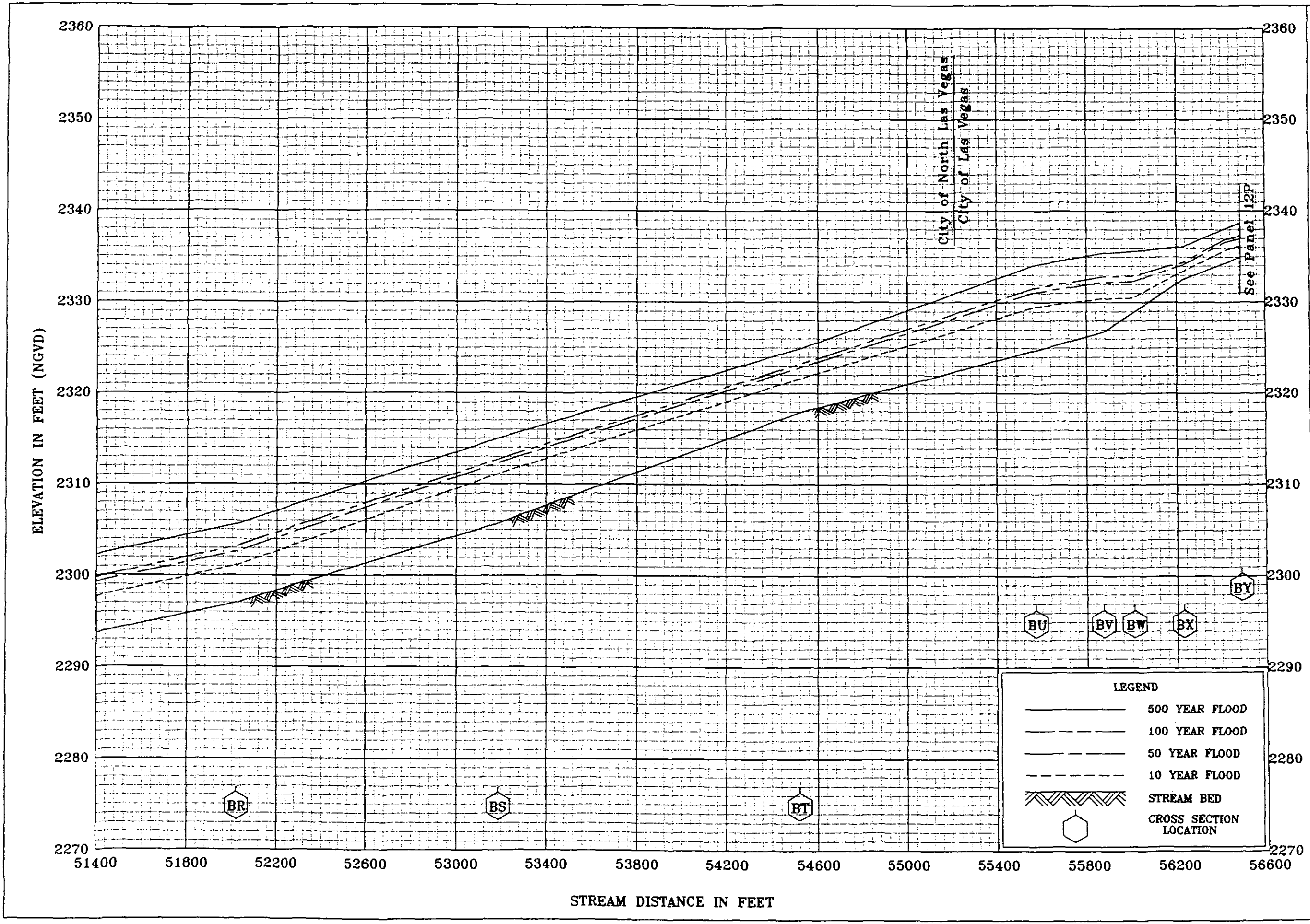


FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY



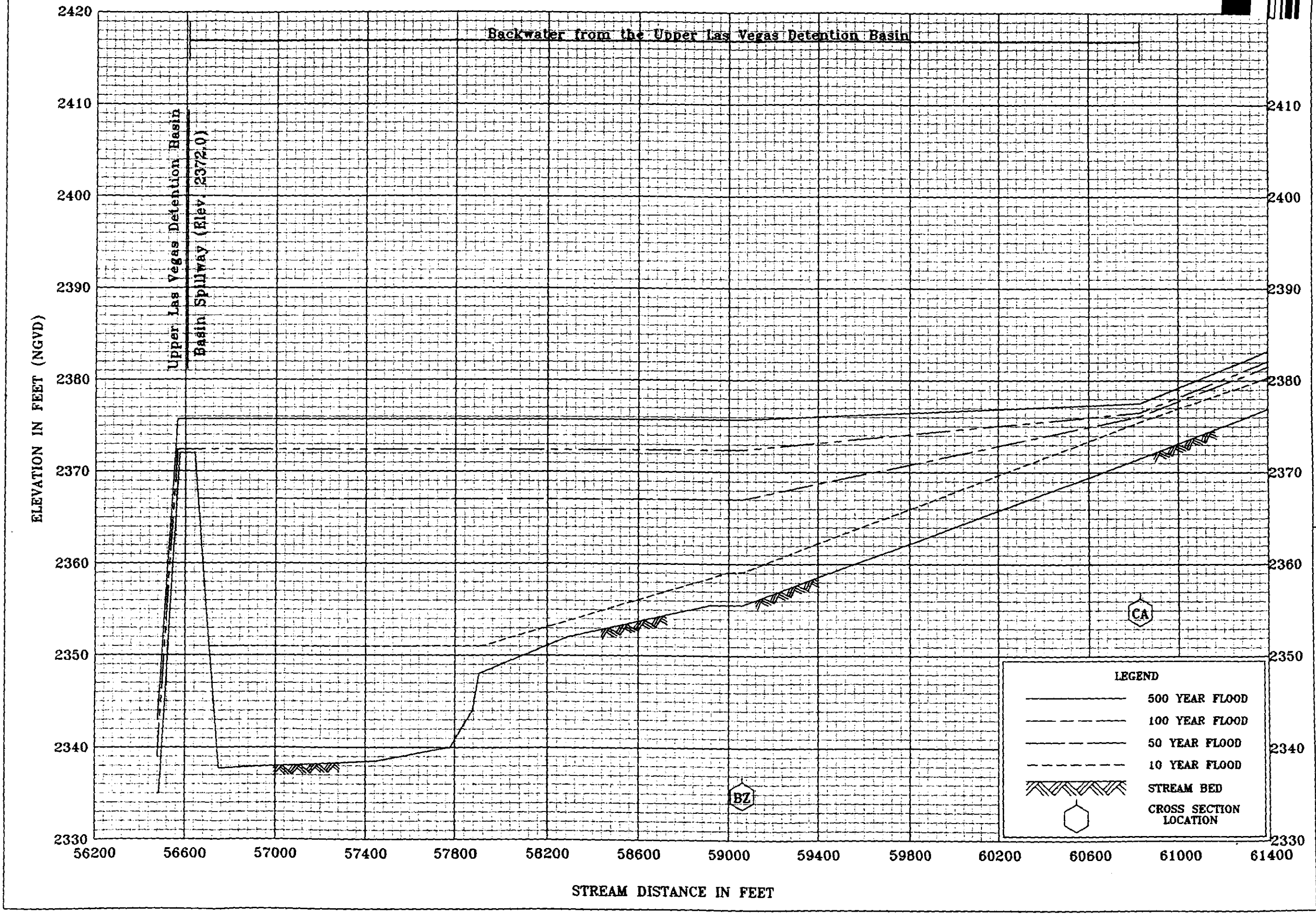
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas
and Clark Co., NV
CLARK COUNTY

11P



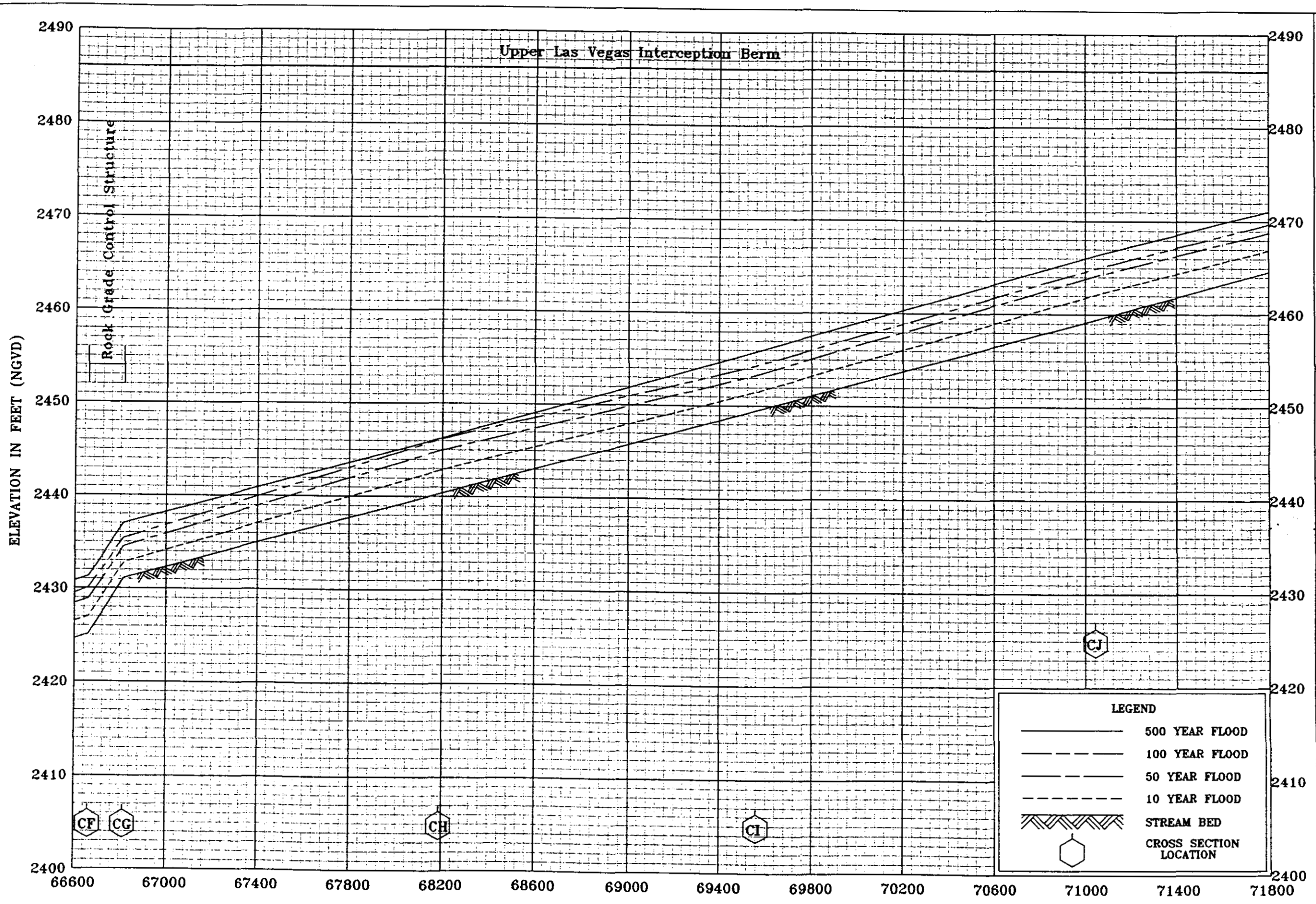
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas
and Clark Co., NV
CLARK COUNTY

12P



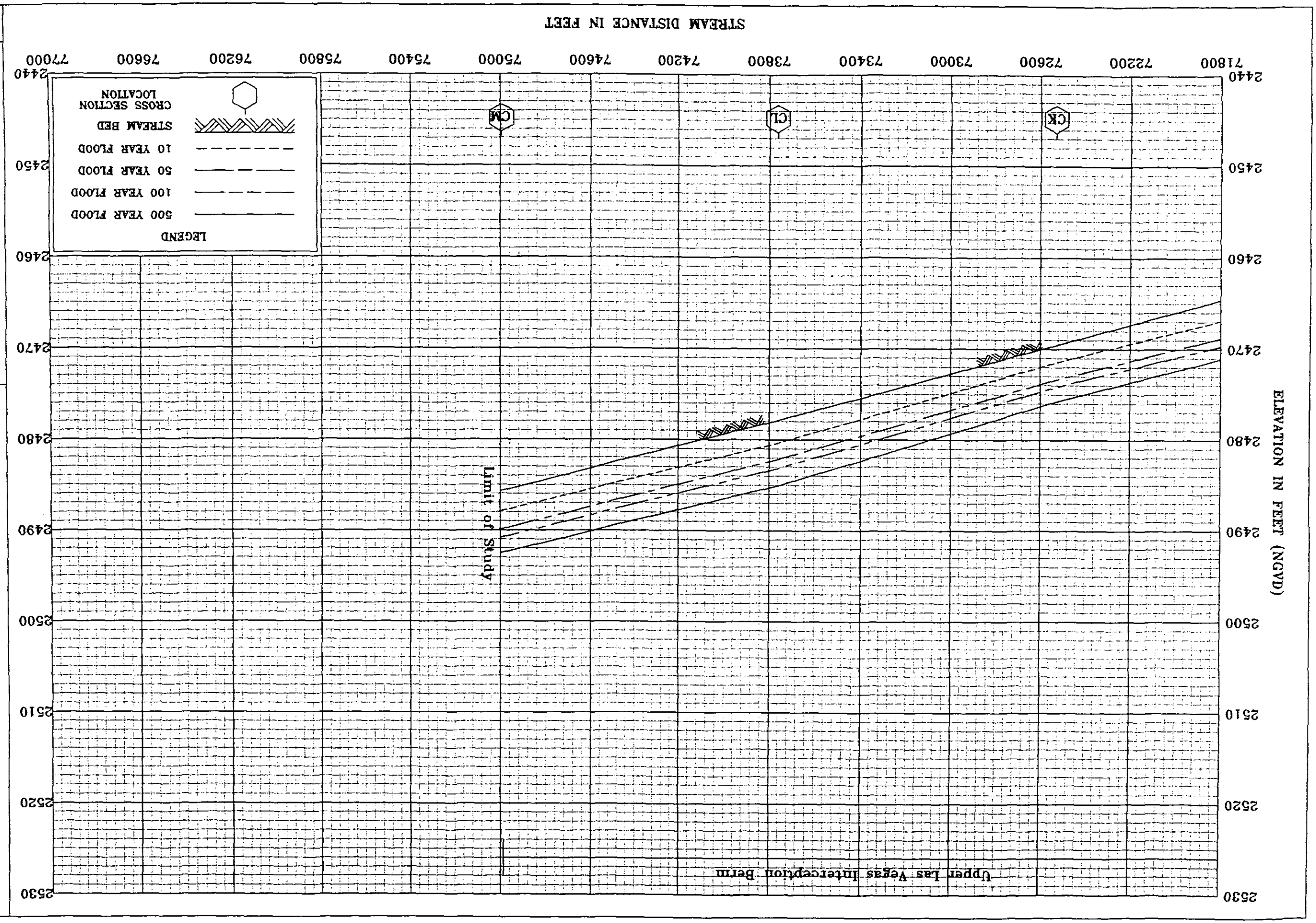
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas
and Clark Co., NV
CLARK COUNTY



UPPER LAS VEGAS WASH
Without North Las Vegas Detention Basin Diversion

FLOOD PROFILES

UPPER LAS VEGAS WASH VOLUME 5

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 5
FIS Report Data
with North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 5
FIS Report Data - with North Las Vegas Detention Basin Diversion Dike

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A. Introduction to Volume 5

B. FIS Report Data

C. Flood Profiles

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 5

This volume of the TSDN contains study report data and flood profiles. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the report data and profiles for the '**With North Las Vegas Detention Basin Diversion Dike**' case. Volume 6 contains similar data for the "Without North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

File name: MD_FISW.ME

METADATA FILE
Upper Las Vegas Wash With
North Las Vegas Detention Basin Diversion Dike

Data Set Identity:	Flood Insurance Study
County and State:	Clark County, Nevada
Theme Keywords:	Flood Insurance Study
Representation Model:	N/A
Spatial Object Types:	Text
Data Set Size:	N/A
Transfer Format:	ASCII, WordPerfect
Data Set Description:	Flood Insurance Report Text and Support Files
Intended Use:	
Data set extent:	N/A
List of file names included:	N/A
Intended Scale of Use:	N/A
Resolution of Data:	N/A
Projection Name:	N/A
Horizontal Datum:	N/A
Vertical Datum:	N/A
Projection Units:	N/A

Zone Number:	N/A
Coordinate Precision:	
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain
Policy Status:	N/A
Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors

Source Name:	WordPerfect 6.1 and ASCII
Source Scale:	N/A
Source Medium:	Paper, Compact Disk
Creator of Source:	Northwest Hydraulic Consultants
Date of Source Material:	22, April, 1998
Source Projection:	N/A
Processing Procedures:	N/A
Procedure Tolerances:	N/A
Positional Accuracy:	N/A
Positional Accuracy Method:	N/A
Attribute Accuracy:	N/A
Data Model Integrity:	N/A
Completeness:	N/A
Metadata Date:	22, April, 1998
Metadata Contact:	Edward E. Wallace

rev. 4.21.98

Flood Insurance Study

Clark County, Nevada

With NLVDB Diversion Dike

1.0 INTRODUCTION

1.1 Purpose of Study

Community Name: City of North Las Vegas; City of Las Vegas; Unincorporated Areas of Clark County
County: Clark County
State: Nevada

1.2 Authority and Acknowledgments

Study Contractor: Northwest Hydraulic Consultants, Inc.
*Subcontracto*r: Kenney Aerial Mapping (Mapping and Surveying)
Completion Date: April, 1998

Provider of Base Map: Kenney Aerial Mapping, Inc

Base Map Compilation Source: Kenney Aerial Mapping, Inc.
Base Map Compilation Scale: 1:4800
Base Map Compilation Date: August, 1996

Coordinate System: State Plane
Projection: State Plane
Datum: NGVD 1929

Has base map source been modified? Yes

If so, how and where: Corporate limits, section lines, and streets were added to base map drawing files from information provided by the City of Las Vegas and the City of North Las Vegas from community GIS mapping.

Any restrictions on the release of base map data?

No

If yes, what restrictions apply?

1.3 Coordination

Initial Consultation and Coordination Officer's (CCO) meeting date:

Wednesday, September 7, 1994

List of attendees and agencies represented at the initial CCO meeting:

Leslie K. Sakumoto, P.E. - FEMA Project Officer
Randy Tarr - City of North Las Vegas
Kevin Eubanks - Clark County Regional Flood Control District
Tom Chiatovich - City of Las Vegas
Bob Murnane - City of North Las Vegas
Phu Simpson - Clark County
Bob MacArthur, Northwest Hydraulic Consultants
Ed Wallace, Northwest Hydraulic Consultants

Intermediate CCO meeting data and attendees (if applicable):

Not applicable.

List of contacts made for the purpose of acquiring information:

Flooding sources requiring detailed study were discussed at the initial community meeting on September 7, 1994 involving representatives from FEMA, Clark County Regional Flood Control District, Clark County, City of North Las Vegas, and City of Las Vegas. Additional contacts were made with each of these agencies during the course of the study to obtain information. Additional contacts for the purpose of obtaining information were made with the US Geological Survey, Desert Research Institute, and FEMA's LMMP contractor, Ensign & Buckley Consulting Engineers.

The study contract was executed on September 25, 1995, and the first site visit and informational meetings were held on September 27 and 28, 1995. Separate meetings were held with the flood control district and each of the three communities in the study area to research available hydrologic and hydraulic reports, design documents for flood control facilities, as-built plans for bridges and other infrastructure, and available topographic mapping and aerial photography. A second site visit for the purpose of geomorphic reconnaissance was conducted on December 6 and 7, 1995. A meeting was held with Clark

County Regional Flood Control District at this time to discuss available information for the West Range Wash Diversion Dike, North Las Vegas Detention Basin and Diversion Dike, and Upper Las Vegas Detention Basin and Interception Berm; key hydrologic studies and precipitation analysis by the Corps of Engineers and NOAA; and existing sedimentation analyses for the diversion facilities.

The review of information provided by FEMA and the communities revealed gaps in the information regarding the design of the flood control facilities in the project area, including the two detention basins and three diversion dikes in the upper portion of the study area. A second site visit and meetings with Clark County Regional Flood Control District and the City of North Las Vegas were conducted on April 17 and 18, 1996. Additional information was obtained at these meetings, including review of microfiche files for the King Charles Channel, N Channel, and two bridges across Upper Las Vegas Wash. Blueline plans for these facilities were provided by the City of North Las Vegas on May 29, 1996.

Following the site review and initial hydraulic analysis, the study contractor requested additional information from the City of North Las Vegas regarding the status of the Sunrise Memorial Park development project and the control of debris in the Upper Las Vegas Wash channel. The City of North Las Vegas provided additional information in a letter dated June 21, 1996, advising the study contractor to consider the planned channel improvements at Sunrise Memorial Park in the hydraulic analysis, and that debris in the Upper Las Vegas Wash is scheduled for annual cleanup.

On August 13, 1996 the study contractor conducted a meeting with FEMA's project officer to discuss the results of preliminary hydrologic and hydraulic analysis. At this meeting, concerns were raised regarding the adequacy of available information in assessing the performance of the three diversion structures in the upper portion of the study area. The study contractor submitted preliminary hydrology and hydraulic information to FEMA on August 29, 1996 relating to these structures. In a September 12 conference call with representatives of FEMA, the study contractor was directed to assume that the Upper Las Vegas Wash Interception Berm would perform adequately in containing the base flood. It was agreed in this meeting that adequate information was not available to assess the performance of the West Range Wash Diversion Dike or the North Las Vegas Detention Basin Diversion Dike.

FEMA requested additional information from the Clark County Regional Flood Control District in a letter dated September 5, 1996, and subsequently notified the District on November 17, 1996 that work on the study had been suspended pending review of additional information on the West Range Wash Diversion

Dike. FEMA's Technical Evaluation Contractor (TEC) also began research into review documentation for the North Las Vegas Detention Basin Diversion Dike. FEMA issued a Letter of Map Revision for the West Range Wash Diversion Dike on January 28, 1997, but FEMA's research (concluded in April 1997) failed to reveal adequate information regarding performance of the North Las Vegas Diversion Dike if subjected to current estimates of the 100-year discharge.

The study contractor summarized the changes in estimated 100-year discharges and concerns regarding performance of the North Las Vegas Diversion Dike in an April 28, 1997 letter to FEMA, and FEMA advised the Clark County Regional Flood Control District of the situation in a May 5, 1997 letter. The Clark County Regional Flood Control District advised FEMA in a June 26, 1997 letter that the District agreed that the impacts of sediment on the structure, and the stability of the structure if overtopped warranted further consideration. The District undertook an independent evaluation of the diversion dike, and provided a report summarizing the results dated February 25, 1998.

To avoid delay in the completion of the study, the study contractor was directed by FEMA to complete hydraulic analysis of independent study cases with and without the North Las Vegas Detention Basin Diversion Dike.

The study contractor conducted a meeting with FEMA on December 11, 1997 and received information regarding a November 20 , 1997 LOMR issued in the study area between Lone Mountain Road and Craig Road. The study contractor conducted a site visit on December 13, 1997 to verify the conditions in the area of the LOMR and the remainder of the study area.

The study contractor met with the FEMA project officer on March 19,1998 to review the results of revised hydraulic analysis including the two cases with and without the North Las Vegas Detention Basin Diversion Dike, and the changes associated with the LOMR.

2.0 AREA STUDIED

2.1 Scope of Study

Note areas excluded from study, as well as areas of extraterritorial jurisdiction:

The study area includes the areas potentially subject to flooding from Upper Las Vegas Wash upstream of Interstate 15, including portions of the City of North Las Vegas, the City of Las Vegas, and unincorporated areas of Clark County. The study area's upstream (northwest) end is the upper end of the Upper Las Vegas

Wash Interception Berm in Section 4, Range 60 East, Township 19 South in the City of Las Vegas. It extends from this point eastward to the North Las Vegas Detention Basin in the City of North Las Vegas in Section 14, Range 61 East, Township 19 South, thence southward through portions of Clark County and the City of North Las Vegas to Interstate 15 near Gowan Road in Section 11, Range 61 East, Township 20 South. The study area excludes the areas southeast of Interstate 15; northwest of the North Las Vegas Detention Basin along the West Range Wash Diversion Channel; and north of the Upper Las Vegas Wash and Upper Las Vegas Wash Interception Berm channels.

List the flooding sources studied in detail (detailed study streams should be listed in the same order as they appear in profiles). If they are also partially studied by approximate methods, provide the limits of detailed study:

The flooding source studied in detail is the portion of Las Vegas Wash generally known as Upper Las Vegas Wash, located northwest of Interstate 15, including the following channel segments as referred to in the Clark County Regional Flood Control District August 1991 Master Plan Update of the Las Vegas Valley (Reference 1):

Upper Las Vegas Wash - King Charles Channel
Upper Las Vegas Wash
"N" Channel Diversion

List the flooding sources studied by approximate methods:

None

If applicable, discuss streams on which study was terminated where the 100-year floodplain permanently narrowed to less than 200 feet wide or for which detailed study was ended where the drainage area was less than 1 square mile:

None

2.2 Community Description

Provide a general description of the community's location within the county and state:

Clark County is located in the southern tip of Nevada. The greater Las Vegas metropolitan area, including the City of Las Vegas, City of North Las Vegas, and development within the unincorporated areas of Clark County, is located in the

central part of Clark County, approximately 20 miles west of Lake Mead. The study area is located in the northern portion of the Las Vegas metropolitan area.

List surrounding communities and their locations with respect to the subject community:

Surrounding communities include the town of East Las Vegas, approximately 10 miles southeast; the City of Henderson, approximately 15 miles southeast; and Boulder City, approximately 25 miles southeast.

List other nearby large cities and their locations:

Las Vegas is located approximately 250 miles northeast of Los Angeles, California; 360 miles southwest of Salt Lake City, Utah; and 340 miles southeast of Reno, Nevada.

Briefly describe the community. This description may include patterns of residential and commercial development; the extent and nature of floodplain development; natural features that affect flood hazards in the community; and sufficient description of climatic, physiographic, and land use features to support the discussion of flood problems that follows (Section 2.3).

The topographic features of Clark County are generally typical of the Basin and Range physiographic province, with north-south trending ranges. Las Vegas Valley cuts diagonally across the county, following a line of geologic deformation indicated by bending of the north-south trending ranges. Major ranges in the area include the Spring Mountain Range to the west, and the Sheep Mountain Range and Las Vegas Range to the north. The elevations of Las Vegas Valley are between approximately 3000 feet and 1800 feet (National Geodetic Vertical Datum, NGVD), and elevations of peaks in the surrounding ranges reach up to nearly 12,000 feet in the Spring Mountain Range and 10,000 feet in the Sheep Mountain Range. A series of large, coalescing alluvial fans are located along the margins of the upper portion of the valley at the base of the ranges. Much of the upper Las Vegas Valley floor is comprised of fine-grained lacustrine sediments. Marginal areas of the upper valley, and the lower Las Vegas Valley are covered by alluvial deposits. (References 2, 3).

The climate is arid to semi-arid, characterized by infrequent rainfall, low humidity, and wide extremes in daily temperatures. Annual precipitation in the area is strongly correlated to elevation, but intense cloudburst storms are possible in all areas of the Las Vegas Valley and surrounding ranges. The Las Vegas Valley receives an average annual rainfall of approximately 4 inches, and the higher elevations in the county receive up to 20 inches. Precipitation varies

greatly in any location from year to year due to local cloudburst events. The average annual temperature is approximately 66^0 F, with average daily maximums in the high 70's and average daily minimums in the mid 50's. Daily maximum temperatures usually exceed 100^0 F in the summer in the lower valley, and daily minimum temperatures drop below 20^0 F in the mountain ranges in the winter.

Vegetation is strongly zoned by elevation, with little or no vegetation on the playas, and sparse vegetation in the lower valleys. Species in the lower valleys are generally phreatophytes. Creosote bush, saltbrush, and rabbitbrush are common on the alluvial slopes, and Joshua trees, Spanish bayonet, small cacti, and blackrush grow on the middle portions of the fans. Above approximately 4,500 feet there are wooded areas of pinion and juniper (Reference 3).

The developed area of Clark County is concentrated in the Las Vegas Valley. Growth has been extremely rapid over the past 60 to 70 years, increasing from less than 5,000 in 1920 to approximately 600,000 in 1986. The current population is approximately 1.1 million. A large portion of the population is located in unincorporated areas of Las Vegas Valley. The developed area is located primarily in the lower portions of Las Vegas Valley, and is subject to runoff concentrated in the lower valley from a large surrounding geographic area. Development in the study area along Upper Las Vegas Wash, King Charles Channel, and "N" Channel includes low density residential, commercial, and industrial development. Extensive additional development, especially commercial and industrial development in North Las Vegas, is planned in the near future. This development is planned within the area formerly mapped within the 100-year flood hazard zone by FEMA in 1995 (Reference 4).

In addition to the permanent population, a large visitor population is present in the Las Vegas Valley throughout the year. The visitor population is generated primarily by the gaming and entertainment industries, which are a prime element in the County's economy.

2.3 Principal Flood Problems

Include the discharges and recurrence intervals of major floods:

Reports of flooding in the Las Vegas area date back almost 100 years. The U.S. Soil Conservation Service reviewed historical flooding in a report entitled History of Flooding, Clark County, Nevada 1905-1975 (Reference 5). This report documented 184 flood events that resulted in damages to private property and public facilities. Since 1960, the Las Vegas area has experienced at least seven floods that caused damages in excess of one million dollars, and the loss of over 22 lives in nine separate flash flood events (Reference 6).

The largest recorded flood on Las Vegas Wash occurred on July 3, 1976, when 12,000 cfs was measured at the USGS gaging station located upstream of Las Vegas Boulevard north of Las Vegas. The next largest events occurred on May 31, 1973 (1,640 cfs) , and September 25, 1967 (1,170 cfs). Although recurrence intervals for these events have previously been estimated by others (Reference 4), the construction of flood control facilities in the upper portion of the study area have altered flood flow paths and added flood storage to the extent that these estimates have little bearing on current recurrence intervals and flood discharges.

Give the location (city and state) of all stream gages for studied streams:

USGS Gages 09419648 (Las Vegas Wash above Detention Basin near North Las Vegas) and 09419650 (Las Vegas Wash at North Las Vegas) were discontinued in 1993 an 1978, respectively. There are no known active gaging stations on the studied streams.

Note any factors that aggravate flood problems:

Although flooding may occur in the study area in any season, the most severe floods are typically associated with intense cloudburst type storms that occur between July and September. This high intensity precipitation on steep mountain slopes and armored desert surfaces produces rapid, high rates of runoff. Runoff is concentrated in the lower valley where the largest population exists. There is a high potential for the public to underestimate the potential for flooding and to be unaware of floods until it is too late to avoid damages or injury. Factors that contribute to these problems include the arid nature of the area, rapid rates of runoff, localized nature of cloudburst precipitation that can result in flooding many miles away from the center of the cloudburst, and the popularity of the area with tourists.

Provide photos of flooding, flood control structures, etc. (with location of photo noted):

Principal flood control facilities in the study area include the King Charles Channel (Photo 1); "N" Channel Diversion (Photo 2); North Las Vegas Detention Basin (Photo 3); North Las Vegas Detention Basin Diversion Dike (Photo 4); Upper Las Vegas Wash Detention Basin (Photo 5); and Upper Las Vegas Wash Interception Berm (Photo 6). The West Range Wash Diversion Dike (Photo 7) is not included in the study area, but diverts flow from the West Range Wash into the North Las Vegas Detention Basin.

2.4 Flood Protection Measures

Describe all flood protection structures and floodplain management measures used to reduce potential flood damage:

The Clark County Regional Flood Control District first adopted a Flood Control Master Plan in 1986. Periodic Master Plan Updates are used to account for changes in land use, construction of new facilities, and improved data. Master planned facilities constructed in the study area include the Upper Las Vegas Wash Detention Basin and Interception Berm (1992); North Las Vegas Detention Basin and Diversion Dike (1984); King Charles Channel (Phase 1 1987; Phase 2 1990); "N" Channel Diversion (Phase 1 1987; Phase 2 1990); and the Upper Las Vegas Wash channel constructed as part of improvement plans for 142 acres between Lone Mountain Road and Craig Road (1997).

The Upper Las Vegas Wash Interception Berm is designed to intercept flows at the upper end of the study area and divert them into the Upper Las Vegas Wash Detention Basin. This basin has a low level outlet as well as a roller compacted concrete spillway. Outflows from the upper basin are confined in an incised wash channel. A diversion dike intercepts flows in this incised channel and diverts them to the North Las Vegas Detention Basin. The West Range Wash Diversion Dike runs across the face of a large alluvial fan to the east of this basin, and also diverts flows into the basin. The North Las Vegas Detention Basin has both low level and spillway outlets that discharge into the wash channel. Flows are conveyed in the natural wash channel until reaching Lone Mountain Road, where they are intercepted by a constructed channel approach to the bridge at Lone Mountain Road. A constructed channel with earth bottom (with gabion grade controls) and riprapped banks carries flows to the Craig Road bridge, where flows enter the concrete lined King Charles Channel. Flows are carried in this lined channel under the Union Pacific Railroad bridge. Downstream of the bridge, a portion of the flows are diverted into the concrete lined "N" Channel Diversion to a culvert crossing of I-15. The flows remaining in the main channel (King Charles Channel) are conveyed in a concrete lined channel parallel to the Interstate to the confluence of the channel with the "A" Channel. The Western Tributary Channel also enters this confluence from the west.

Mention all dams, including those affecting the communities that lie outside the community:

Dams in the study area include those listed above for the North Las Vegas Detention Basin and the Upper Las Vegas Detention Basin.

Mention dams within the community used for purposes other than flood control:

None.

If levees are mentioned, state whether the levees meet or fail to meet the FEMA 3-foot freeboard requirement.

The berm along the south side of the Upper Las Vegas Wash Interception Berm meets the FEMA freeboard requirements. The Diversion Dike at the upper end of the North Las Vegas Detention Basin would not meet this criterion. However, for the purpose of this study case, it has been assumed to remain in place during a 100-year event.

3.0 ENGINEERING METHODS *(Note any digital methodologies used)*

3.1 Hydrologic Analyses

Describe the hydrologic analyses for all flooding sources studied in detail:

Previous hydrologic analyses conducted by the US Army Corps of Engineers (1988), James M. Montgomery (1991), Boyle Engineering Corporation (1991), and Black & Veatch (1993) were reviewed during the study (References 7,8,9,10). The previous studies considered numerous separate storm centerings to identify the storm configurations that produced the highest peak flows at various locations in the basin. These studies utilized HEC-1 models (Reference 11) to estimate peak flows for various recurrence intervals. These models were calibrated to the Corps of Engineers regional analysis curve. The conclusions of the previous studies with respect to critical storm centerings were reviewed and accepted for this study:

- the "Spring Mountain Storm" produces the highest uncontrolled peak inflows to the Upper Las Vegas Wash Interception Berm and Detention Basin;
- the "Interbasin Storm" produces the highest 100-year peak inflow to the North Las Vegas Wash Detention Basin; and
- an unnamed storm in the West Range Wash tributary area produces the highest peak inflows to the West Range Wash Diversion Dike (although the West Range Wash Diversion Dike is not a part of the study area, flows were modeled for the purpose of reviewing the potential impact of the structure's performance on flows in Las Vegas Wash downstream, and for determining flood elevations in the North Las Vegas Detention Basin).

The previously developed HEC-1 models were modified to reflect the presence and current outlet work configurations of the existing flood control facilities. In addition, the models were expanded to represent 10- and 50- year rainfall events for the Interbasin Storm, and 500-year events for the Spring Mountain, Interbasin, and West Range Wash storms.

No changes were made to the previously defined runoff and channel routing parameters (including basin areas, curve numbers, loss rates, channel geometry, channel routing parameters, or rainfall amounts). Review of the existing models indicated that these values were all consistent with the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (Reference 12).

Changes were made in the existing HEC-1 models to reflect as-built stage -storage and stage-discharge relationships for the Upper Las Vegas Wash Detention Basin (Reference 9), and to reflect the stage-discharge relationship for the modified three-pipe outlet structure at the North Las Vegas Detention Basin, including the upstream barrier wall.

Rainfall amounts for the 500-year Spring Mountain Storm, not previously modeled, were determined by extrapolation of the 10-, 50-, and 100-year rainfall amounts in previous models (Reference 7). Rainfall amounts for the 10- and 50-year Interbasin Storm events, not previously modeled, are based on the precipitation amounts for the Lower Central Valley storm (Reference 7) and the NOAA Atlas 2 (Reference 13) for Nevada, adjusted to reflect appropriate depth-area reduction factors from the Hydrologic Criteria and Drainage Design Manual. Rainfall amounts for the 500-year Interbasin Storm event were determined by extrapolation of the 10-, 50-, and 100-year rainfall amounts. Rainfall amounts for the 500-year West Range Wash storm event were determined by extrapolating rainfall amounts from the previous models for the 10-, 50-, and 100-year events.

The analyses produce results similar to the previously adopted FIS discharges for the 10- through 100-year peak discharges. The revised hydrologic analyses produce an increase of approximately 80% over the previously adopted FIS peak discharge for the 500-year event. This change is due to a loss of flow control at the detention basin that was not addressed in previous models.

Peak discharges determined using HEC-1 were applied in the computation of water surface profiles for the portion of the study area upstream of the outflow from the North Las Vegas Detention Basin. Downstream of this point, the 500-year peak discharge exceeded channel capacity, and flows were lost from the main channel at several points. Peak discharges were computed in this area using the HEC-1 results for the computation node downstream of the North Las Vegas

Detention Basin at the upstream end of this reach, and the results of the hydraulic analyses described in Section 3.2 to determine flow splits and losses from the main channel. Where significant flows were lost from the main channel, they were subtracted from the total flow downstream. Where flows were determined to re-enter the channel, they were added to the remaining flows in the main channel.

In a summary of discharges table, provide a summary of drainage area-peak discharge relationships for the streams studied by detailed methods. Discharges and drainage areas for each stream should be listed in descending order. Streams should be listed in the same order as flood profiles:

Summary of Peak Discharges (in cfs) for Las Vegas Wash

Location	Storm Area, sq.mi. [a]	Storm Return Period 10-year	50-year	100-year	500-year
King Charles Channel below N Channel Diversion	54.4 [b]	1,025	1,746	2,266	4694 [d]
N Channel					
I-15 to Donovan Road	NA	256	436	567	2025 [d]
Donovan Road to King Charles		256	436	567	1173 [d]
Downstream of North Las Vegas Detention Basin	54.4 [b]	1,281	2,183	2,833	8,988
North Las Vegas Detention Basin Pipe and Spillway	54.4 [b]	1,292	2,186	2,839	6,322
Diversion Dike Overflow at North Las Vegas Detention Basin	54.4 [b]	0	0	194	6,838
Inflow to North Las Vegas Detention Basin	54.4 [b]	2,939	6,751	8,343	11,017
Inflow to North Las Vegas Detention Basin Diversion Dike	54.4 [b]	2,939	6,751	8,537	17,855
Outflow from Upper Las Vegas Wash Detention Basin	136.3 [c]	2,426	3,888	5,019	19,217
Inflow to Upper Las Vegas Wash Detention Basin	136.3 [c]	3,465	10,312	14,737	24,938

a Storm area is smaller than total tributary area
b Reference 10
c Reference 8
d Discharges based on upstream flow splits from hydraulic analysis

If applicable, discuss methods used to determine stillwater elevations and reference the Summary of Stillwater Elevations table:

Not applicable.

3.2 Hydraulic Analyses

State how cross sections were developed for all streams studied by detailed methods:

Cross sections were developed from four primary sources:

- aerial photogrammetry;
- field surveys;
- as-built plans for flood control facilities; and
- improvement plans for streets, bridges and development areas.

Aerial photogrammetry was used to develop topographic maps of the study area with a contour interval of 4 feet (Reference 13). Cross sections were developed by photogrammetric methods for most of the upper portion of the study area where there are few flood control channel improvements. Additional cross sections were developed directly from the aerial topographic mapping where determined necessary based on preliminary hydraulic analyses. Additional field surveys were conducted to obtain elevations for the bridge crossings of Upper Las Vegas Wash at Lone Mountain Road, Craig Road, and the Union Pacific Railroad Bridge. Field surveys were also conducted to increase the density of topographic data near the intersection of Losee Road and Lone Mountain Road, where flows from the wash cross Losee Road in two low water crossings. As-built plans for the King Charles Channel (References 14, 15), Improvements for 142 acres at Losee Road and Craig Road (Reference 16), Lone Mountain Road Bridge (Reference 17), North Las Vegas Detention Basin (Reference 18), Upper Las Vegas Wash Detention Basin and Interception Berm/Channel (Reference 19) were used to develop cross sections in these areas.

The following table describes the cross section data used:

Cross Section Station	**Data Source**
1+50 to 37+20	As-built plans - King Charles Diversion Channel Phase 1
37+20 to 58+53	As-built plans - King Charles Diversion Channel Phase 2; field survey at UPRR bridge

58+53 to 86+82	As-built improvement plans - 142 acre development at Losee Road and Craig Road; field survey at Craig Road bridge
87+80 to 88+61	As-built plans - Lone Mountain Road Bridge; field survey at Lone Mountain Road bridge; As-built improvement plans - 142 acre development and Losee Road and Craig Road
91+20	Aerial photogrammetry
92+37 to 94+29	Aerial topographic mapping
101+55 to 141+67	Aerial photogrammetry
143+68	Aerial topographic mapping
151+14	Aerial photogrammetry
156+67	Aerial topographic mapping
165+46 to 184+36	Aerial photogrammetry
184+62 to 192+15	Aerial topographic mapping
198+02 to 263+83	Aerial photogrammetry
270+00 to 273+03	Aerial topographic mapping
289+03 to 309+35	As-built plans - Las Vegas Detention Basin Flood Control Project
312+35 to 315+00	Aerial topographic mapping
320+44 to 555+70	Aerial photogrammetry
560+10 to 564+87	As-built plans - Upper Las Vegas Detention Basin and Interception Berm/Channel

59+059 to 749+97 Aerial photogrammetry

Describe how the dimensions of hydraulic structures were determined:

The dimensions of major hydraulic structures, including the outlet dams and outlet works for the two detention basins and their interception and diversion channels, were determined from as-built drawings. Field surveys were completed at all bridge crossings.

Explain how channel roughness factors (Manning's "n") were assigned. The "n" values for ALL streams studied by detailed methods (channel and overbank areas) should be given:

Channel roughness factors were determined based on standard hydraulic engineering references (References 20, 21), engineering judgment, and field observations. Limited sensitivity testing was conducted during hydraulic modeling to determine the effect of a range of 'n' values on model results. Final model roughness values were selected to represent a combination of roughness due to vegetation, bed and bank material, and bed form irregularity. The depth of flow was also considered in selecting appropriate 'n' values. The following Manning's 'n' values were assigned to various channel and overbank areas:

Channel/Overbank Type	**Manning's 'n'**
Concrete lined channel	0.014 to 0.017
Developed overbanks (Primarily pavement areas, smooth earth, or sparse landscaping)	0.030 to 0.035
Earth channels (constructed)	0.030
Unimproved wash channels (with vegetation)	0.040 to 0.045
Industrial lots (with obstructions)	0.045

State how water surface elevations were obtained for all streams studied by detailed methods:

The US Army Corps of Engineers HEC-2 program (Reference 22) was used as the primary tool for computation of water surface profiles for this study. This model was run in both subcritical and supercritical modes for various reaches of the study area. The results of the HEC-2 model were supplemented by independent calculations at bridges and culverts using the Federal Highway Administration HY-8 program (Reference 23) and by hand. Shallow overbank flooding depths and velocities were computed in some areas by hand using normal depth computations from Manning's equation.

Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals. Peak discharges on the "A" Channel were found to produce backwater in the lower portion of the King Charles Channel with higher water surface elevations than HEC-2 models for the corresponding recurrence intervals on the King Charles Channel. The water surfaces from backwater on the "A" Channel are shown in the profiles. Maximum basin stages in the North Las Vegas Detention Basin and Upper Las Vegas Detention Basin computed using the HEC-1 models, produced higher water surface elevations for the 50-, 100-, and 500-year flood events than the HEC-2 models for the portions of the wash immediately upstream of the basins. These elevations are reflected on the profiles.

The starting water surface elevations for the Upper Las Vegas Wash at the confluence with the "A" Channel were calculated using the slope area method. Water surface elevations at the N Channel were computed using supercritical profiles. These starting water surfaces match the water surface elevations calculated at the diversion from the King Charles Channel. Starting water surface elevations at the North Las Vegas Detention Basin were derived from HEC-1 routing of flows through the basin. The starting water surface elevations were taken as the basin stage at the time of the peak discharge. The starting water surface elevations in Upper Las Vegas Detention Basin were computed using the same methods.

The hydraulic analyses for this study were based on unobstructed flow through the wash and hydraulic structures except at Lone Mountain Road Bridge. Lone Mountain Road Bridge is the first bridge that Upper Las Vegas wash passes through moving downstream and is subject to high debris and sediment loads from the wash. The bridge is subject to pressure flow at the 500-year peak discharge. Under these conditions, the capacity of the bridge to transport large bed load sediments will be less than the capacity of the inflowing channel. Due to the high availability of cobble sized bed load that can be generated by progression of existing headcuts upstream of the bridge, opening was assumed blocked during the 500-year peak discharge.

The HEC-2 models and the HY-8 program were used to define the locations where channel and hydraulic structure capacities were inadequate to convey the peak flood discharges for various recurrence intervals. Where overbank flows remained hydraulically connected to the main wash or channel flows, the overbank flows were modeled with HEC-2, and the results used to delineate AE flood hazard zones. Where breakout flows were determined likely to become hydraulically separated from the main wash or channel, the breakout flow depths and velocities were estimated using normal depth computations, and the results of these computations used to delineate AO flood hazard zones. Breakout flows occur at

the 500-year flood discharge near Azure and Losee Road, Lone Mountain Road, Craig Road, and the UPRR Bridge. A portion of these flows return to the main channel downstream in various locations within the study area. Overflow magnitudes were determined using HEC-2 and hand calculations. For determination of the profiles in the main channel or wash downstream of breakout flows, the overflow was subtracted from the total flow upstream. Flows in the HEC-2 models decrease in a downstream direction as overflows are progressively subtracted from the main flow area at subsequent breakout locations.

Average 100-year flow depths in overflow areas were determined using normal-depth calculations. Areas of inundation for the 500-year flood discharge were determined by approximate methods using a combination of normal depth calculations, review of available topographic mapping, and field observation.

Shallow flooding is often characterized by highly unpredictable flow directions caused by low relief or shifting channels and high debris loads. Where such conditions exist, the entire area susceptible to this unpredictable flow was delineated as a zone of equal risk. Small scale topographic variations were averaged across inundated areas to determine flood depths.

Describe the methodology for wave height/runup, lacustrine, ice jam, alluvial fan flooding, and shallow flooding areas (where applicable):

Not applicable.

If applicable, reference the Transect Descriptions which should include: transect number, location, 100-year stillwater elevation, and maximum 100-year wave elevation.

Not applicable.

If performed, describe the hydraulic analyses for the approximate flooding sources:

No approximate flooding sources studied.

If applicable, reference the Transect Data Table which should include: Flooding Source (with the affected transects), 10-, 50-, 100-, and 500-year stillwater elevation, zone designation and Base Flood Elevation.

Not applicable.

If applicable, reference the Transect Location Map.

Not applicable.

Standard paragraphs in this section include paragraphs for cross sections, NGVD, and unobstructed flow.

No modifications required to standard paragraphs, except that the Lone Mountain Road Bridge was assumed blocked in the 500-year event as described above.

Specify whether elevations are referenced to NGVD or NAVD or other datum, and give releveling dates, if any.

All elevations are referenced to NGVD (1929).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

4.1 Floodplain Boundaries

Identify all maps used. Include the scale, contour interval, and type of map (topographic, compiled from aerial photographs, etc):

Flood boundaries for the 100- and 500-year flood discharges in the Upper Las Vegas Wash were delineated on 1:4,800 scale topographic maps with a contour interval of 4 feet (reference 24). Where flood boundaries for the 500-year flood discharge was located outside the extent of this mapping, the boundaries were determined using topographic mapping developed for the City of North Las Vegas at a scale of 1:4,800 with a contour interval of 2 feet (reference 25) and USGS quadrangle topographic maps, 1:24,000 (references 26 and 27).

Cross sections within the unimproved areas of the wash were obtained by aerial photogrammetry and interpolated from topographic maps. Cross sections at structures were obtained from as-built plans and verified by field inspections and surveys.

There is a datum difference between the NGVD 1929 and NAVD 1988 mapping from ranging 2.41 to 2.46 feet in the Upper Las Vegas Wash. The average difference between the control points was 2.43 feet. Therefore, 2.43 feet was subtracted from the photogrammetric control and the ERM elevations to convert from NAVD 1988 to NGVD 1929. Cross section elevations obtained from NAVD 1988 topographic mapping used in the hydraulic models were converted to NGVD 1929 by subtracting 2.4 feet.

Identify and reference all maps or methods used to delineate floodplain boundaries for approximate flooding sources:

Not applicable.

4.2 Floodways

List streams, if any, for which floodway widths extend beyond the corporate limits:

No floodway determined.

List streams affected by backwater:

The lower portion of the King Charles Channel is affected by backwater from the "A" Channel. These two channels have there confluence at the study area downstream boundary near Interstate 15. The "A" Channel backwater elevations were extended upstream to intersect with the computed water surface elevations in the King Charles Channel.

Provide method used for floodway computations:

No floodway determined.

Give reason why no floodway was delineated for streams or portions of streams:

Determination of a floodway was discussed, but not requested by community at the initial CCO meeting, due to anticipated confinement of 100-year flood in natural and constructed channel boundaries. The FEMA Project Officer agreed that a floodway was not required.

Identify any abnormal procedures (such as state-imposed surcharges of less than 1.0 foot) for floodway delineations:

No abnormal procedures.

7.0 OTHER STUDIES

Identify and reference all other FISs for contiguous communities and any other published reports or available data dealing with related flooding sources. All disagreements and discrepancies must be noted and resolved:

This report is for a restudy of one of the streams covered in the current Flood Insurance Study for Clark County, Nevada and Incorporated Areas (Reference 4). Changes in discharges and water surface profiles in this study are due to the recent construction of flood control facilities.

8.0 BIBLIOGRAPHY AND REFERENCES

List references with complete information, including date, place of publication, and scale (as applicable):

1. Clark County Regional Control District, August 1991 Master Plan Update of the Las Vegas Valley, 1991

2. U.S. Department of the Interior, Geological Survey, Geologic Map of Clark County, Nevada, Scale 1: 250,000, Contour interval 500 feet, 1964

3. Nevada Bureau of Mines and Geology, Bulletin 62, Geology and Mineral Deposits of Clark County, Nevada, 1965

4. Federal Emergency Management Agency, Flood Insurance Study, Clark County Nevada and Incorporated Areas, 1995

5. U.S. Department of Agriculture, Soil Conservation Service, History of Flooding, Clark County, Nevada 1905 -1975, 1976

6. Clark County Regional Flood Control District, Annual Report 1992-1993, 1993

7. U.S. Department of the Army, Corps of Engineers, Hydrologic Documentation for Feasibility Study, Las Vegas Wash and Tributaries, 1988

8. James M. Montgomery, Las Vegas Valley Flood Insurance Study Hydrology Report, 1991

9 Boyle Engineering Corporation, Western and Eastern Tributaries of Range Wash Flood Control Facility Plan, 1991

10. Black & Veatch, North Las Vegas Detention Basin Outlet Modification Report, 1993

11. U.S. Department of the Army, Corps of Engineers, HEC-1 Flood Hydrograph Package Users Manual, 1987

12. Clark County Regional Flood Control District, Hydrologic Criteria and Drainage Design Manual, 1990

13. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Precipitation-Frequency Atlas of the Western United States, 1973

14. James M. Montgomery Consulting Engineers, Inc., King Charles Diversion Channel from N-Channel Phase I, 1987

15. James M. Montgomery Consulting Engineers, Inc., King Charles Diversion Channel from N-Channel Phase II, 1990

16. BSI Consultants, Inc., 142 Acres at Losee and Craig Road Site Improvement Plans, As-built drawings, 1997

17. Church Engineering, Inc., Lone Mountain Road Bridge Plans, 1991

18. Montgomery Engineers of Nevada Consulting Engineers, Las Vegas Wash Detention Basin and Interception Control Project drawings, 1983

19. Black & Veatch, Upper Las Vegas Wash Detention Basin and Interception Berm/Channel Plans, As-built drawings, 1993

20. Chow, Ven Te, Open-Channel Hydraulics, McGraw-Hill Publishing Company, 1959

21. French, Richard H., Open Channel Hydraulics, McGraw-Hill Book Company, 1985

22. U.S. Department of the Army, Corps of Engineers, HEC-2 Water Surface Profiles User's Manual, 1990

23. US Federal Highway Administration, HY-8 computer program

24. Kenney Aerial Mapping, Inc., Topographic Mapping of the Upper Las Vegas Wash, Scale 1:4800, Contour Interval 4 feet, NGVD 1929, 1996

25. Kenney Aerial Mapping, Inc., Topographic Mapping for the City of North Las Vegas, Scale 1:4800, Contour Interval 2 feet, NGVD 1929, 1996

26. US Geological Survey, Valley Quadrangle, Clark County, Nevada, Scale 1:24000, Contour Interval 20 feet, NGVD 1929, 1982

27. US Geological Survey, Las Vegas NE Quadrangle, Clark County, Nevada, Scale 1:24000, Contour Interval 10 feet, NGVD 1929, 1984

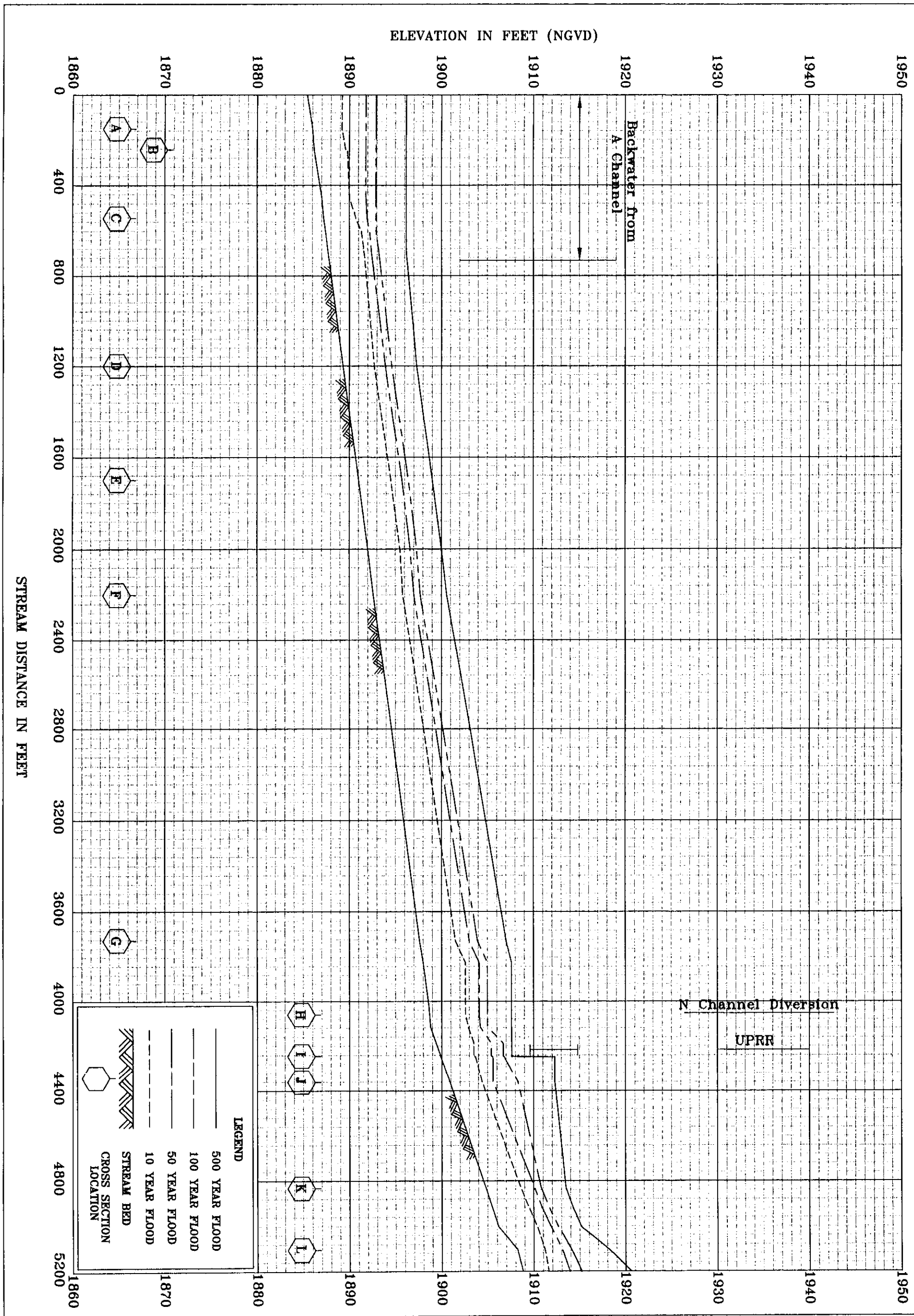
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METADATA FILE
Upper Las Vegas Wash With
North Las Vegas Detention Basin Diversion Dike

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Representation Model:	Vector
Spatial Object Types:	Point, node, polyline, arc, & block
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Transfer Format:	DWG
Data Set Description:	Flood Profiles for the Upper Las Vegas Wash
Intended Use:	FIS Figure
Data set extent:	N/A
List of file names included:	WO-PRF.dwg, NCH-WO.dwg
Intended Scale of Use:	1 inch = 400 feet Horizontal, 1 inch = 10 feet Vertical 1 inch = 100 feet Horizontal, 1 inch = 5 feet Vertical
Resolution of Data:	N/A
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Horizontal Datum:	N/A

Vertical Datum:	National Geodetic Vertical Datum of 1929
Projection Units:	Feet
Zone Number:	N/A
Coordinate Precision:	N/A
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain
Policy Status:	N/A

Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors
Source Name:	AutoCad R12
Source Scale:	1:4800H, 1:120V, 1:1200H, 1:60V
Source Medium:	Paper, Compact Disk
Creator of Source:	Northwest Hydraulic Consultants
Date of Source Material:	22, April, 1998
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Metadata Contact:	Edward E. Wallace



1P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

with North Las Vegas Detention Basin Diversion Dike

STREAM DISTANCE IN FEET

5200 5600 6000 6400 6800 7200 7600 8000 8400 8800 9200 9600 10000 10400

ELEVATION IN FEET (NGVD)

1890 1900 1910 1920 1930 1940 1950 1960 1970 1980

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

M N O P Q R S T U V W X Y Z

Sta Back 88+34.5

Sta Ahead 88+60

Craig Road

Lone Mountain Road

La Madre Way

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

STREAM DISTANCE IN FEET

1040 1080 1120 1160 1200 1240 1280 1320 1360 1400 1440 1480 1520 1560

ELEVATION IN FEET (NGVD)

1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

AA AB AC AD AE AF AG

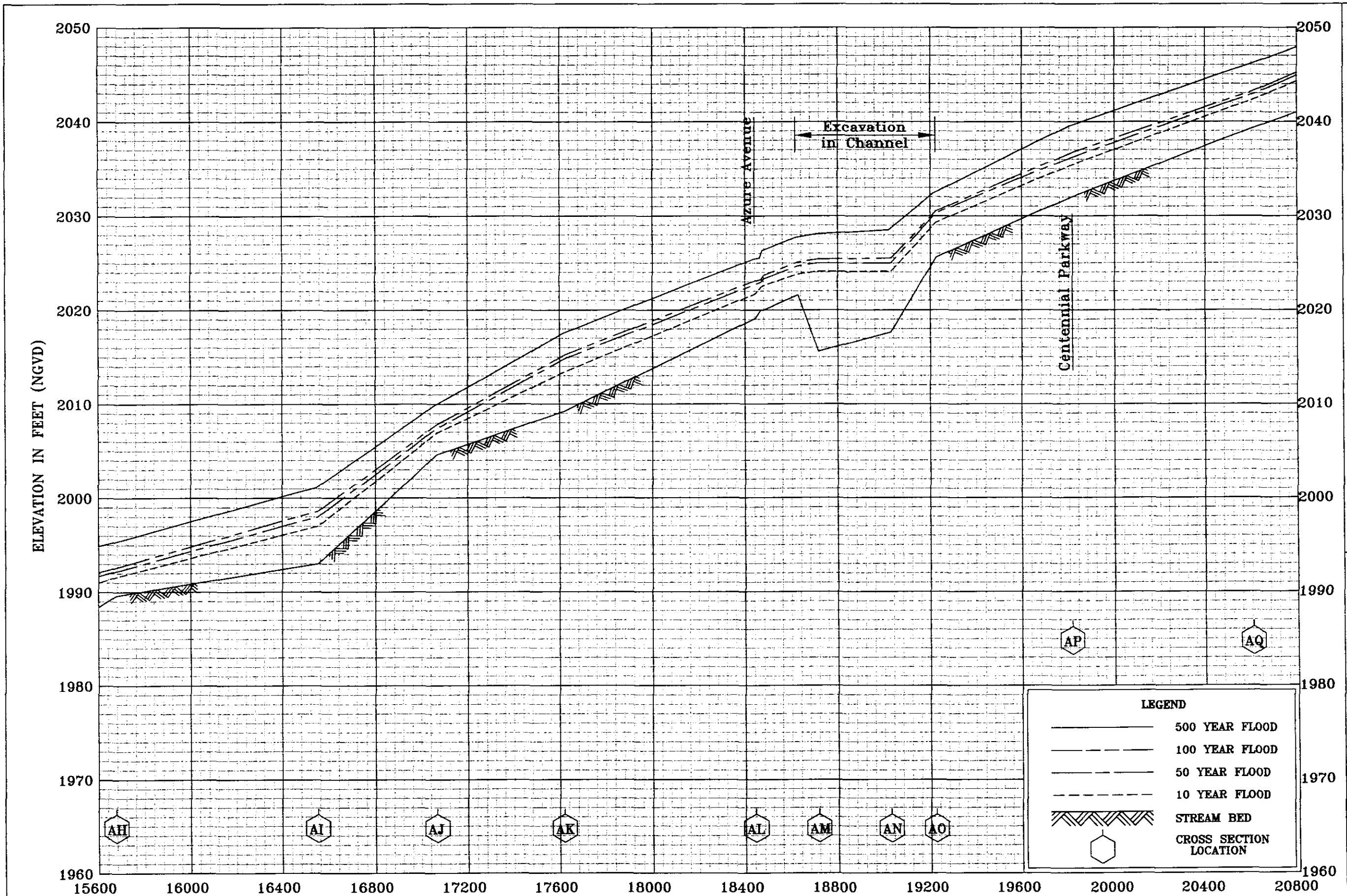
Losee Road

Washburn Road

UPPER LAS VEGAS WASH

with North Las Vegas Detention Basin Diversion Dike

FLOOD PROFILES

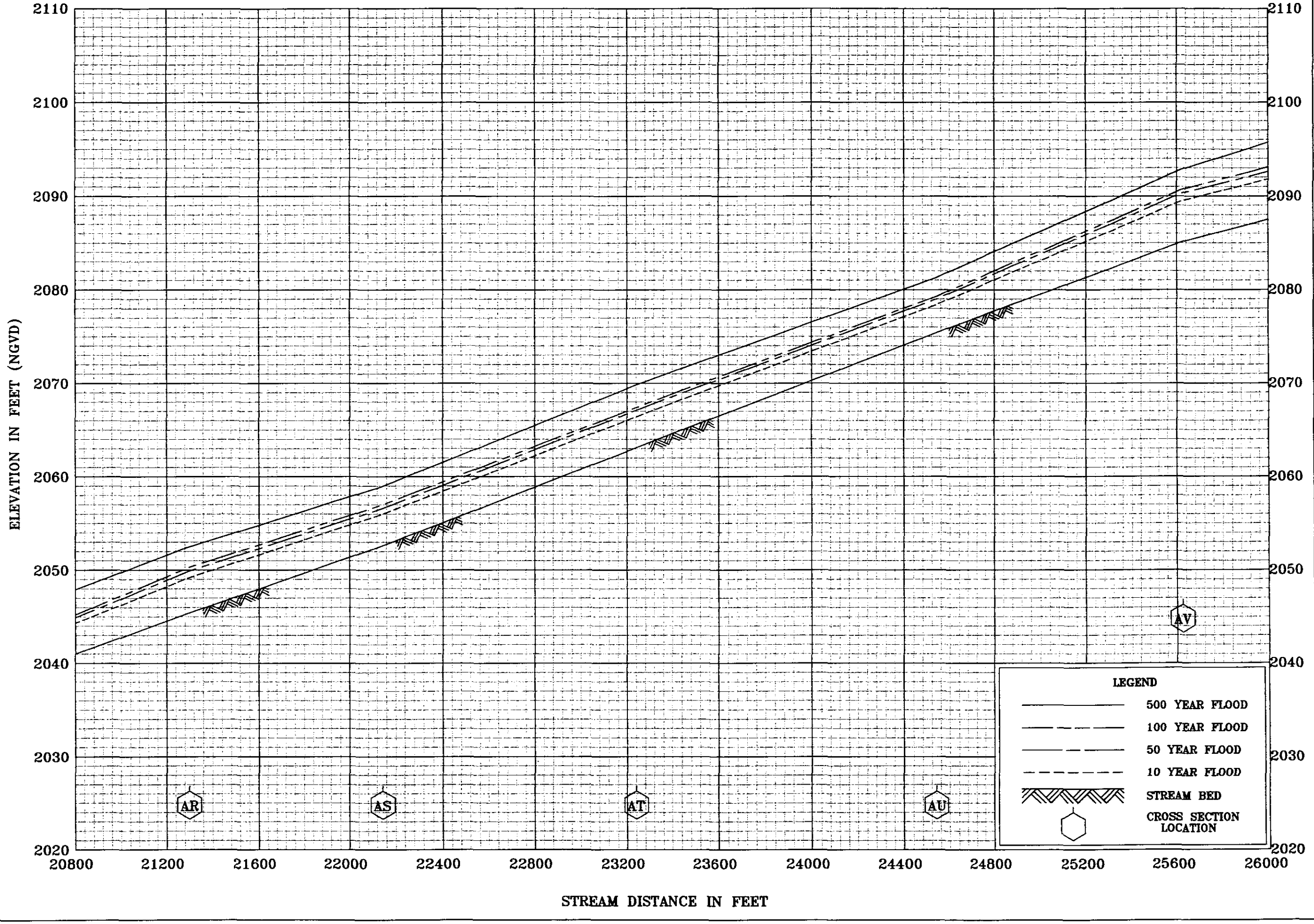


FLOOD PROFILES

UPPER LAS VEGAS WASH
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

4P



FLOOD PROFILES

UPPER LAS VEGAS WASH

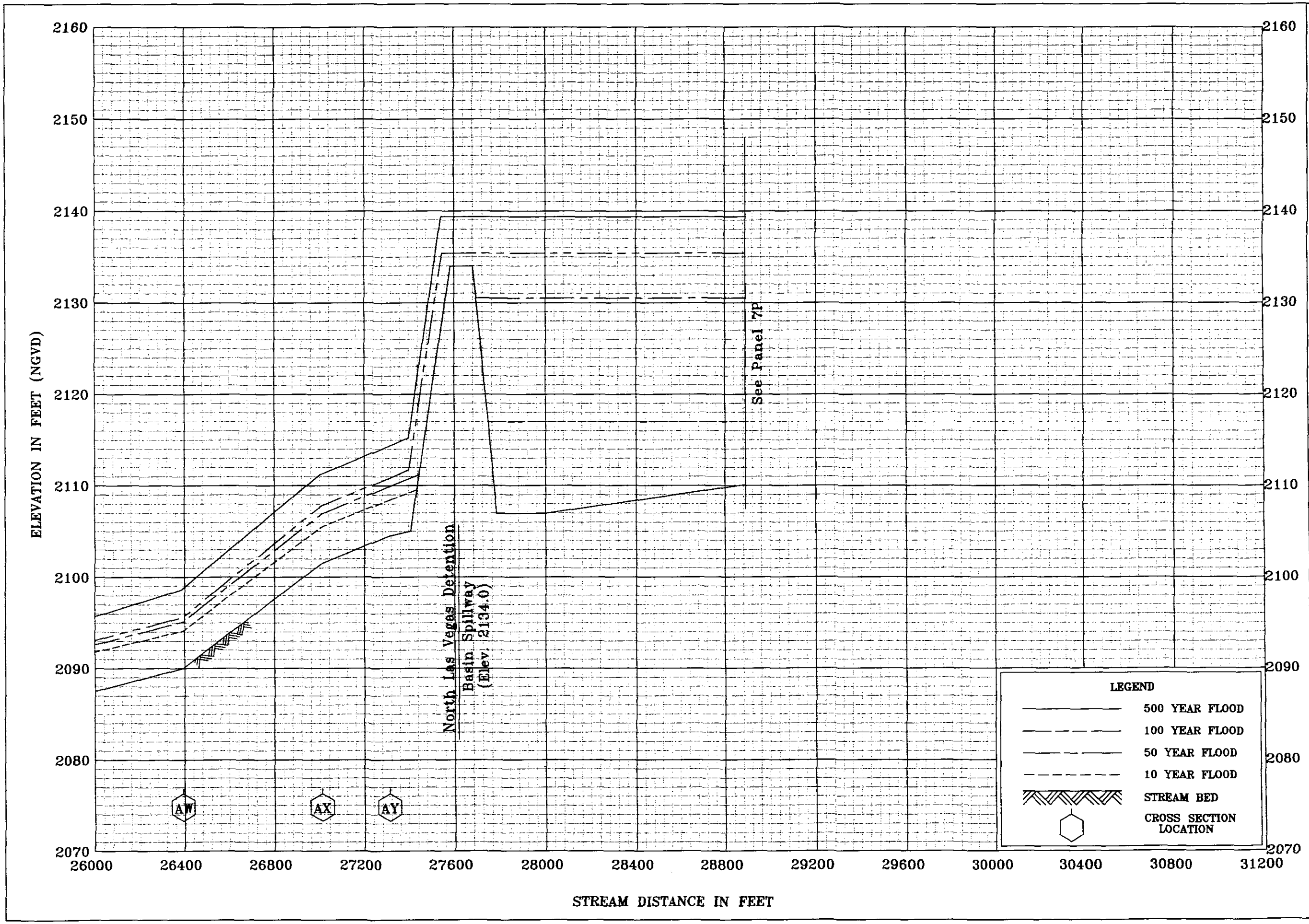
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

5P



FLOOD PROFILES

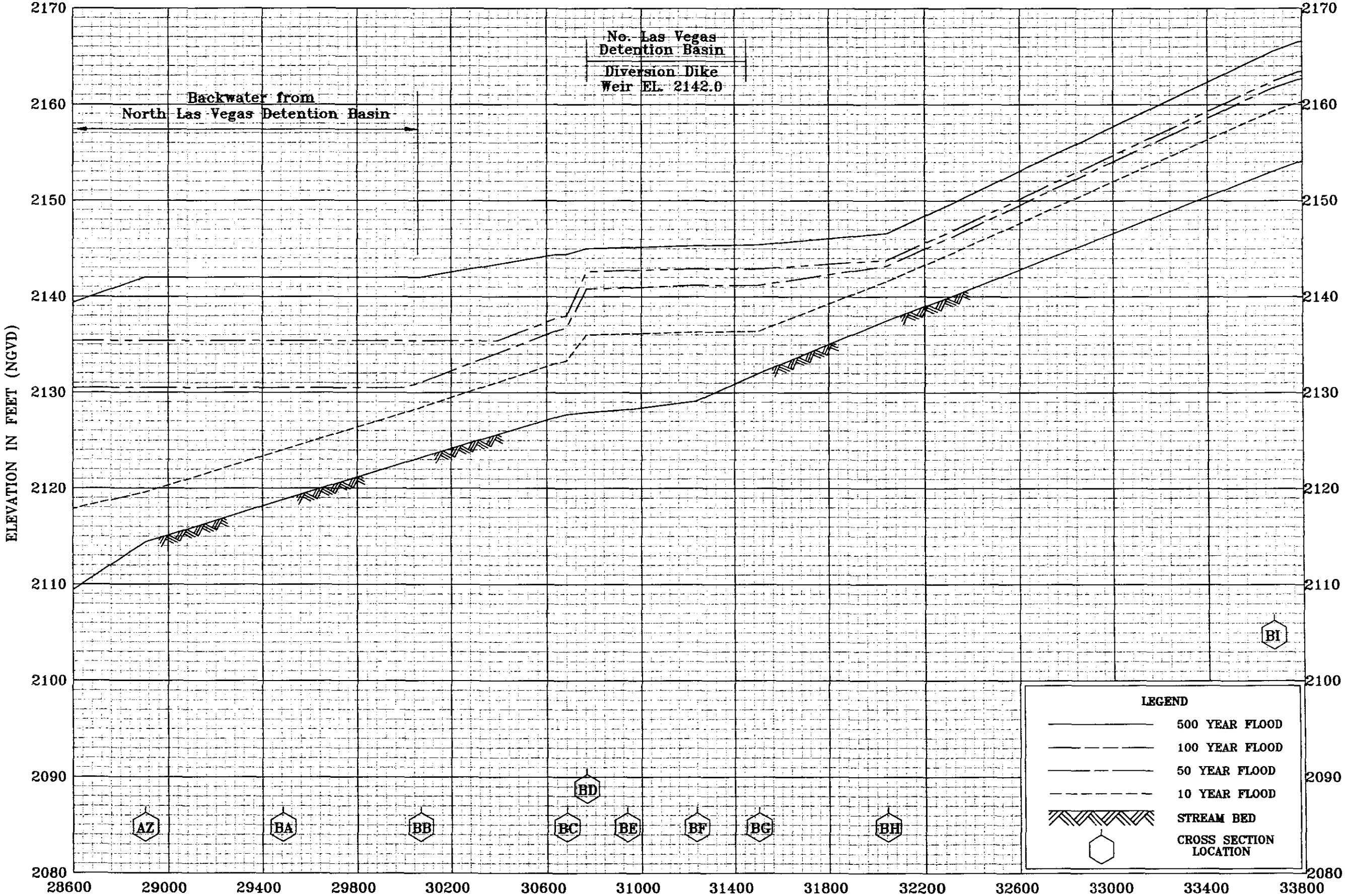
UPPER LAS VEGAS WASH

with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

6P



FLOOD PROFILES

UPPER LAS VEGAS WASH

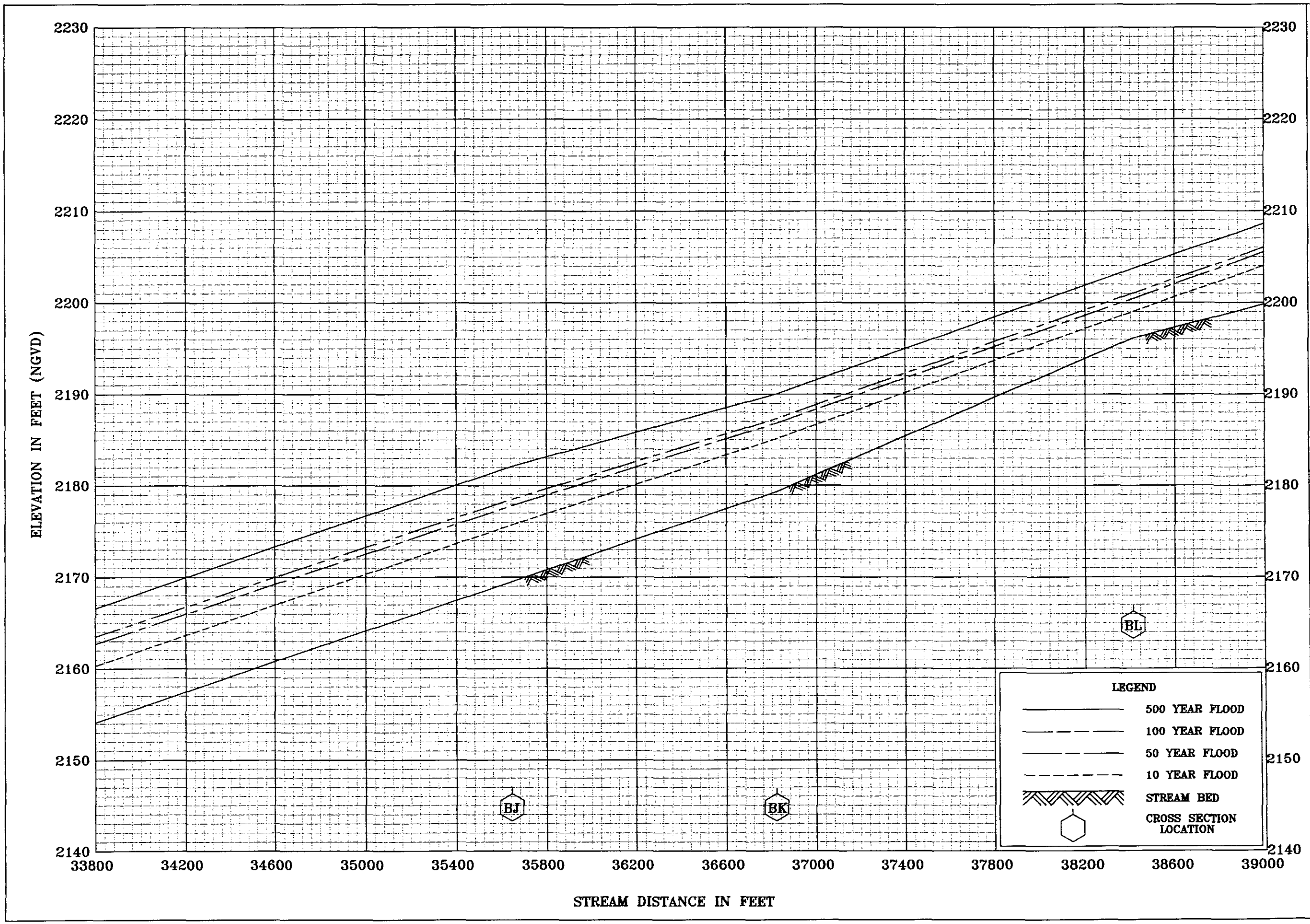
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

7P



FLOOD PROFILES

UPPER LAS VEGAS WASH

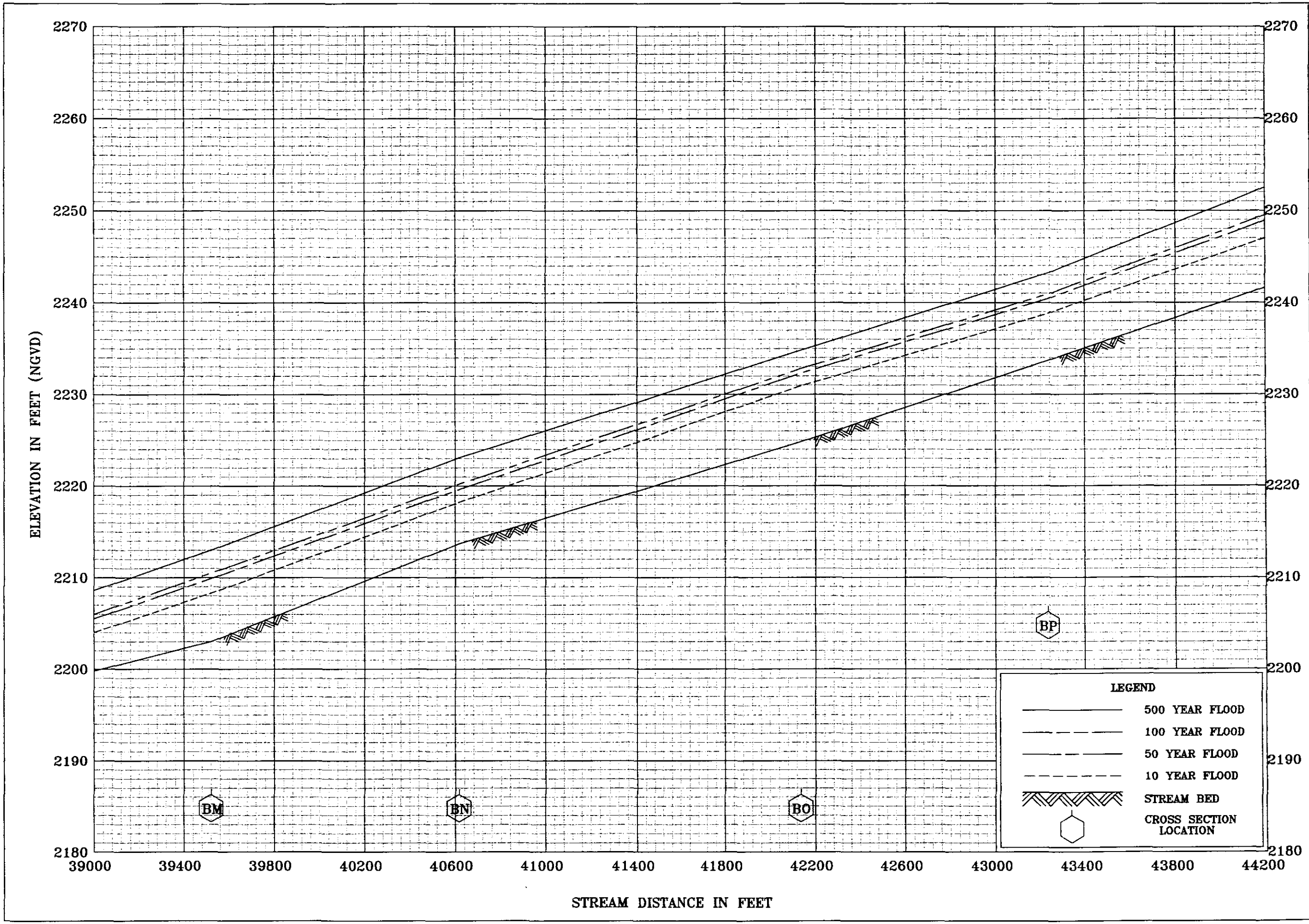
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

8P



FLOOD PROFILES

UPPER LAS VEGAS WASH

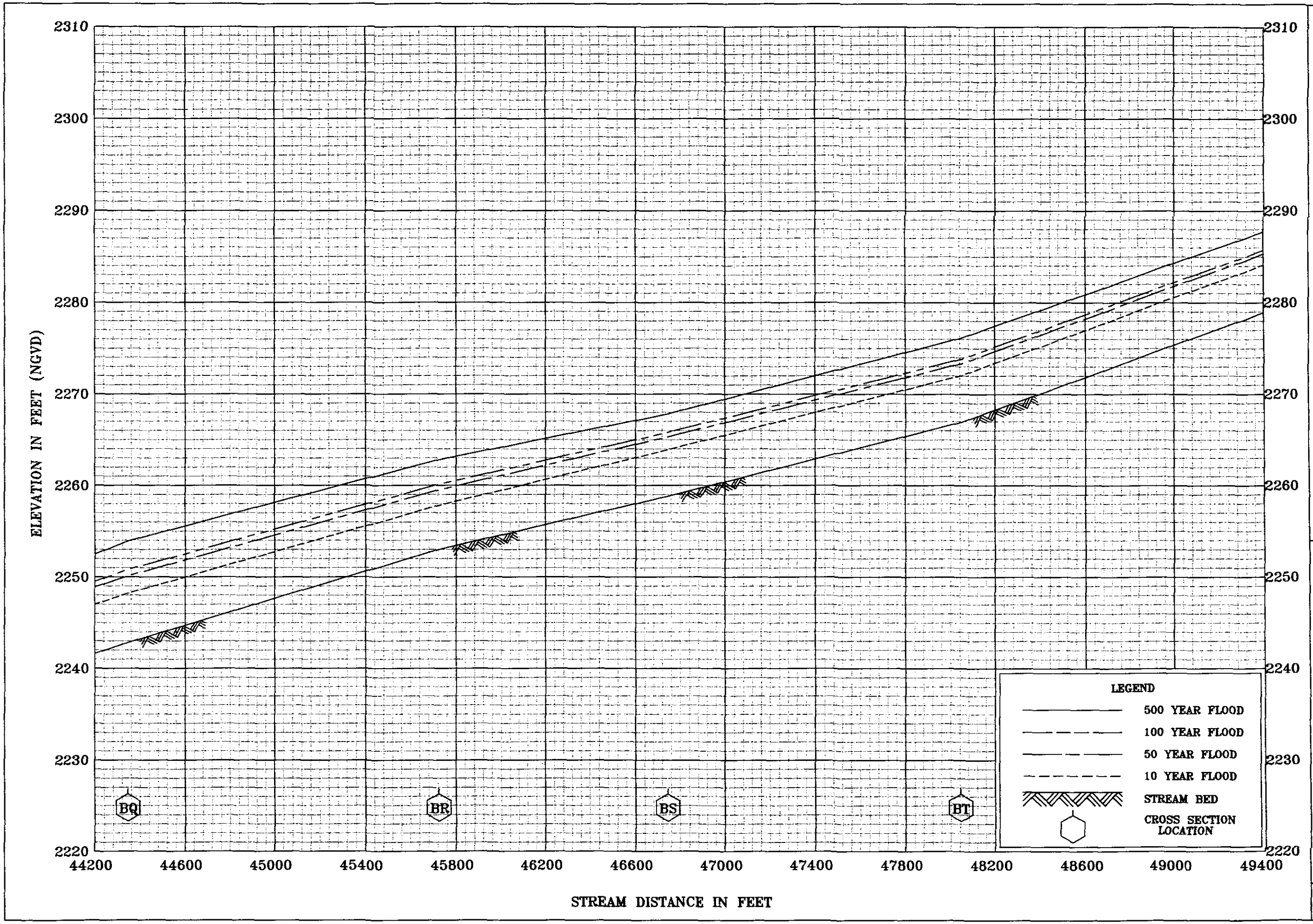
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

9P



FLOOD PROFILES

UPPER LAS VEGAS WASH

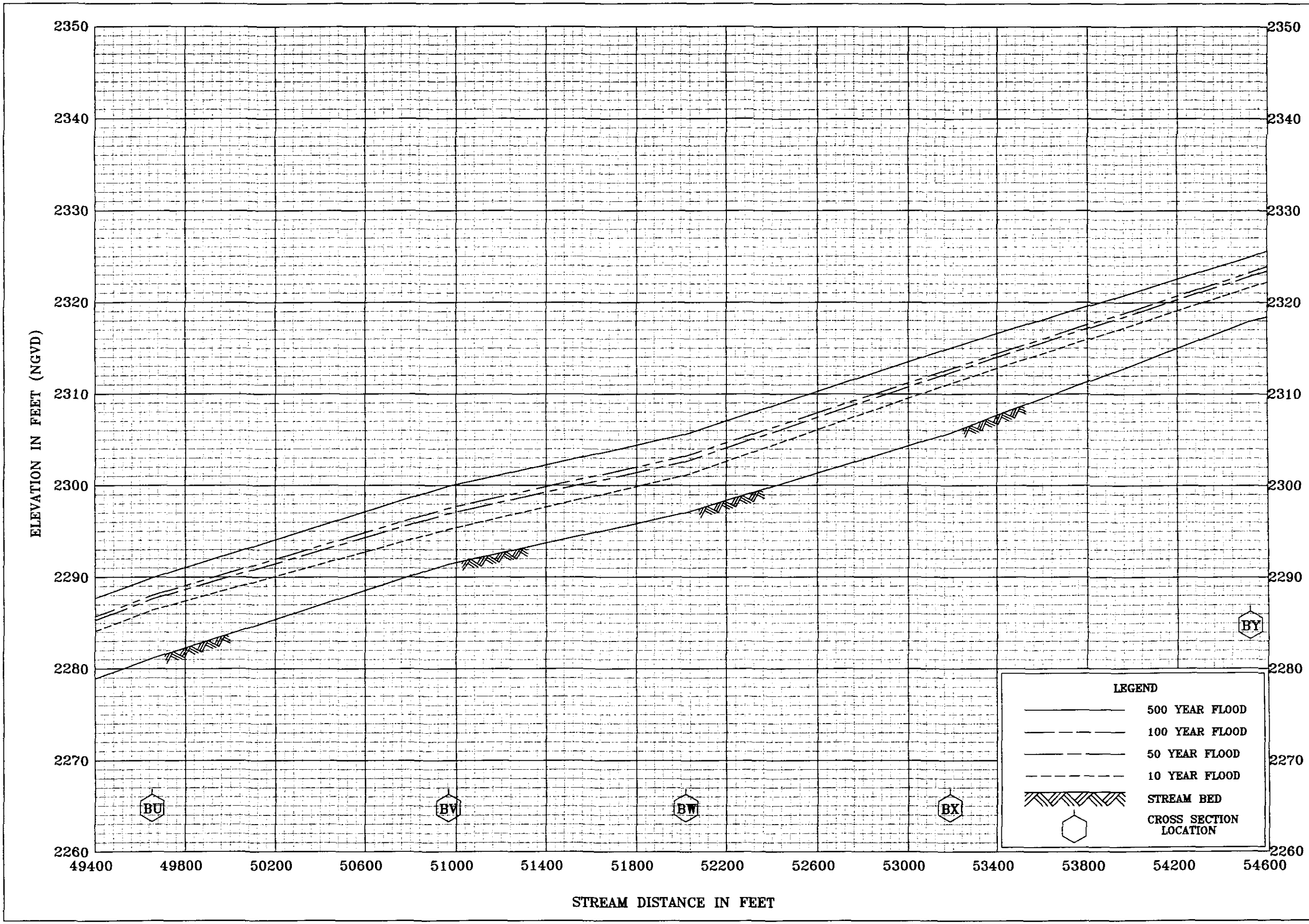
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

10P



FLOOD PROFILES

UPPER LAS VEGAS WASH

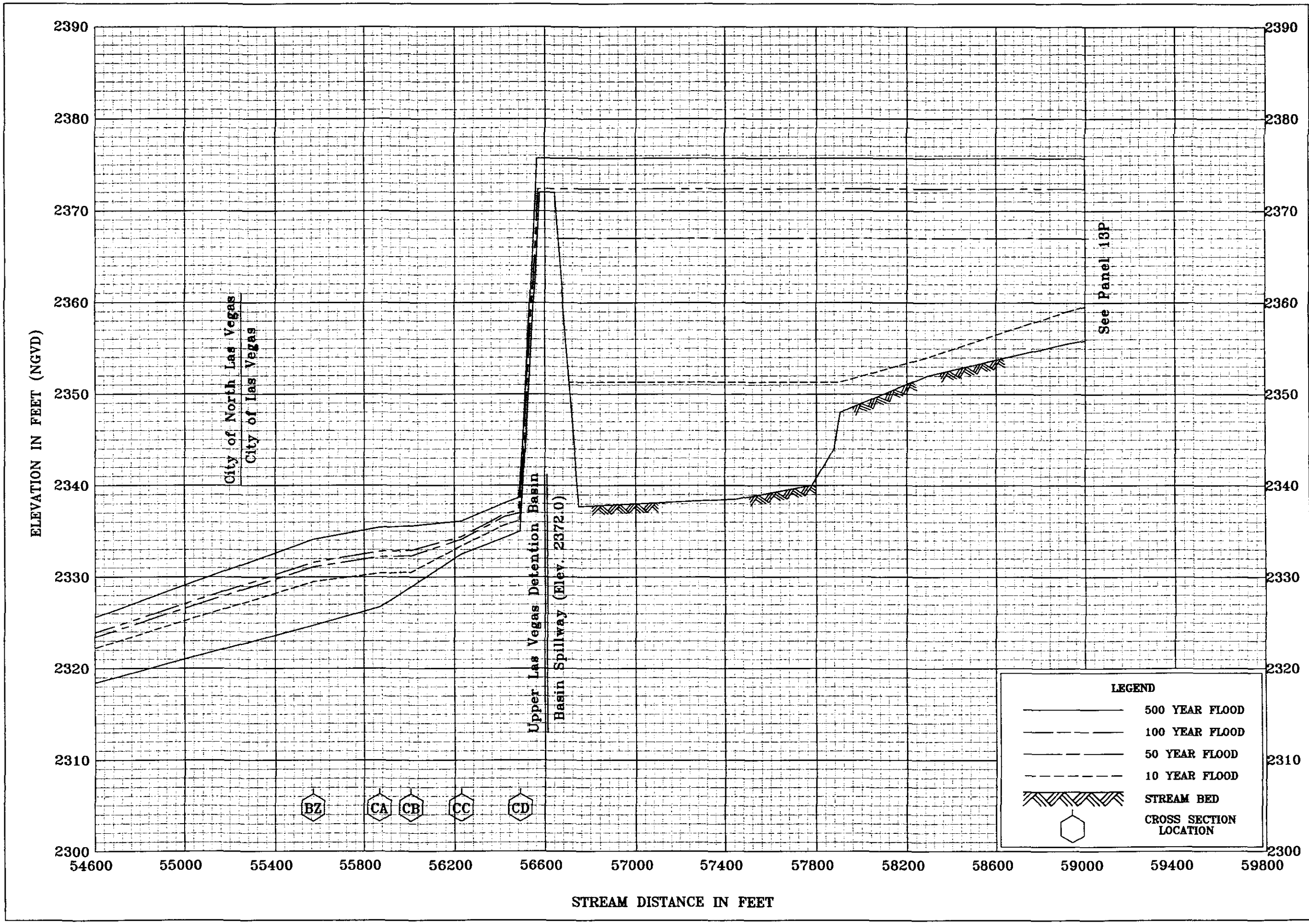
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

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FLOOD PROFILES

UPPER LAS VEGAS WASH

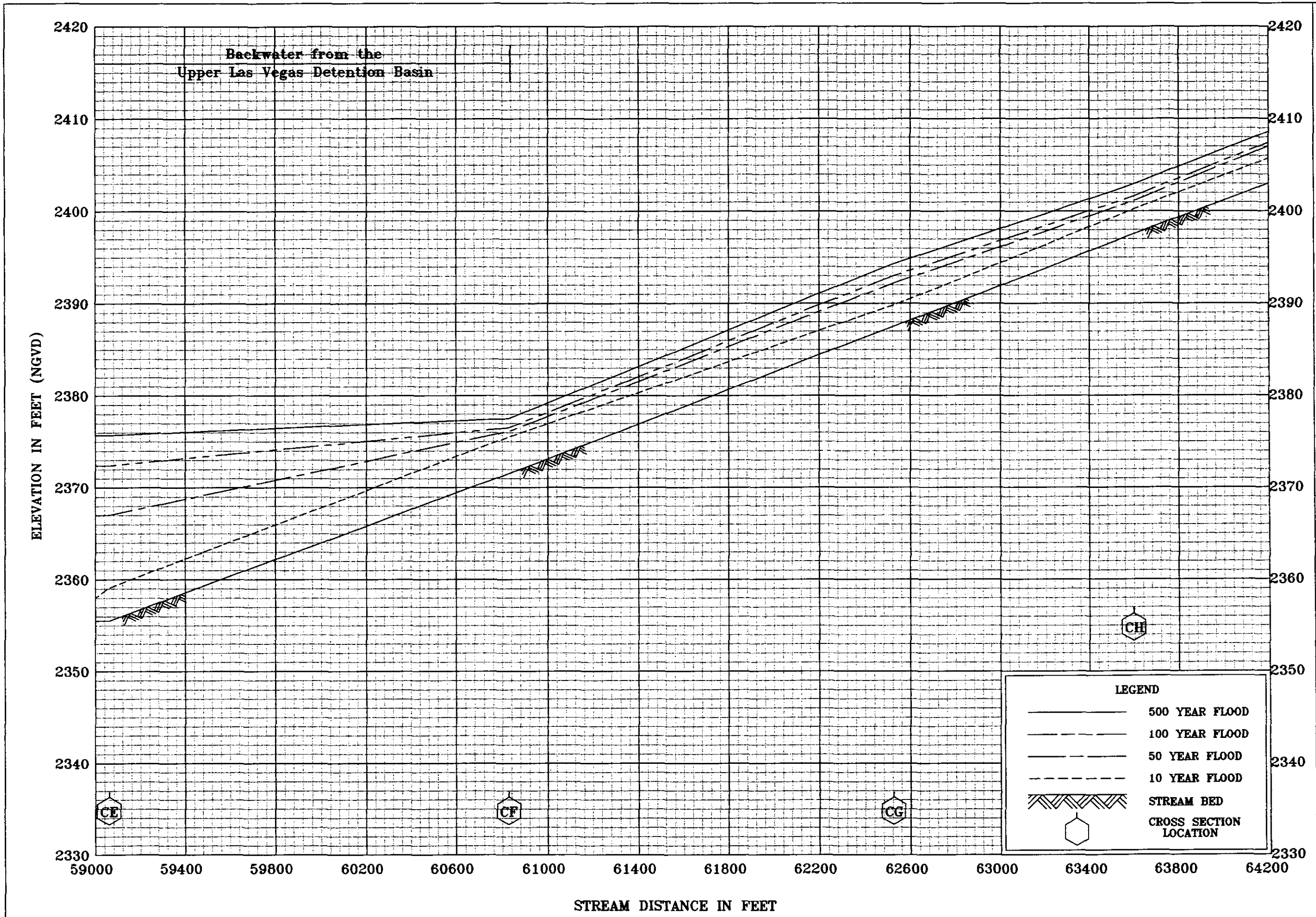
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

12P



FLOOD PROFILES

UPPER LAS VEGAS WASH

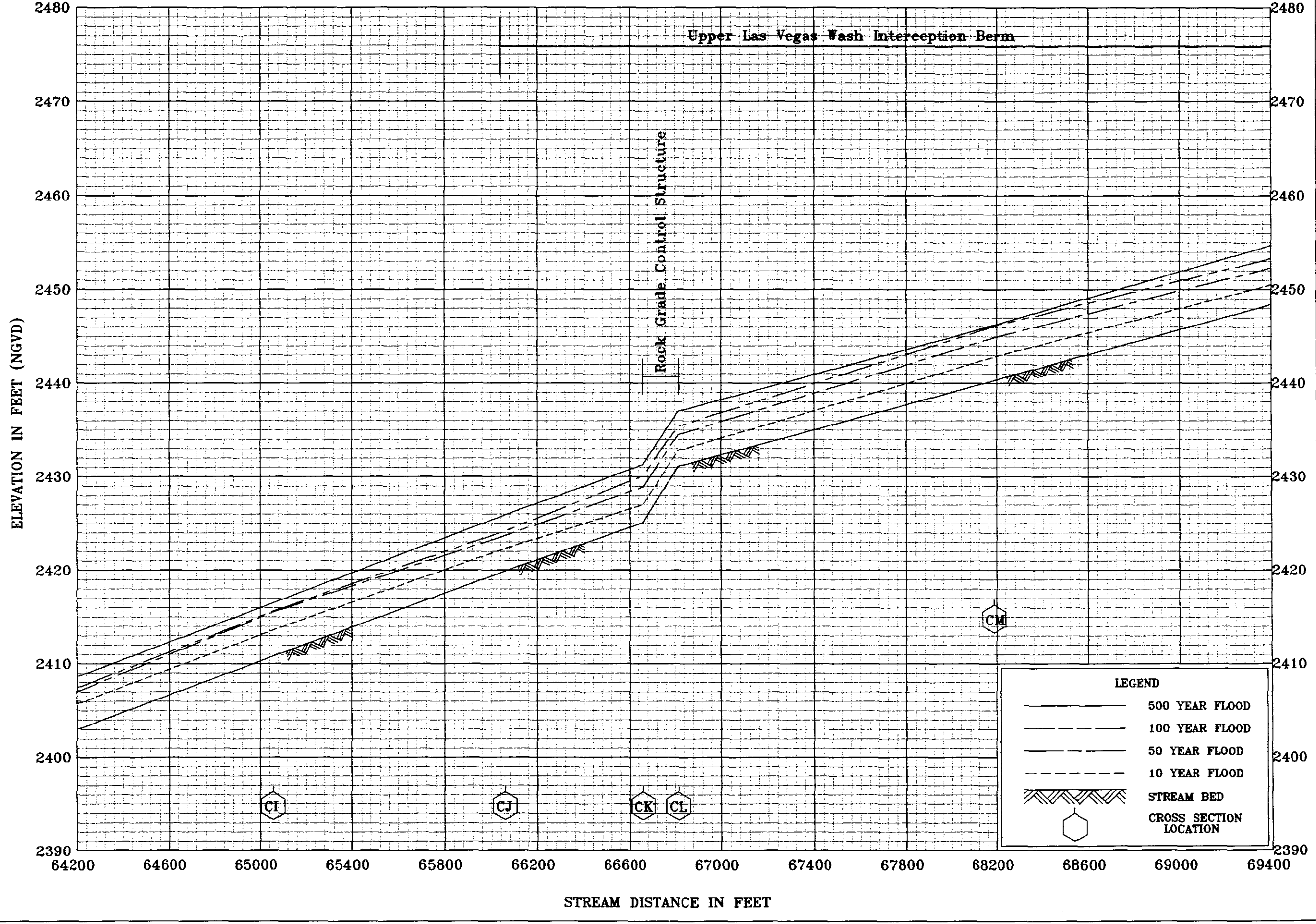
with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

13P



FLOOD PROFILES

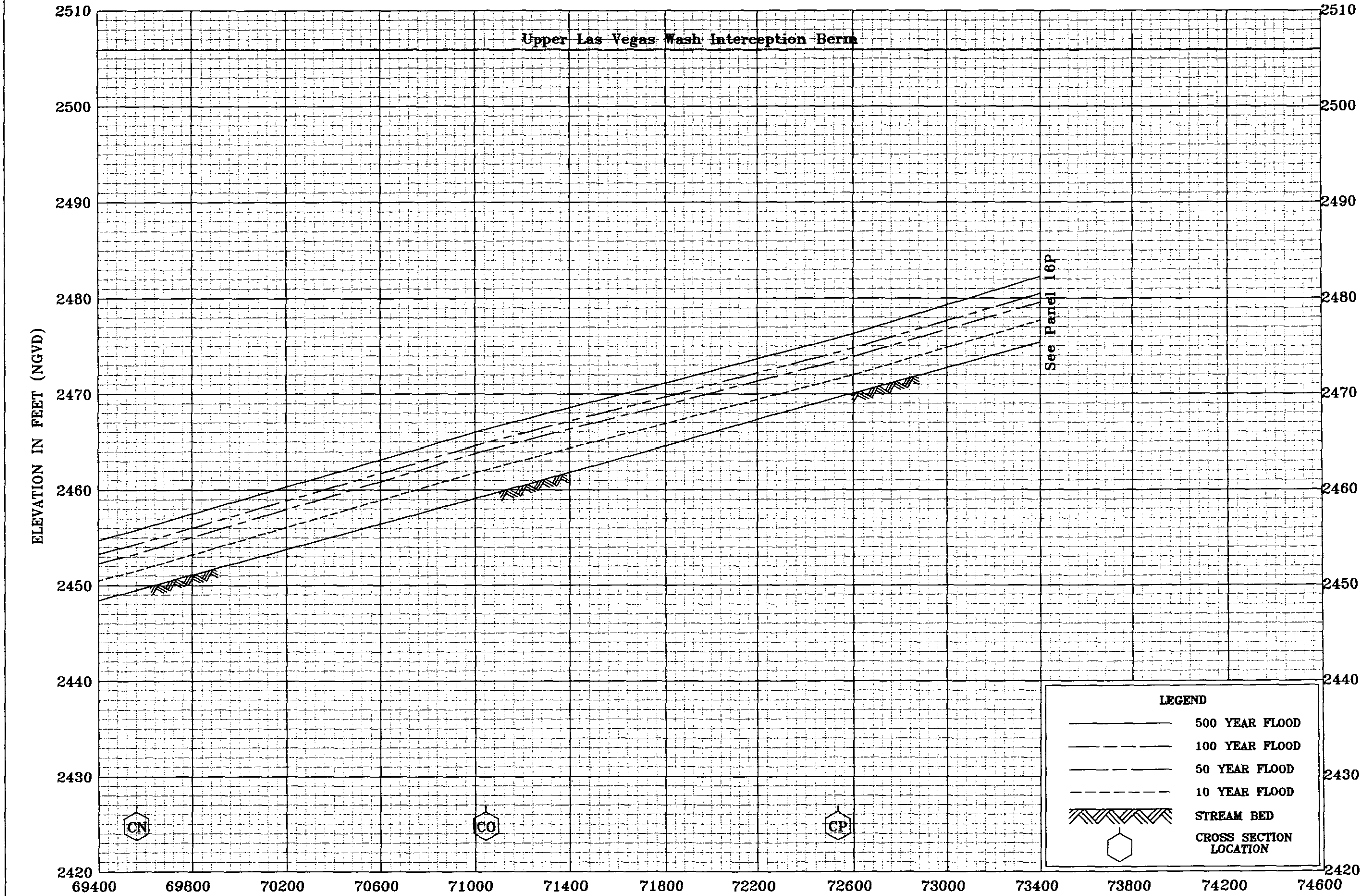
UPPER LAS VEGAS WASH

with North Las Vegas Detention Basin Diversion Dike

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY



FLOOD PROFILES

UPPER LAS VEGAS WASH
North Las Vegas Detention Basin Diversion Dike with No

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas and Clark Co., NV
CLARK COUNTY

15P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

with North Las Vegas Detention Basin Diversion Dike

STREAM DISTANCE IN FEET

73400 73800 74200 74600 75000 75400 75800 76200 76600 77000 77400 77800 78200 78600

ELEVATION IN FEET (NGVD)

2450 2460 2470 2480 2490 2500 2510 2520 2530 2540

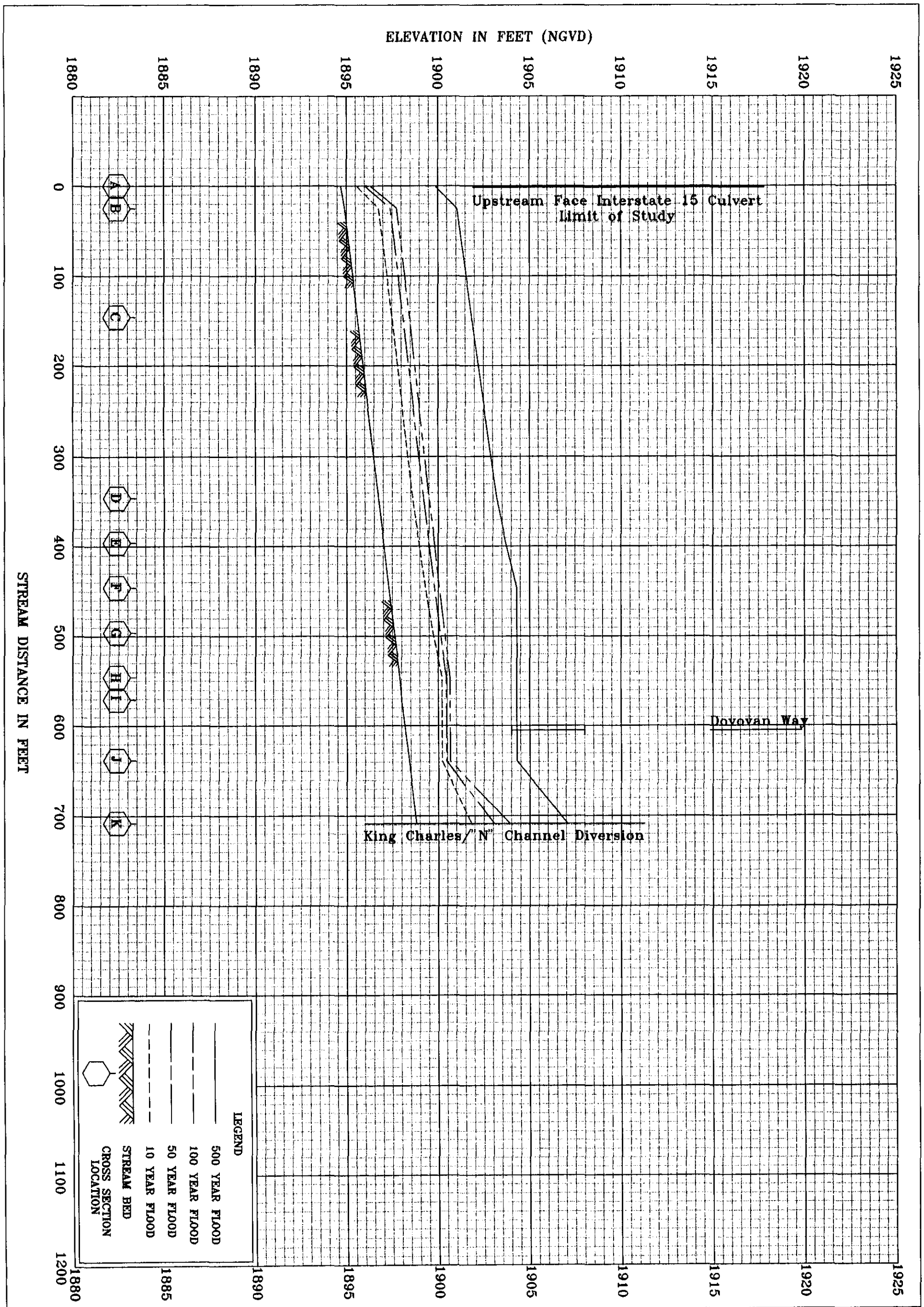
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Upper Las Vegas Interception Berm

Limit of Study

LEGEND

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION



17P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

"N" Channel

Technical Support Data Notebook

Upper Las Vegas Wash
Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 6
FIS Report Data
without North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 6
FIS Report Data - without North Las Vegas Detention Basin Diversion Dike

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A. Introduction to Volume 6

B. FIS Report Data

C. Flood Profiles

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 6

This volume of the TSDN contains study report data and flood profiles. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the report data and profiles for the '**Without North Las Vegas Detention Basin Diversion Dike**' case. Volume 5 contains similar data for the "With North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

3601 Eisenhower Ave., Suite 600
Alexandria, Virginia 22304

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Letter of Transmittal

Mr. Kevin Eubanks, P.E.	DATE: 10-8-99 JOB NO.
Assistant General Manager	RE: Las Vegas Wash
Clark County Regional Flood Control District	
600 S. Grand Central Parkway	
~~ATTENTION:~~ Las Vegas, NV 89106-4511	

THE INFORMATION DESCRIBED BELOW IS BEING SENT TO YOU VIA:

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NO. OF COPIES	DATE	DESCRIPTION
1	1-15-99	Technical Support Data Notebook - Volumes 1 & 2, and 4 workmaps for Las Vegas Wash, downstream of Charleston Boulevard
1	4-20-98	Technical Support Data Notebook - Volumes 1 through 10, and 8 workmaps for Las Vegas Wash upstream of Interstate 15

THE INFORMATION IS TRANSMITTED AS CHECKED BELOW:

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REMARKS:
package # 1 of 2

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File name: MD_FISWO.ME

METADATA FILE
Upper Las Vegas Wash Without North Las Vegas Detention Basin Diversion Dike

Data Set Identity:	Flood Insurance Study
County and State:	Clark County, Nevada
Theme Keywords:	Flood Insurance Study
Representation Model:	N/A
Spatial Object Types:	Text
Data Set Size:	N/A
Transfer Format:	ASCII, WordPerfect
Data Set Description:	Flood Insurance Report Text and Support Files
Intended Use:	
Data set extent:	N/A
List of file names included:	N/A
Intended Scale of Use:	N/A
Resolution of Data:	N/A
Projection Name:	N/A
Horizontal Datum:	N/A
Vertical Datum:	N/A
Projection Units:	N/A

Zone Number:	N/A
Coordinate Precision:	
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
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Completeness:	N/A
Metadata Date:	22, April, 1998
Metadata Contact:	Edward E. Wallace

rev. 4.21.98

Flood Insurance Study

Clark County, Nevada

Without NLVDB Diversion Dike

1.0 INTRODUCTION

1.1 Purpose of Study

Community Name: City of North Las Vegas; City of Las Vegas; Unincorporated Areas of Clark County
County: Clark County
State: Nevada

1.2 Authority and Acknowledgments

Study Contractor: Northwest Hydraulic Consultants, Inc.
*Subcontracto*r: Kenney Aerial Mapping (Mapping and Surveying)
Completion Date: April, 1998

Provider of Base Map: Kenney Aerial Mapping, Inc.

Base Map Compilation Source: Kenney Aerial Mapping, Inc
Base Map Compilation Scale: 1:4800
Base Map Compilation Date: August, 1996

Coordinate System: State Plane
Projection: State Plane
Datum: NGVD 1929

Has base map source been modified?

Yes

If so, how and where:

Corporate limits, section lines, and streets were added based on information provided by the City of Las Vegas and the City of North Las Vegas from community GIS mapping.

Any restrictions on the release of base map data?

No

If yes, what restrictions apply?

1.3 Coordination

Initial Consultation and Coordination Officer's (CCO) meeting date:

Wednesday, September 7, 1994

List of attendees and agencies represented at the initial CCO meeting:

Leslie K. Sakumoto, P.E. - FEMA Project Officer
Randy Tarr - City of North Las Vegas
Kevin Eubanks - Clark County Regional Flood Control District
Tom Chiatovich - City of Las Vegas
Bob Murnane - City of North Las Vegas
Phu Simpson - Clark County
Bob MacArthur, Northwest Hydraulic Consultants
Ed Wallace, Northwest Hydraulic Consultants

Intermediate CCO meeting data and attendees (if applicable):

Not applicable.

List of contacts made for the purpose of acquiring information:

Flooding sources requiring detailed study were discussed at the initial community meeting on September 7, 1994 involving representatives from FEMA, Clark County Regional Flood Control District, Clark County, City of North Las Vegas, and City of Las Vegas. Additional contacts were made with each of these agencies during the course of the study to obtain information. Additional contacts for the purpose of obtaining information were made with the US Geological Survey, Desert Research Institute, and FEMA's LMMP contractor, Ensign & Buckley Consulting Engineers.

The study contract was executed on September 25, 1995, and the first site visit and informational meetings were held on September 27 and 28, 1995. Separate meetings were held with the flood control district and each of the three communities in the study area to research available hydrologic and hydraulic

reports, design documents for flood control facilities, as-built plans for bridges and other infrastructure, and available topographic mapping and aerial photography. A second site visit for the purpose of geomorphic reconnaissance was conducted on December 6 and 7, 1995. A meeting was held with Clark County Regional Flood Control District at this time to discuss available information for the West Range Wash Diversion Dike, North Las Vegas Detention Basin and Diversion Dike, and Upper Las Vegas Detention Basin and Interception Berm; key hydrologic studies and precipitation analysis by the Corps of Engineers and NOAA; and existing sedimentation analyses for the diversion facilities.

The review of information provided by FEMA and the communities revealed gaps in the information regarding the design of the flood control facilities in the project area, including the two detention basins and three diversion dikes in the upper portion of the study area. A second site visit and meetings with Clark County Regional Flood Control District and the City of North Las Vegas were conducted on April 17 and 18, 1996. Additional information was obtained at these meetings, including review of microfiche files for the King Charles Channel, N Channel, and two bridges across Upper Las Vegas Wash. Blueline plans for these facilities were provided by the City of North Las Vegas on May 29, 1996.

Following the site review and initial hydraulic analysis, the study contractor requested additional information from the City of North Las Vegas regarding the status of the Sunrise Memorial Park development project and the control of debris in the Upper Las Vegas Wash channel. The City of North Las Vegas provided additional information in a letter dated June 21, 1996, advising the study contractor to consider the planned channel improvements at Sunrise Memorial Park in the hydraulic analysis, and that debris in the Upper Las Vegas Wash is scheduled for annual cleanup.

On August 13, 1996 the study contractor conducted a meeting with FEMA's project officer to discuss the results of preliminary hydrologic and hydraulic analysis. At this meeting, concerns were raised regarding the adequacy of available information in assessing the performance of the three diversion structures in the upper portion of the study area. The study contractor submitted preliminary hydrology and hydraulic information to FEMA on August 29, 1996 relating to these structures. In a September 12 conference call with representatives of FEMA, the study contractor was directed to assume that the Upper Las Vegas Wash Interception Berm would perform adequately in containing the base flood. It was agreed in this meeting that adequate information was not available to assess the performance of the West Range Wash Diversion Dike or the North Las Vegas Detention Basin Diversion Dike.

FEMA requested additional information from the Clark County Regional Flood Control District in a letter dated September 5, 1996, and subsequently notified the District on November 17, 1996 that work on the study had been suspended pending review of additional information on the West Range Wash Diversion Dike. FEMA's Technical Evaluation Contractor (TEC) also began research into review documentation for the North Las Vegas Detention Basin Diversion Dike. FEMA issued a Letter of Map Revision for the West Range Wash Diversion Dike on January 28, 1997, but FEMA's research (concluded in April 1997) failed to reveal adequate information regarding performance of the North Las Vegas Diversion Dike if subjected to current estimates of the 100-year discharge.

The study contractor summarized the changes in estimated 100-year discharges and concerns regarding performance of the North Las Vegas Diversion Dike in an April 28, 1997 letter to FEMA, and FEMA advised the Clark County Regional Flood Control District of the situation in a May 5, 1997 letter. The Clark County Regional Flood Control District advised FEMA in a June 26, 1997 letter that the District agreed that the impacts of sediment on the structure, and the stability of the structure if overtopped, warranted further consideration. The District undertook an independent evaluation of the diversion dike, and provided a report summarizing the results dated February 25, 1998.

To avoid delay in the completion of the study, the study contractor was directed by FEMA to complete hydraulic analysis of independent study cases with and without the North Las Vegas Detention Basin Diversion Dike.

The study contractor conducted a meeting with FEMA on December 11, 1997 and received information regarding a November 20 , 1997 LOMR issued in the study area between Lone Mountain Road and Craig Road. The study contractor conducted a site visit on December 13, 1997 to verify the conditions in the area of the LOMR and the remainder of the study area.

The study contractor met with the FEMA project officer on March 19,1998 to review the results of revised hydraulic analysis including the two cases with and without the North Las Vegas Detention Basin Diversion Dike, and the changes associated with the LOMR.

2.0 AREA STUDIED

2.1 Scope of Study

Note areas excluded from study, as well as areas of extraterritorial jurisdiction:

The study area includes the areas potentially subject to flooding from Upper Las Vegas Wash upstream of Interstate 15, including portions of the City of North Las Vegas, the City of Las Vegas, and unincorporated areas of Clark County. The study area's upstream (northwest) end is the upper end of the Upper Las Vegas Wash Interception Berm in Section 4, Range 60 East, Township 19 South in the City of Las Vegas. It extends from this point eastward to the North Las Vegas Detention Basin in the City of North Las Vegas in Section 14, Range 61 East, Township 19 South, thence southward through portions of Clark County and the City of North Las Vegas to Interstate 15 near Gowan Road in Section 11, Range 61 East, Township 20 South. The study area excludes the areas southeast of Interstate 15; northwest of the North Las Vegas Detention Basin along the West Range Wash Diversion Channel; and north of the Upper Las Vegas Wash and Upper Las Vegas Wash Interception Berm channels.

List the flooding sources studied in detail (detailed study streams should be listed in the same order as they appear in profiles). If they are also partially studied by approximate methods, provide the limits of detailed study:

The flooding source studied in detail is the portion of Las Vegas Wash generally known as Upper Las Vegas Wash, located northwest of Interstate 15, including the following channel segments as referred to in the Clark County Regional Flood Control District August 1991 Master Plan Update of the Las Vegas Valley (Reference 1):

Upper Las Vegas Wash - King Charles Channel
Upper Las Vegas Wash
"N" Channel Diversion

List the flooding sources studied by approximate methods:

None

If applicable, discuss streams on which study was terminated where the 100-year floodplain permanently narrowed to less than 200 feet wide or for which detailed study was ended where the drainage area was less than 1 square mile:

None

2.2 Community Description

Provide a general description of the community's location within the county and state:

Clark County is located in the southern tip of Nevada. The greater Las Vegas metropolitan area, including the City of Las Vegas, City of North Las Vegas, and development within the unincorporated areas of Clark County, is located in the central part of Clark County, approximately 20 miles west of Lake Mead. The study area is located in the northern portion of the Las Vegas metropolitan area.

List surrounding communities and their locations with respect to the subject community:

Surrounding communities include the town of East Las Vegas, approximately 10 miles southeast; the City of Henderson, approximately 15 miles southeast; and Boulder City, approximately 25 miles southeast.

List other nearby large cities and their locations:

Las Vegas is located approximately 250 miles northeast of Los Angeles, California; 360 miles southwest of Salt Lake City, Utah; and 340 miles southeast of Reno, Nevada.

Briefly describe the community. This description may include patterns of residential and commercial development; the extent and nature of floodplain development; natural features that affect flood hazards in the community; and sufficient description of climatic, physiographic, and land use features to support the discussion of flood problems that follows (Section 2.3).

The topographic features of Clark County are generally typical of the Basin and Range physiographic province, with north-south trending ranges. Las Vegas Valley cuts diagonally across the county, following a line of geologic deformation indicated by bending of the north-south trending ranges. Major ranges in the area include the Spring Mountain Range to the west, and the Sheep Mountain Range and Las Vegas Range to the north. The elevations of Las Vegas Valley are between approximately 3000 feet and 1800 feet (National Geodetic Vertical Datum, NGVD), and elevations of peaks in the surrounding ranges reach up to nearly 12,000 feet in the Spring Mountain Range and 10,000 feet in the Sheep Mountain Range. A series of large, coalescing alluvial fans are located along the margins of the upper portion of the valley at the base of the ranges. Much of the upper Las Vegas Valley floor is comprised of fine-grained lacustrine sediments.

Marginal areas of the upper valley, and the lower Las Vegas Valley are covered by alluvial deposits. (References 2, 3).

The climate is arid to semi-arid, characterized by infrequent rainfall, low humidity, and wide extremes in daily temperatures. Annual precipitation in the area is strongly correlated to elevation, but intense cloudburst storms are possible in all areas of the Las Vegas Valley and surrounding ranges. The Las Vegas Valley receives an average annual rainfall of approximately 4 inches, and the higher elevations in the county receive up to 20 inches. Precipitation varies greatly in any location from year to year due to local cloudburst events. The average annual temperature is approximately 66^0 F, with average daily maximums in the high 70's and average daily minimums in the mid 50's. Daily maximum temperatures usually exceed 100^0 F in the summer in the lower valley, and daily minimum temperatures drop below 20^0 F in the mountain ranges in the winter.

Vegetation is strongly zoned by elevation, with little or no vegetation on the playas, and sparse vegetation in the lower valleys. Species in the lower valleys are generally phreatophytes. Creosote bush, saltbrush, and rabbitbrush are common on the alluvial slopes, and Joshua trees, Spanish bayonet, small cacti, and blackrush grow on the middle portions of the fans. Above approximately 4,500 feet there are wooded areas of pinion and juniper (Reference 3).

The developed area of Clark County is concentrated in the Las Vegas Valley. Growth has been extremely rapid over the past 60 to 70 years, increasing from less than 5,000 in 1920 to approximately 600,000 in 1986. The current population is approximately 1.1 million. A large portion of the population is located in unincorporated areas of Las Vegas Valley. The developed area is located primarily in the lower portions of Las Vegas Valley, and is subject to runoff concentrated in the lower valley from a large surrounding geographic area. Development in the study area along Upper Las Vegas Wash, King Charles Channel, and "N" Channel includes low density residential, commercial, and industrial development. Extensive additional development, especially commercial and industrial development in North Las Vegas, is planned in the near future. This development is planned within the area formerly mapped within the 100-year flood hazard zone by FEMA in 1995 (Reference 4).

In addition to the permanent population, a large visitor population is present in the Las Vegas Valley throughout the year. The visitor population is generated primarily by the gaming and entertainment industries, which are a prime element in the County's economy.

2.3 Principal Flood Problems

Include the discharges and recurrence intervals of major floods:

Reports of flooding in the Las Vegas area date back almost 100 years. The U.S. Soil Conservation Service reviewed historical flooding in a report entitled History of Flooding, Clark County, Nevada 1905-1975 (Reference 5). This report documented 184 flood events that resulted in damages to private property and public facilities. Since 1960, the Las Vegas area has experienced at least seven floods that caused damages in excess of one million dollars, and the loss of over 22 lives in nine separate flash flood events (Reference 6).

The largest recorded flood on Las Vegas Wash occurred on July 3, 1976, when 12,000 cfs was measured at the USGS gaging station located upstream of Las Vegas Boulevard north of Las Vegas. The next largest events occurred on May 31, 1973 (1,640 cfs) , and September 25, 1967 (1,170 cfs). Although recurrence intervals for these events have previously been estimated by others (Reference 4), the construction of flood control facilities in the upper portion of the study area have altered flood flow paths and added flood storage to the extent that these estimates have little bearing on current recurrence intervals and flood discharges.

Give the location (city and state) of all stream gages for studied streams:

USGS Gages 09419648 (Las Vegas Wash above Detention Basin near North Las Vegas) and 09419650 (Las Vegas Wash at North Las Vegas) were discontinued in 1993 an 1978, respectively. There are no known active gaging stations on the studied streams.

Note any factors that aggravate flood problems:

Although flooding may occur in the study area in any season, the most severe floods are typically associated with intense cloudburst type storms that occur between July and September. This high intensity precipitation on steep mountain slopes and armored desert surfaces produces rapid, high rates of runoff. Runoff is concentrated in the lower valley where the largest population exists. There is a high potential for the public to underestimate the potential for flooding and to be unaware of floods until it is too late to avoid damages or injury. Factors that contribute to these problems include the arid nature of the area, rapid rates of runoff, localized nature of cloudburst precipitation that can result in flooding many miles away from the center of the cloudburst, and the popularity of the area with tourists.

Provide photos of flooding, flood control structures, etc. (with location of photo noted):

Principal flood control facilities in the study area include the King Charles Channel (Photo 1); "N" Channel Diversion (Photo 2); North Las Vegas Detention Basin (Photo 3); North Las Vegas Detention Basin Diversion Dike (Photo 4); Upper Las Vegas Wash Detention Basin (Photo 5); and Upper Las Vegas Wash Interception Berm (Photo 6). The West Range Wash Diversion Dike (Photo 7) is not included in the study area, but diverts flow from the West Range Wash into the North Las Vegas Detention Basin.

2.4 Flood Protection Measures

Describe all flood protection structures and floodplain management measures used to reduce potential flood damage:

The Clark County Regional Flood Control District first adopted a Flood Control Master Plan in 1986. Periodic Master Plan Updates are used to account for changes in land use, construction of new facilities, and improved data. Master planned facilities constructed in the study area include the Upper Las Vegas Wash Detention Basin and Interception Berm (1992); North Las Vegas Detention Basin and Diversion Dike (1984); King Charles Channel (Phase 1 1987; Phase 2 1990); "N" Channel Diversion (Phase 1 1987; Phase 2 1990); and the Upper Las Vegas Wash channel constructed as part of improvement plans for 142 acres between Lone Mountain Road and Craig Road (1997).

The Upper Las Vegas Wash Interception Berm is designed to intercept flows at the upper end of the study area and divert them into the Upper Las Vegas Wash Detention Basin. This basin has a low level outlet as well as a roller compacted concrete spillway. Outflows from the upper basin are confined in an incised wash channel. A diversion dike intercepts flows in this incised channel and diverts them to the North Las Vegas Detention Basin. The West Range Wash Diversion Dike runs across the face of a large alluvial fan to the east of this basin, and also diverts flows into the basin. The North Las Vegas Detention Basin has both low level and spillway outlets that discharge into the wash channel. Flows are conveyed in the natural wash channel until reaching Lone Mountain Road, where they are intercepted by a constructed channel approach to the bridge at Lone Mountain Road. A constructed channel with earth bottom (with gabion grade controls) and riprapped banks carries flows to the Craig Road bridge, where flows enter the concrete lined King Charles Channel. Flows are carried in this lined channel under the Union Pacific Railroad bridge. Downstream of the bridge, a portion of the flows are diverted into the concrete lined "N" Channel Diversion to a culvert crossing of I-15. The flows remaining in the main channel (King Charles

Channel) are conveyed in a concrete lined channel parallel to the Interstate to the confluence of the channel with the "A" Channel. The Western Tributary Channel also enters this confluence from the west.

Mention all dams, including those affecting the communities that lie outside the community:

Dams in the study area include those listed above for the North Las Vegas Detention Basin and the Upper Las Vegas Detention Basin.

Mention dams within the community used for purposes other than flood control:

None.

If levees are mentioned, state whether the levees meet or fail to meet the FEMA 3-foot freeboard requirement.

The berm along the south side of the Upper Las Vegas Wash Interception Berm meets the FEMA freeboard requirements. The Diversion Dike at the upper end of the North Las Vegas Detention Basin would not meet this criterion. In this study case, it has therefore been assumed that the dike is not in place at the peak discharge of a 100-year event.

3.0 ENGINEERING METHODS *(Note any digital methodologies used)*

3.1 Hydrologic Analyses

Describe the hydrologic analyses for all flooding sources studied in detail:

Previous hydrologic analyses conducted by the US Army Corps of Engineers (1988), James M. Montgomery (1991), Boyle Engineering Corporation (1991), and Black & Veatch (1993) were reviewed during the study (References 7,8,9,10). The previous studies considered numerous separate storm centerings to identify the storm configurations that produced the highest peak flows at various locations in the basin. These studies utilized HEC-1 models (Reference 11) to estimate peak flows for various recurrence intervals. These models were calibrated to the Corps of Engineers regional analysis curve. The conclusions of the previous studies with respect to critical storm centerings were reviewed and accepted for this study:

- the "Spring Mountain Storm" produces the highest uncontrolled peak inflows to the Upper Las Vegas Wash Interception Berm and Detention Basin;

- the "Interbasin Storm" produces the highest 100-year peak inflow to the North Las Vegas Wash Detention Basin; and

- an unnamed storm in the West Range Wash tributary area produces the highest peak inflows to the West Range Wash Diversion Dike (although the West Range Wash Diversion Dike is not a part of the study area, flows were modeled for the purpose of reviewing the potential impact of the structure's performance on flows in Las Vegas Wash downstream, and for determining flood elevations in the North Las Vegas Detention Basin).

The previously developed HEC-1 models were modified to reflect the presence and current outlet work configurations of the existing flood control facilities. In addition, the models were expanded to represent 10- and 50- year rainfall events for the Interbasin Storm, and 500-year events for the Spring Mountain, Interbasin, and West Range Wash storms.

No changes were made to the previously defined runoff and channel routing parameters (including basin areas, curve numbers, loss rates, channel geometry, channel routing parameters, or rainfall amounts). Review of the existing models indicated that these values were all consistent with the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual (Reference 12).

Changes were made in the existing HEC-1 models to reflect as-built stage storage and stage-discharge relationships for the Upper Las Vegas Wash Detention Basin (Reference 9), and to reflect the stage-discharge relationship for the modified three-pipe outlet structure at the North Las Vegas Detention Basin, including the upstream barrier wall.

Rainfall amounts for the 500-year Spring Mountain Storm, not previously modeled, were determined by extrapolation of the 10-, 50-, and 100-year rainfall amounts in previous models (Reference 7). Rainfall amounts for the 10- and 50-year Interbasin Storm events, not previously modeled, are based on the precipitation amounts for the Lower Central Valley storm (Reference 7) and the NOAA Atlas 2 (Reference 13) for Nevada, adjusted to reflect appropriate depth-area reduction factors from the Hydrologic Criteria and Drainage Design Manual. Rainfall amounts for the 500-year Interbasin Storm event were determined by extrapolation of the 10-, 50-, and 100-year rainfall amounts. Rainfall amounts for the 500-year West Range Wash storm event were determined by extrapolating rainfall amounts from the previous models for the 10-, 50-, and 100-year events.

Upstream of the North Las Vegas Detention Basin, the analyses produce results similar to the previously adopted FIS discharges for the 10- through 100-year

peak discharges. The revised hydrologic analyses produce an increase of approximately 80% over the previously adopted FIS peak discharge for the 500-year event. This change is due to a loss of flow control at the detention basins that was not addressed in previous models.

Preliminary hydraulic analysis at the North Las Vegas Detention Basin Diversion Dike indicated that a spill over the dike was likely to occur in the 100-year event. In the absence of conclusive data that this diversion dike would be stable under these conditions, the dike was assumed to not be in place for discharges equal to or greater than the 100-year peak discharge. This results in much higher flows downstream of the North Las Vegas Detention Basin for the 100- and 500- year events compared to previous estimates. Peak discharges for the 10- and 50-year events are based on routing through the North Las Vegas Detention Basin.

Peak discharges determined using HEC-1 were applied in the computation of water surface profiles for the portion of the study area upstream of the North Las Vegas Detention Basin. Downstream of this point, the 100- and 500-year peak discharges exceed channel capacity, and flows were lost from the main channel at several points. Therefore, peak discharges and flow splits in the channel and overbank areas downstream of the North Las Vegas Detention Basin were determined in the hydraulic analyses described in Section 3.2. Where significant flows were lost from the main channel, they were subtracted from the total flow downstream. Where flows were determined to re-enter the channel, they were added to the remaining flows in the main channel.

In a summary of discharges table, provide a summary of drainage area-peak discharge relationships for the streams studied by detailed methods. Discharges and drainage areas for each stream should be listed in descending order. Streams should be listed in the same order as flood profiles:

Summary of Peak Discharges (in cfs) for Las Vegas Wash

Location	Storm Area, sq.mi. [a]	Storm Return Period 10-year	50-year	100-year	500-year
King Charles Channel below N Channel	54.4 [b]	1,025	1,746	4,623 [d]	5,833 [d]
N Channel					
I-15 to Donovan Road	NA	258	437	1,975 [d]	2,526 [d]
Donovan Road to King Charles	NA	258	437	1,156 [d]	1,248 [d]
Downstream of North Las Vegas Detention Basin	54.4 [b]	1,281	2,183	8,536	17,855
Downstream of North Las Vegas Detention Basin Diversion Dike	54.4 [b]	0	0	8,536	17,855
Inflow to North Las Vegas Detention Basin	54.4 [b]	2,939	6,751	8,343	8,343
Outflow from Upper Las Vegas Wash Detention Basin	136.3 [c]	2,426	3,888	5,019	19,217
Inflow to Upper Las Vegas Wash Detention Basin	136.3 [c]	3,465	10,312	14,737	24,938

a Storm area is smaller than total tributary area
b Reference 10
c Reference 8
d Discharges based on upstream flow splits from hydraulic analysis

If applicable, discuss methods used to determine stillwater elevations and reference the Summary of Stillwater Elevations table:

Not applicable.

3.2 Hydraulic Analyses

State how cross sections were developed for all streams studied by detailed methods:

Cross sections were developed from four primary sources:

- aerial photogrammetry;
- field surveys;
- as-built plans for flood control facilities; and
- improvement plans for streets, bridges and development areas.

Aerial photogrammetry was used to develop topographic maps of the study area with a contour interval of 4 feet (Reference 13). Cross sections were developed by photogrammetric methods for most of the upper portion of the study area where there are few flood control channel improvements. Additional cross sections were developed directly from the aerial topographic mapping where determined necessary based on preliminary hydraulic analyses. Additional field surveys were conducted to obtain elevations for the bridge crossings of Upper Las Vegas Wash at Lone Mountain Road, Craig Road, and the Union Pacific Railroad Bridge. Field surveys were also conducted to increase the density of topographic data near the intersection of Losee Road and Lone Mountain Road, where flows from the wash cross Losee Road in two low water crossings. As-built plans for the King Charles Channel (References 14, 15), Improvements for 142 acres at Losee Road and Craig Road (Reference 16), Lone Mountain Road Bridge (Reference 17), North Las Vegas Detention Basin (Reference 18), Upper Las Vegas Wash Detention Basin and Interception Berm/Channel (Reference 19) were used to develop cross sections in these areas.

The following table describes the cross section data used:

Cross Section Station	**Data Source**
1+50 to 37+20	As-built plans - King Charles Diversion Channel Phase 1
37+20 to 58+53	As-built plans - King Charles Diversion Channel Phase 2; field survey at UPRR bridge
58+53 to 86+82	As-built improvement plans - 142 acre development at Losee Road and Craig Road; field survey at Craig Road bridge

87+80 to 88+61	As-built plans - Lone Mountain Road Bridge; field survey at Lone Mountain Road bridge; As-built improvement plans - 142 acre development and Losee Road and Craig Road
91+20	Aerial photogrammetry
92+37 to 94+29	Aerial topographic mapping
101+55 to 141+67	Aerial photogrammetry
143+68	Aerial topographic mapping
151+14	Aerial photogrammetry
156+67	Aerial topographic mapping
165+46 to 184+36	Aerial photogrammetry
184+62 to 192+15	Aerial topographic mapping
198+02 to 263+83	Aerial photogrammetry
270+00 to 273+03	Aerial topographic mapping
289+03 to 309+35	As-built plans - Las Vegas Detention Basin Flood Control Project
312+35 to 315+00	Aerial topographic mapping
320+44 to 555+70	Aerial photogrammetry
560+10 to 564+87	As-built plans - Upper Las Vegas Detention Basin and Interception Berm/Channel
59+059 to 749+97	Aerial photogrammetry

Describe how the dimensions of hydraulic structures were determined:

The dimensions of major hydraulic structures, including the outlet dams and outlet works for the two detention basins and their interception and diversion channels, were determined from as-built drawings. Field surveys were completed at all bridge crossings.

Explain how channel roughness factors (Manning's "n") were assigned. The "n" values for ALL streams studied by detailed methods (channel and overbank areas) should be given:

Channel roughness factors were determined based on standard hydraulic engineering references (References 20, 21), engineering judgment, and field observations. Limited sensitivity testing was conducted during hydraulic modeling to determine the effect of a range of 'n' values on model results. Final model roughness values were selected to represent a combination of roughness due to vegetation, bed and bank material, and bed form irregularity. The depth of flow was also considered in selecting appropriate 'n' values. The following Manning's 'n' values were assigned to various channel and overbank areas:

Channel/Overbank Type	**Manning's 'n'**
Concrete lined channel	0.014 to 0.017
Developed overbanks (Primarily pavement areas, smooth earth, or sparse landscaping)	0.030 to 0.035
Earth channels (constructed)	0.030
Unimproved wash channels (with vegetation)	0.040 to 0.045
Industrial lots (with obstructions)	0.045

State how water surface elevations were obtained for all streams studied by detailed methods:

The US Army Corps of Engineers HEC-2 program (Reference 22) was used as the primary tool for computation of water surface profiles for this study. This model was run in both subcritical and supercritical modes for various reaches of the study area. The results of the HEC-2 model were supplemented by independent calculations at bridges and culverts using the Federal Highway Administration HY-8 program (Reference 23) and by hand. Shallow overbank flooding depths and velocities were computed in some areas by hand using normal depth computations from Manning's equation.

Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals. The 10- and 50-year peak discharges on the "A" Channel were found to produce backwater in the lower portion of the King Charles Channel with higher water surface elevations than HEC-2 models for the corresponding recurrence intervals on the King Charles Channel. The water surfaces from backwater on the "A" Channel are shown in the profiles for these recurrence intervals. Maximum basin stages in the North Las Vegas Detention Basin and Upper Las Vegas Detention Basin computed using the HEC-1 models, produced higher water surface elevations for the 50-, 100-, and 500-year flood events than the HEC-2 models for the portions of the wash immediately upstream of the basins. These elevations are reflected on the profiles.

The starting water surface elevations for the Upper Las Vegas Wash at the confluence with the "A" Channel were calculated using the slope area method. Water surface elevations at the "N" Channel were computed using supercritical profiles. These starting water surfaces match the water surface elevations calculated at the diversion from the King Charles Channel. Starting water surface elevations at the North Las Vegas Detention Basin were derived from HEC-1 routing of flows through the basin. The starting water surface elevations were taken as the basin stage at the time of the peak discharge. The starting water surface elevations in Upper Las Vegas Detention Basin were computed using the same methods.

The hydraulic analyses for this study were based on unobstructed flow through the wash and hydraulic structures except at Lone Mountain Road Bridge. Lone Mountain Road Bridge is the first bridge that Upper Las Vegas wash passes through moving downstream, and is subject to high debris and sediment loads from the wash. The bridge is subject to pressure flow at the 100- and 500-year peak discharges. Under these conditions, the capacity of the bridge to transport large bed load sediments will be less than the capacity of the inflowing channel. Due to the high availability of cobble sized bed load that can be generated by progression of existing headcuts upstream of the bridge, the bridge opening was assumed blocked during the 100- and 500-year peak discharges.

The HEC-2 models and the HY-8 program were used to define the locations where channel and hydraulic structure capacities were inadequate to convey the peak flood discharges for various recurrence intervals. Where overbank flows remained hydraulically connected to the main wash or channel flows, the overbank flows were modeled with HEC-2, and the results used to delineate AE flood hazard zones. Where breakout flows were determined likely to become hydraulically separated from the main wash or channel, the breakout flow depths and velocities were estimated using normal depth computations, and the results of these computations used to delineate AO flood hazard zones. Breakout flows occur at

the 100- and 500-year flood discharges near Azure and Losee Road, Lone Mountain Road, Craig Road, and the UPRR Bridge. A portion of these flows return to the main channel downstream in various locations within the study area. Overflow magnitudes were determined using HEC-2 and hand calculations. For determination of the profiles in the main channel or wash downstream of breakout flows, the overflow was subtracted from the total flow upstream. Flows in the HEC-2 models decrease in a downstream direction as overflows are progressively subtracted from the main flow area at subsequent breakout locations.

Average 100-year flow depths in overflow areas were determined using normal-depth calculations. Areas of inundation for the 500-year flood discharge were determined by approximate methods using a combination of normal depth calculations, review of available topographic mapping, and field observation.

Shallow flooding is often characterized by highly unpredictable flow directions caused by low relief or shifting channels and high debris loads. Where such conditions exist, the entire area susceptible to this unpredictable flow was delineated as a zone of equal risk. Small scale topographic variations were averaged across inundated areas to determine flood depths.

Describe the methodology for wave height/runup, lacustrine, ice jam, alluvial fan flooding, and shallow flooding areas (where applicable):

Not applicable.

If applicable, reference the Transect Descriptions which should include: transect number, location, 100-year stillwater elevation, and maximum 100-year wave elevation.

Not applicable.

If performed, describe the hydraulic analyses for the approximate flooding sources:

No approximate flooding sources studied.

If applicable, reference the Transect Data Table which should include: Flooding Source (with the affected transects), 10-, 50-, 100-, and 500-year stillwater elevation, zone designation and Base Flood Elevation.

Not applicable.

If applicable, reference the Transect Location Map.

Not applicable.

Standard paragraphs in this section include paragraphs for cross sections, NGVD, and unobstructed flow.

No modifications required to standard paragraphs, except Lone Mountain Road Bridge assumed blocked for the 100- and 500-year peak discharges as described above.

Specify whether elevations are referenced to NGVD or NAVD or other datum, and give releveling dates, if any.

All elevations are referenced to NGVD (1929).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

4.1 Floodplain Boundaries

Identify all maps used. Include the scale, contour interval, and type of map (topographic, compiled from aerial photographs, etc):

Flood boundaries for the 100- and 500-year flood events in the Upper Las Vegas Wash were delineated on 1:4,800 scale topographic map with a contour interval of 4 feet (reference 24). Flood boundaries for the 500-year flood event located outside the extent of this mapping were delineated on the topographic mapping developed for the City of North Las Vegas at a scale of 1:4,800 with a contour interval of 2 feet (reference 25) and USGS quadrangle topographic maps, 1:24,000 (reference 26 and 27).

Cross sections within the unimproved areas of the wash were obtained by aerial photogrametry and interpolated from topographic maps. Cross sections at structures were obtained from as-built plans and verified by field inspections and surveys.

There is a datum difference between the NGVD 1929 and NAVD 1988 mapping from ranging 2.41 to 2.46 feet in the Upper Las Vegas Wash. The average difference between the control points was 2.43 feet. Therefore, 2.43 feet was subtracted from the photogrametric control and the ERM elevations to convert from NAVD 1988 to NGVD 1929. Cross section elevations obtained from NAVD 1988 topographic mapping used in the hydraulic models were converted to NGVD 1929 by subtracting 2.4 feet.

Identify and reference all maps or methods used to delineate floodplain boundaries for approximate flooding sources:

Not applicable.

4.2 Floodways

List streams, if any, for which floodway widths extend beyond the corporate limits:

No floodway determined.

List streams affected by backwater:

The lower portion of the King Charles Channel is affected by backwater from the "A" Channel for the 10- and 50-year peak discharges. These two channels have their confluence at the study area downstream boundary near Interstate 15. The "A"Channel backwater elevations for the 10- and 50-year peak discharges were extended upstream to intersect with the computed water surface elevations in the King Charles Channel for the corresponding recurrence intervals.

Provide method used for floodway computations:

No floodway determined.

Give reason why no floodway was delineated for streams or portions of streams:

Determination of a floodway was discussed, but not requested by community at the initial CCO meeting, due to anticipated confinement of 100-year flood in natural and constructed channel boundaries. The FEMA Project Officer agreed that a floodway was not required.

Identify any abnormal procedures (such as state-imposed surcharges of less than 1.0 foot) for floodway delineations:

No abnormal procedures.

7.0 OTHER STUDIES

Identify and reference all other FISs for contiguous communities and any other published reports or available data dealing with related flooding sources. All disagreements and discrepancies must be noted and resolved:

This report is for a restudy of one of the streams covered in the current Flood Insurance Study for Clark County, Nevada and Incorporated Areas (Reference 4). Changes in discharges and water surface profiles in this study are due to the recent construction of flood control facilities.

8.0 BIBLIOGRAPHY AND REFERENCES

List references with complete information, including date, place of publication, and scale (as applicable):

1. Clark County Regional Control District, August 1991 Master Plan Update of the Las Vegas Valley, 1991

2. U.S. Department of the Interior, Geological Survey, Geologic Map of Clark County, Nevada, Scale 1: 250,000, Contour interval 500 feet, 1964

3. Nevada Bureau of Mines and Geology, Bulletin 62, Geology and Mineral Deposits of Clark County, Nevada, 1965

4. Federal Emergency Management Agency, Flood Insurance Study, Clark County Nevada and Incorporated Areas, 1995

5. U.S. Department of Agriculture, Soil Conservation Service, History of Flooding, Clark County, Nevada 1905 -1975, 1976

6. Clark County Regional Flood Control District, Annual Report 1992-1993, 1993

7. U.S. Department of the Army, Corps of Engineers, Hydrologic Documentation for Feasibility Study, Las Vegas Wash and Tributaries, 1988

8. James M. Montgomery, Las Vegas Valley Flood Insurance Study Hydrology Report, 1991

9 Boyle Engineering Corporation, Western and Eastern Tributaries of Range Wash Flood Control Facility Plan, 1991

10. Black & Veatch, North Las Vegas Detention Basin Outlet Modification Report, 1993

11. U.S. Department of the Army, Corps of Engineers, HEC-1 Flood Hydrograph Package Users Manual, 1987

12. Clark County Regional Flood Control District, Hydrologic Criteria and Drainage Design Manual, 1990

13. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Precipitation-Frequency Atlas of the Western United States, 1973

14. James M. Montgomery Consulting Engineers, Inc., King Charles Diversion Channel from N-Channel Phase I, 1987

15. James M. Montgomery Consulting Engineers, Inc., King Charles Diversion Channel from N-Channel Phase II, 1990

16. BSI Consultants, Inc., 142 Acres at Losee and Craig Road Site Improvement Plans, As-built drawings, 1997

17. Church Engineering, Inc., Lone Mountain Road Bridge Plans, 1991

18. Montgomery Engineers of Nevada Consulting Engineers, Las Vegas Wash Detention Basin and Interception Control Project drawings, 1983

19. Black & Veatch, Upper Las Vegas Wash Detention Basin and Interception Berm/Channel Plans, As-built drawings, 1993

20. Chow, Ven Te, Open-Channel Hydraulics, McGraw-Hill Publishing Company, 1959

21. French, Richard H., Open Channel Hydraulics, McGraw-Hill Book Company, 1985

22. U.S. Department of the Army, Corps of Engineers, HEC-2 Water Surface Profiles User's Manual, 1990

23. Federal Highway Administration, HY-8 computer program

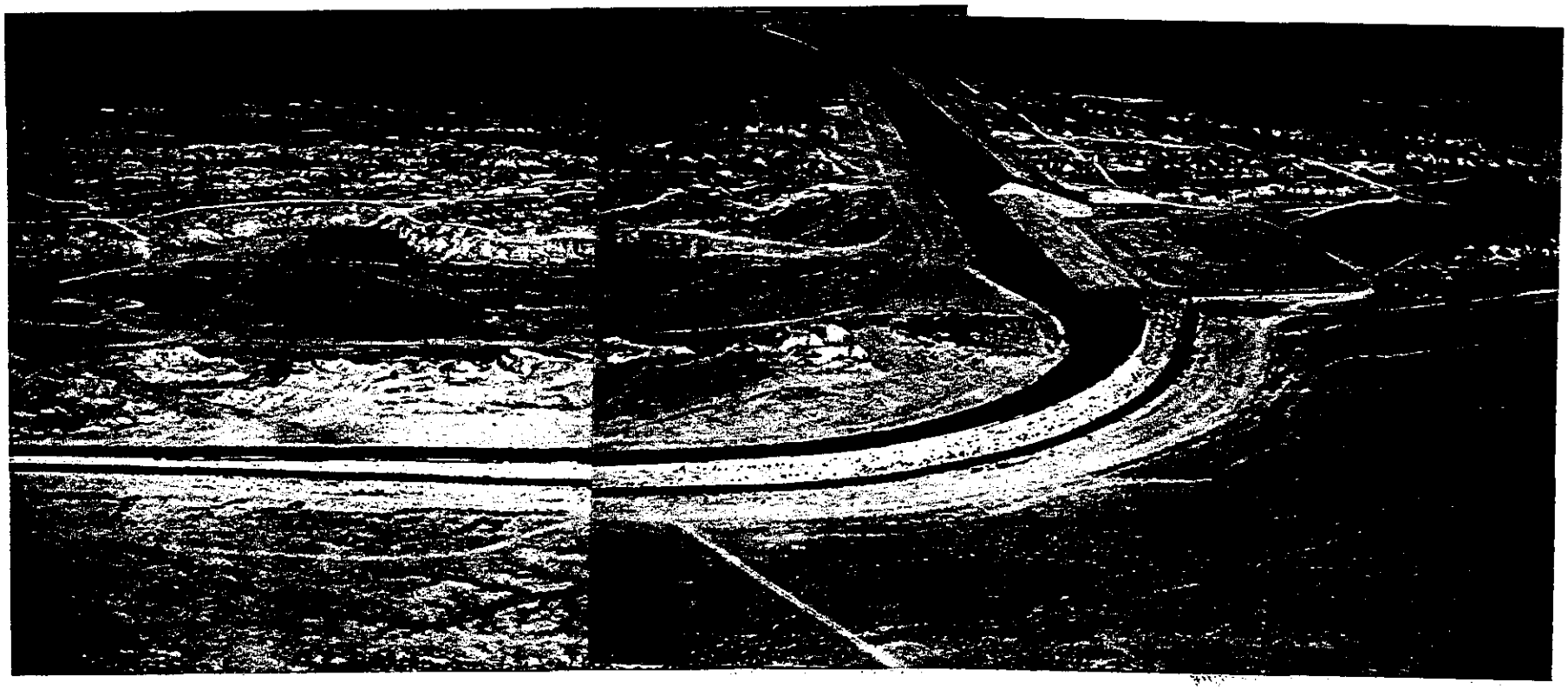
24. Kenney Aerial Mapping, Inc., Topographic Mapping of the Upper Las Vegas Wash, Scale 1:4800, Contour Interval 4 feet, NGVD 1929, 1996

25. Kenney Aerial Mapping, Inc., Topographic Mapping for the City of North Las Vegas, Scale 1:4800, Contour Interval 2 feet, NGVD 1929, 1996

26. US Geological Survey, Valley Quadrangle, Clark County, Nevada, Scale 1:24000, Contour Interval 20 feet, NGVD 1929, 1982

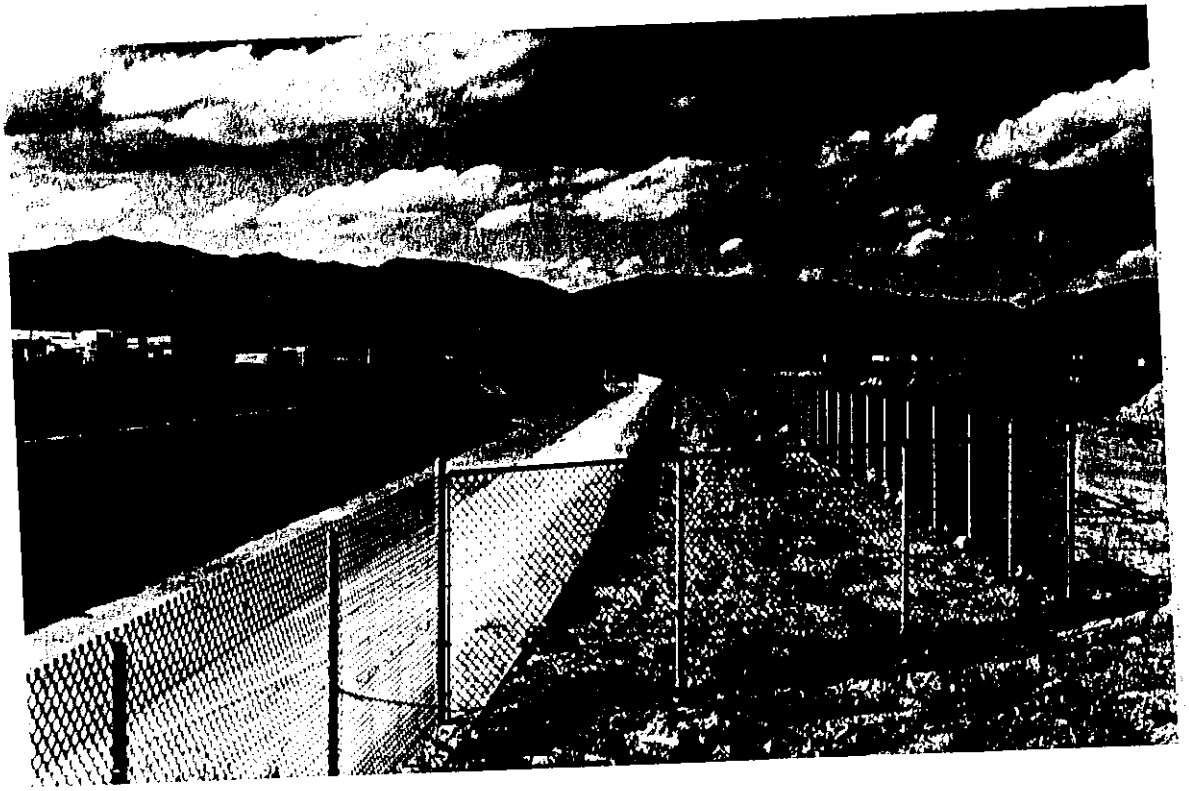
27. US Geological Survey, Las Vegas NE Quadrangle, Clark County, Nevada, Scale 1:24000, Contour Interval 10 feet, NGVD 1929, 1984

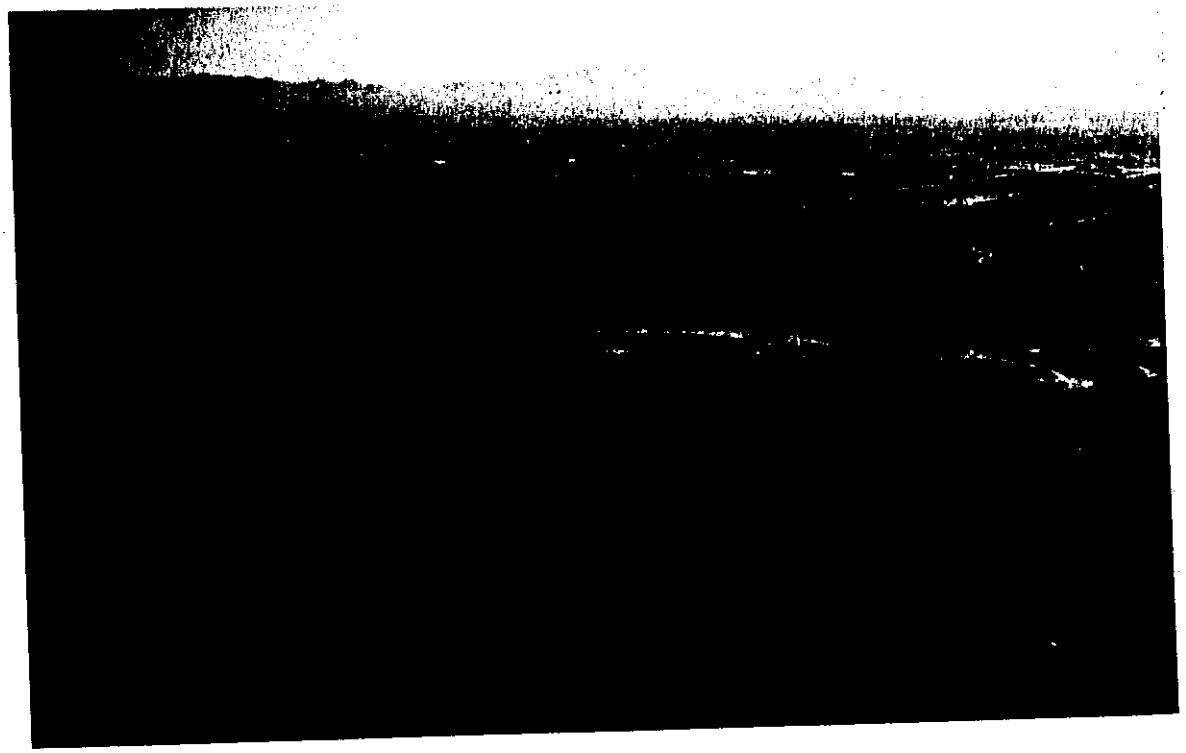
Original Photographs included in other binder

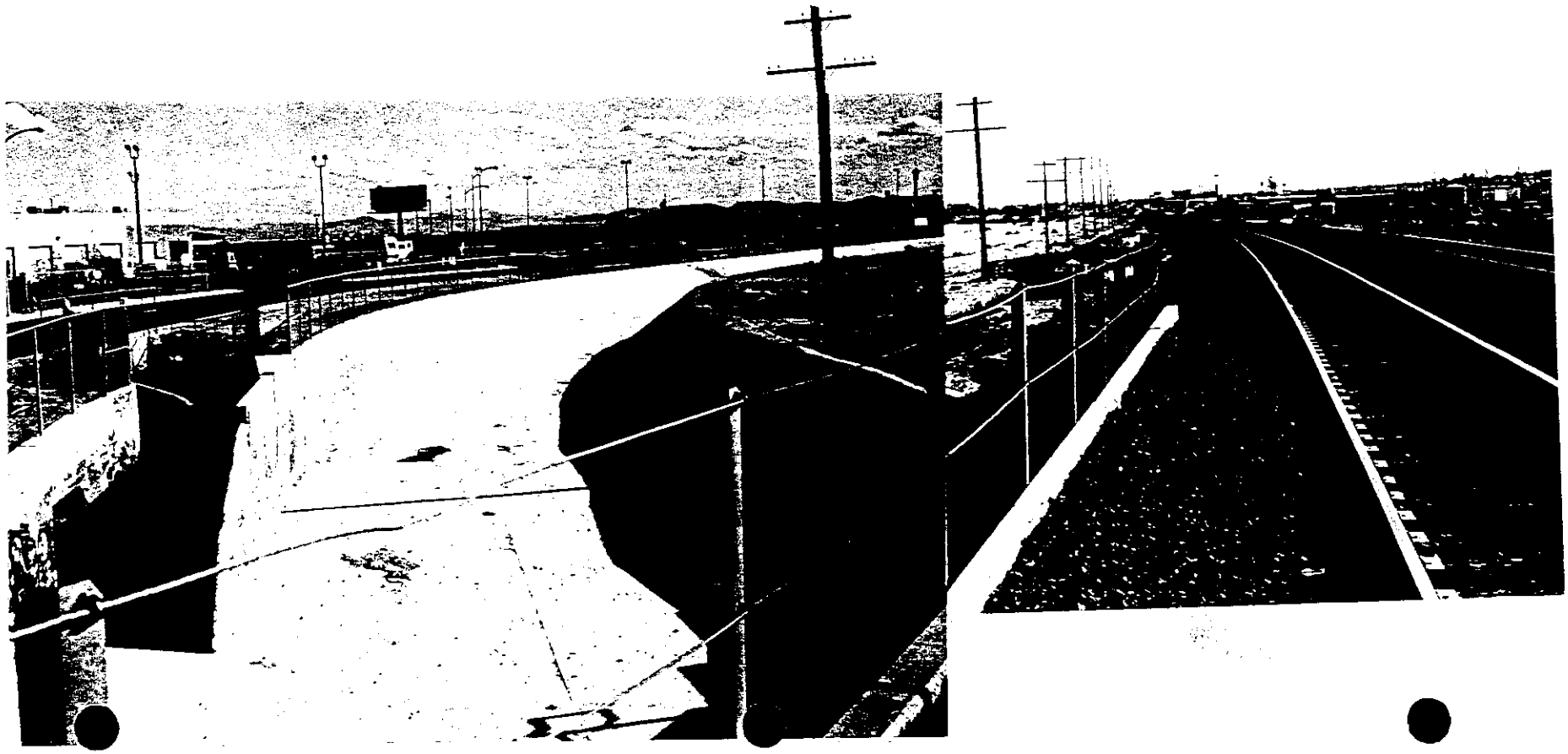


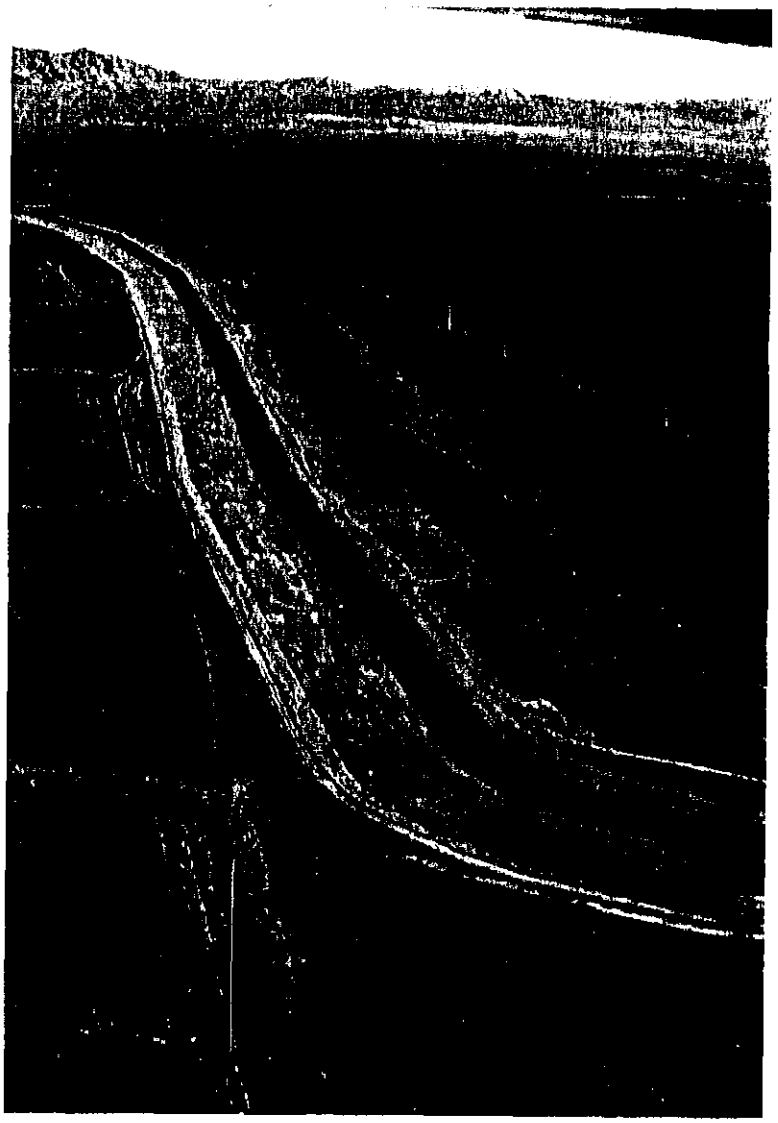












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Transfer Format:	DWG
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Intended Use:	FIS Figure
Data set extent:	N/A
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Intended Scale of Use:	1 inch = 400 feet Horizontal, 1 inch = 10 feet Vertical 1 inch = 100 feet Horizontal, 1 inch = 5 feet Vertical
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Horizontal Datum:	N/A

Vertical Datum:	National Geodetic Vertical Datum of 1929
Projection Units:	Feet
Zone Number:	N/A
Coordinate Precision:	N/A
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain
Policy Status:	N/A

Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors
Source Name:	AutoCad R12
Source Scale:	1:4800H, 1:120V, 1:1200H, 1:60V
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Date of Source Material:	22, April, 1998
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Metadata Contact:	Edward E. Wallace

ELEVATION IN FEET (NGVD)

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950

STREAM DISTANCE IN FEET

0 400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200

Backwater from
A Channel
for 10 and 50
Year Flood Events

N Channel Diversion

UPRR

A B C D E F G H I J K L

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

1P

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

FLOOD PROFILES

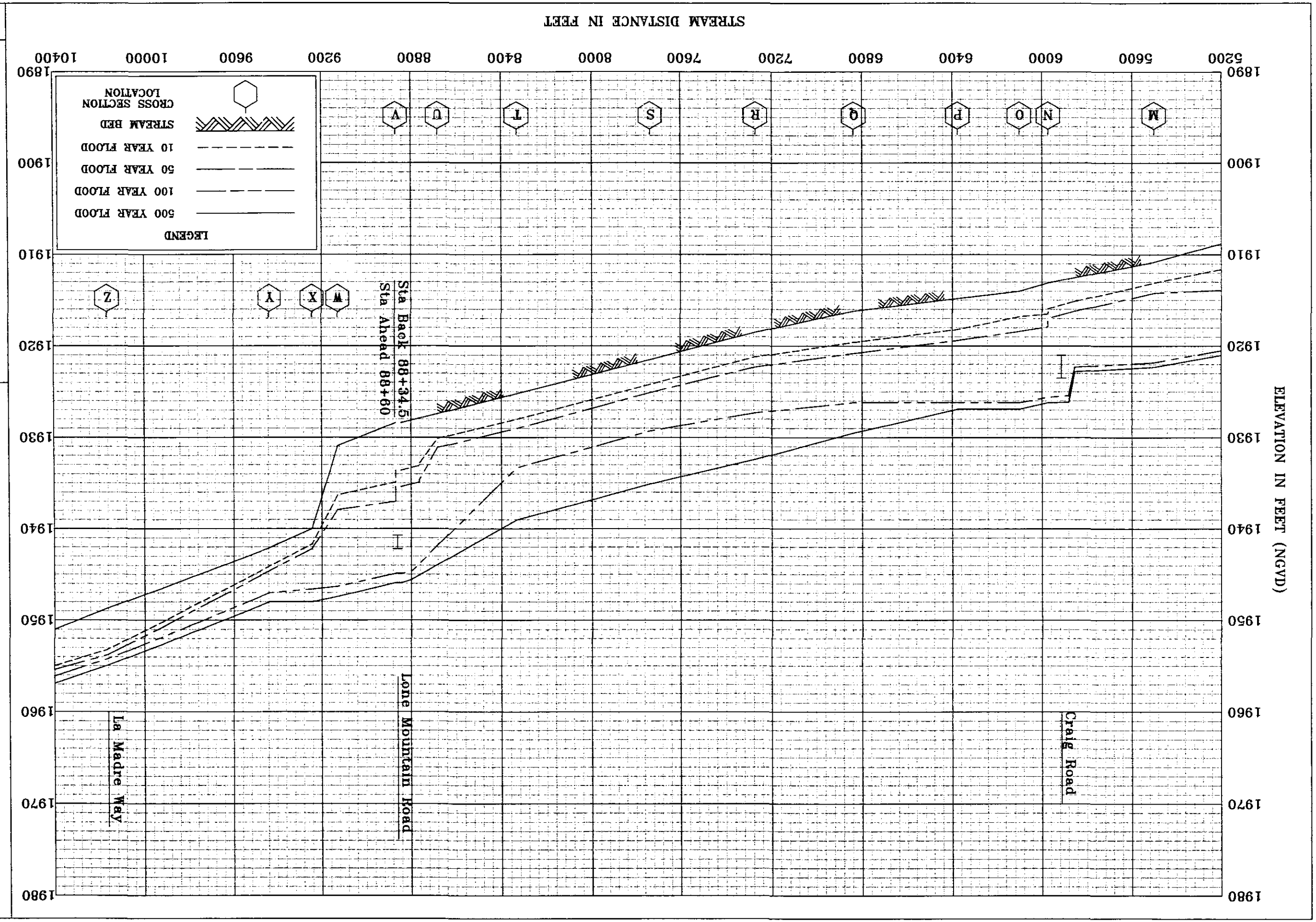
UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY



FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

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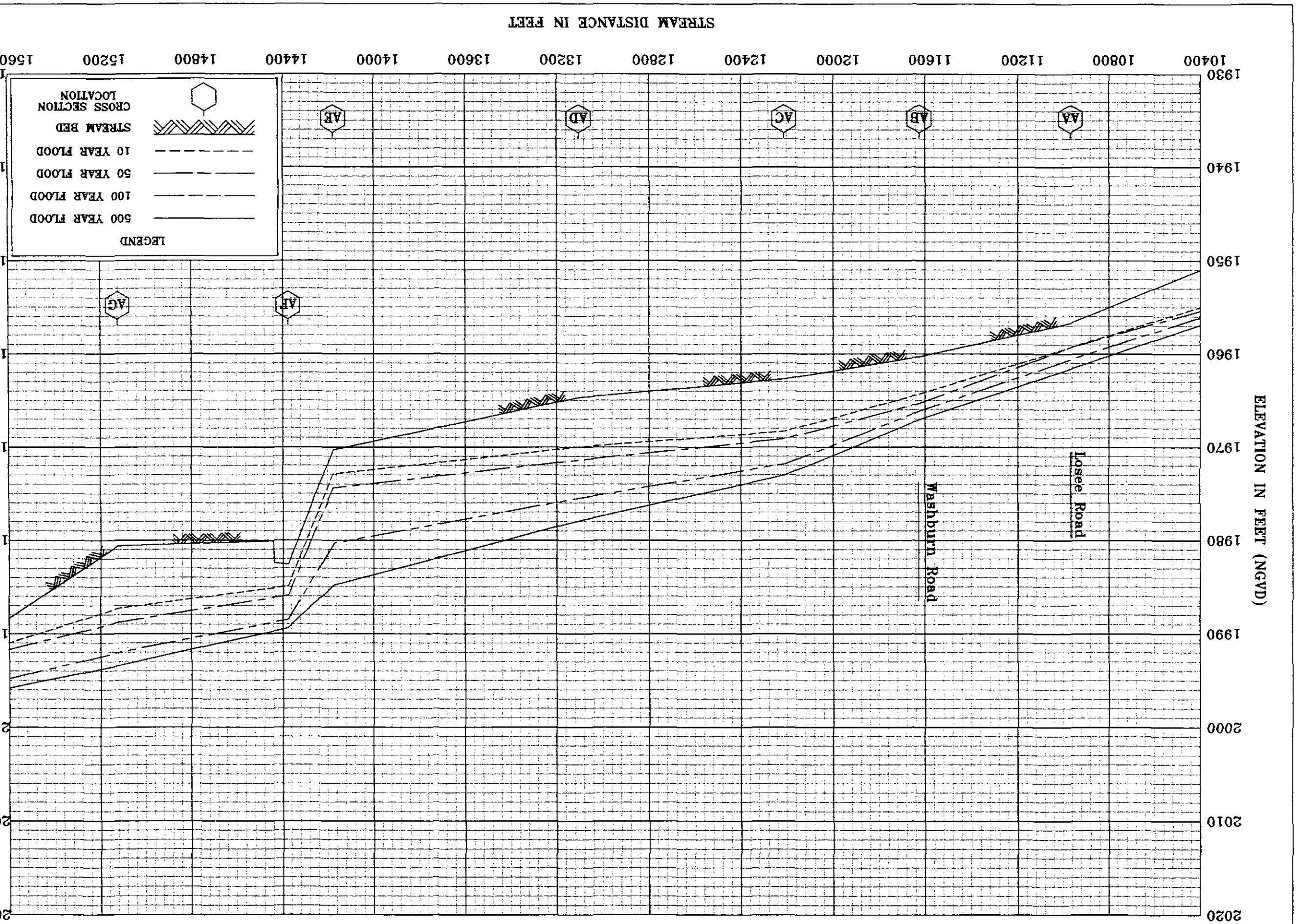
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CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

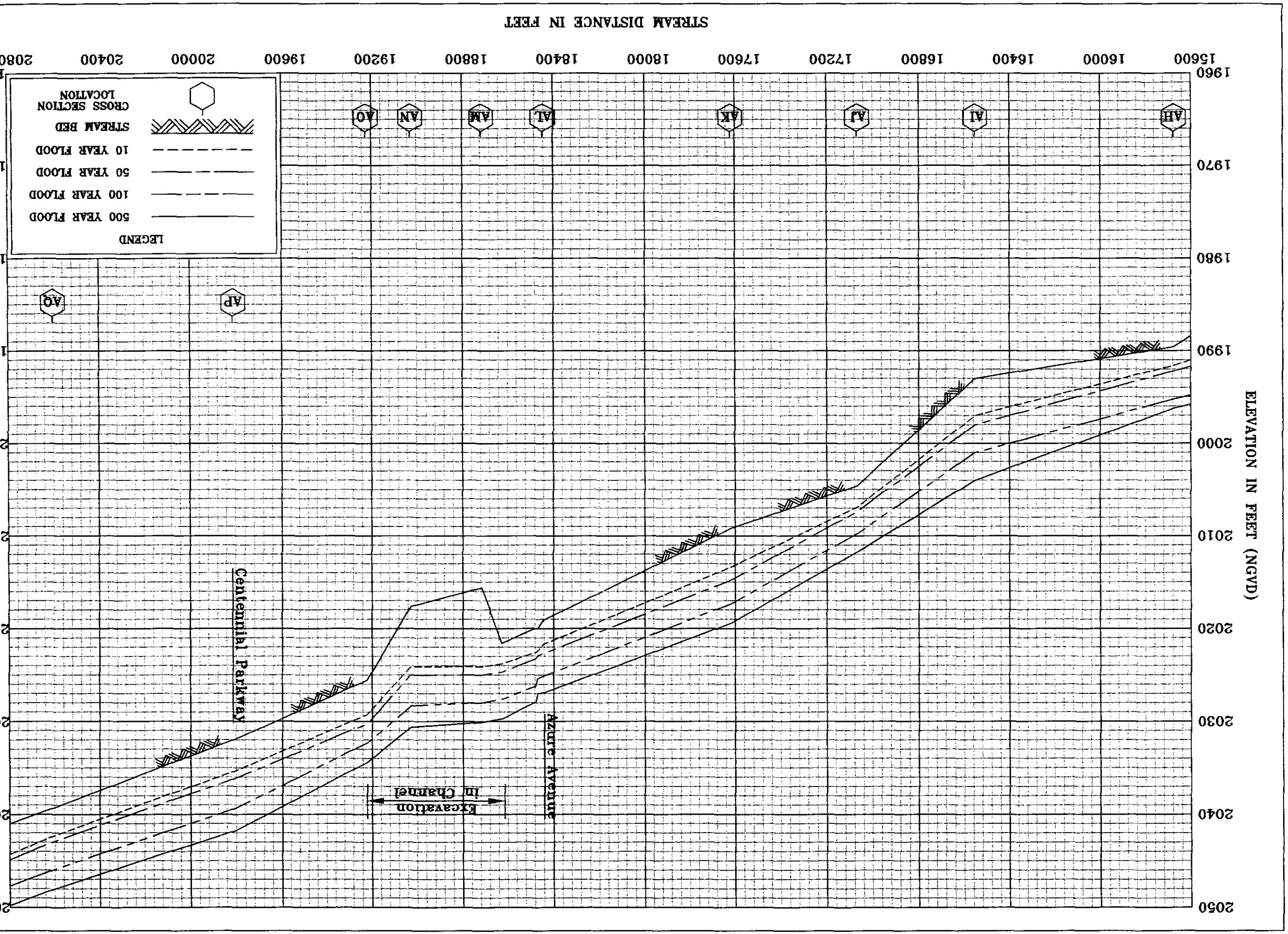
Without North Las Vegas Detention Basin Diversion



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City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY



FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

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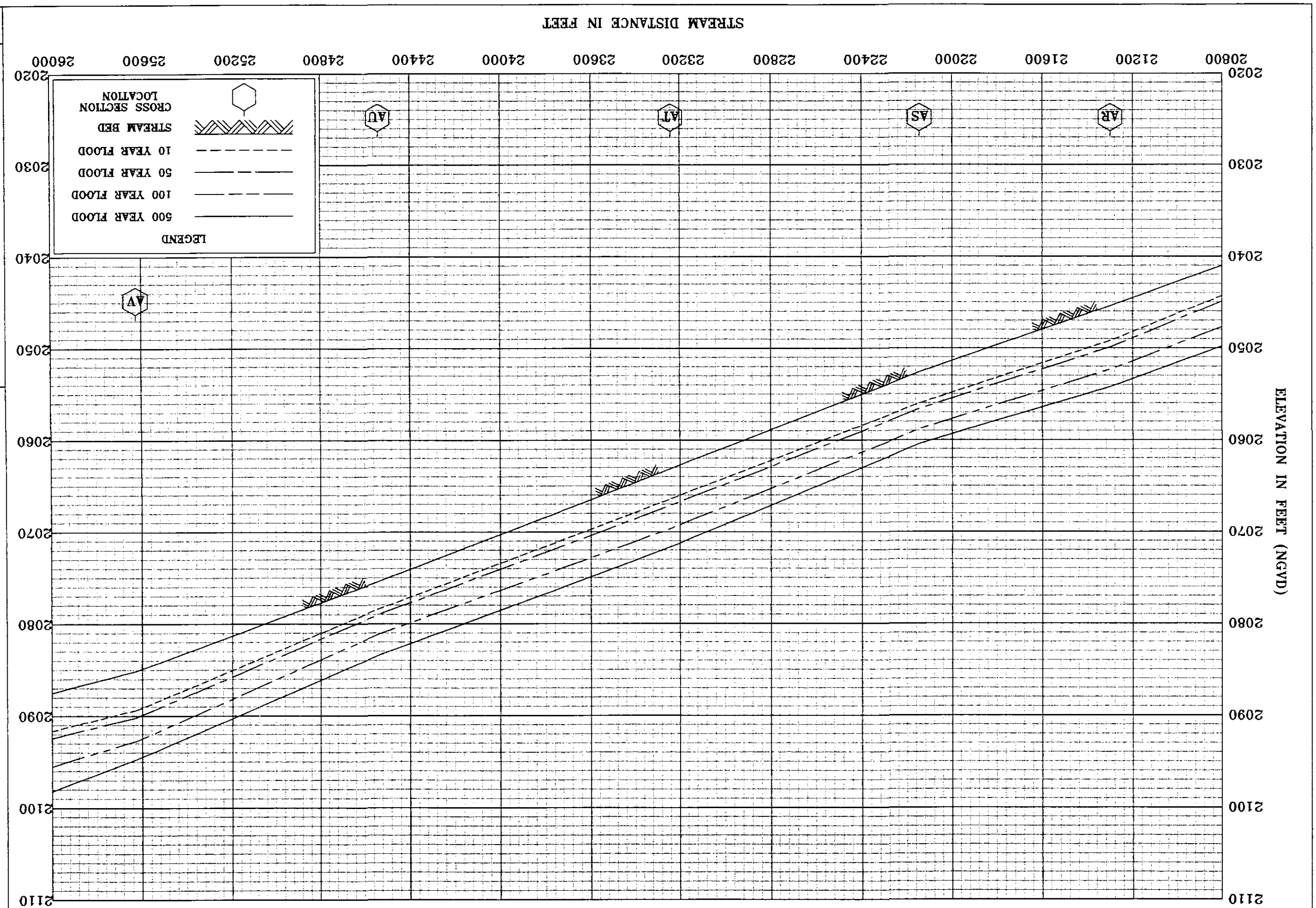
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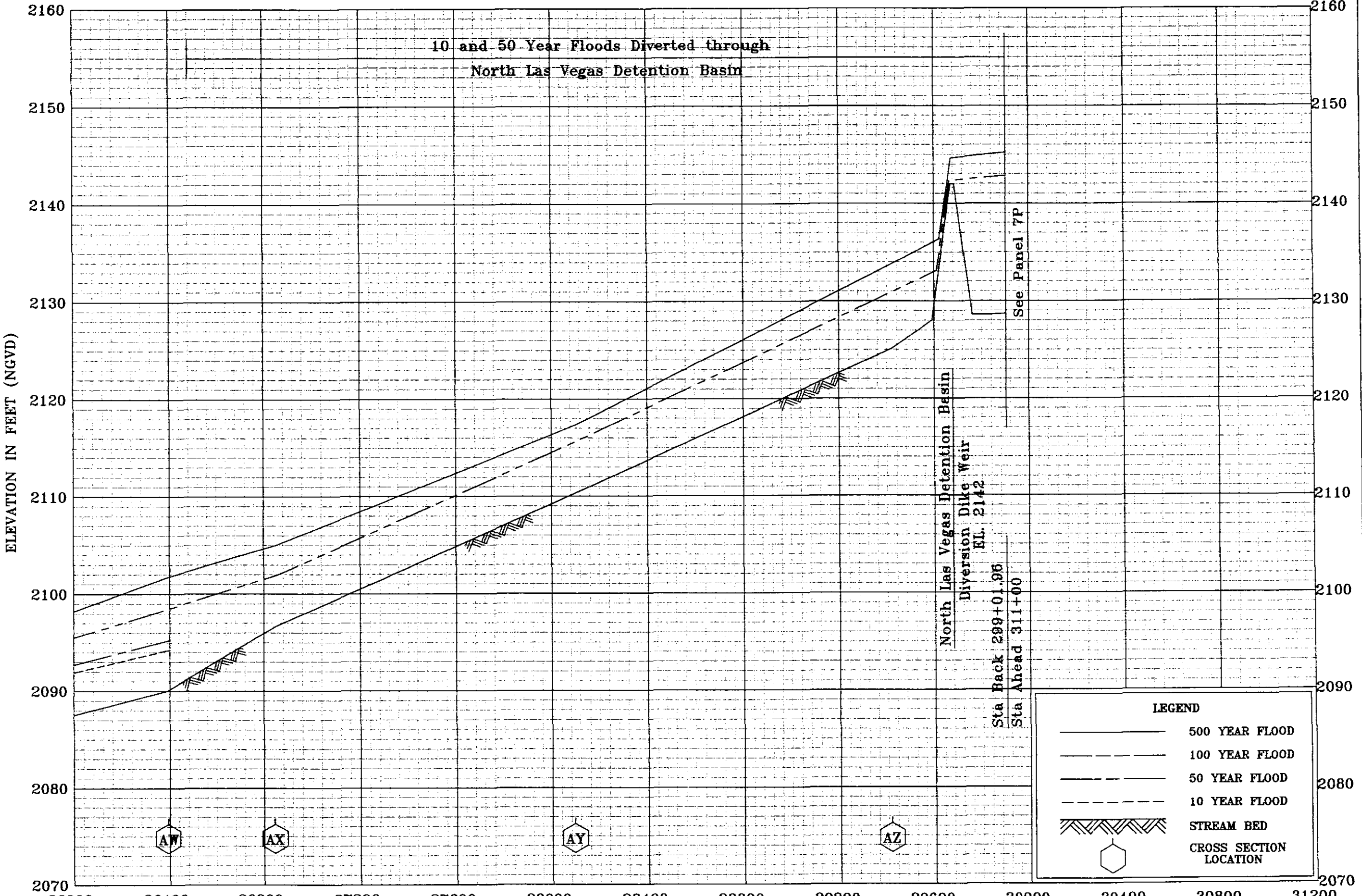
CLARK COUNTY

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FLOOD PROFILES





FLOOD PROFILES

UPPER LAS VEGAS WASH

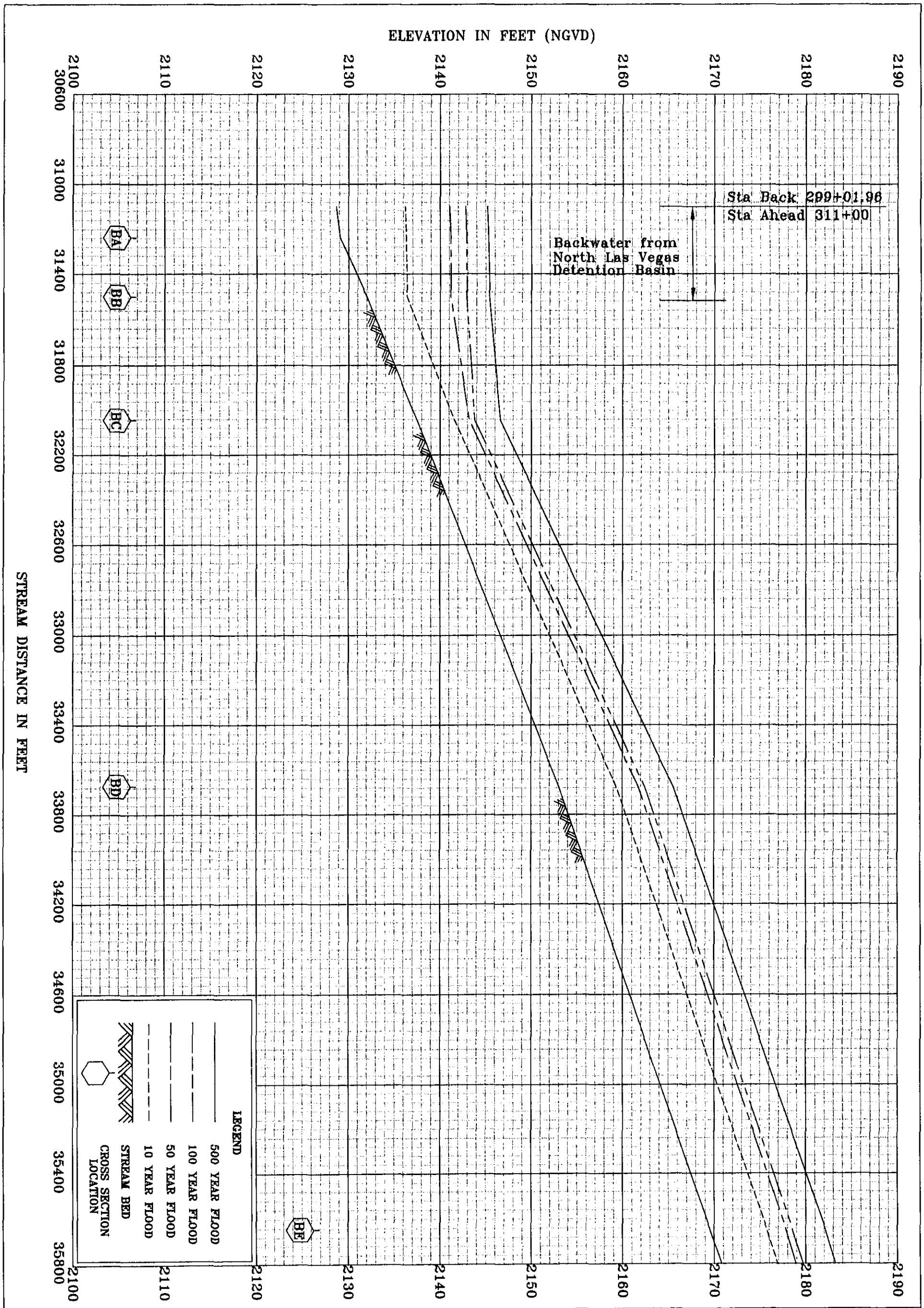
Without North Las Vegas Detention Basin Diversion

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City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

6P



7P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

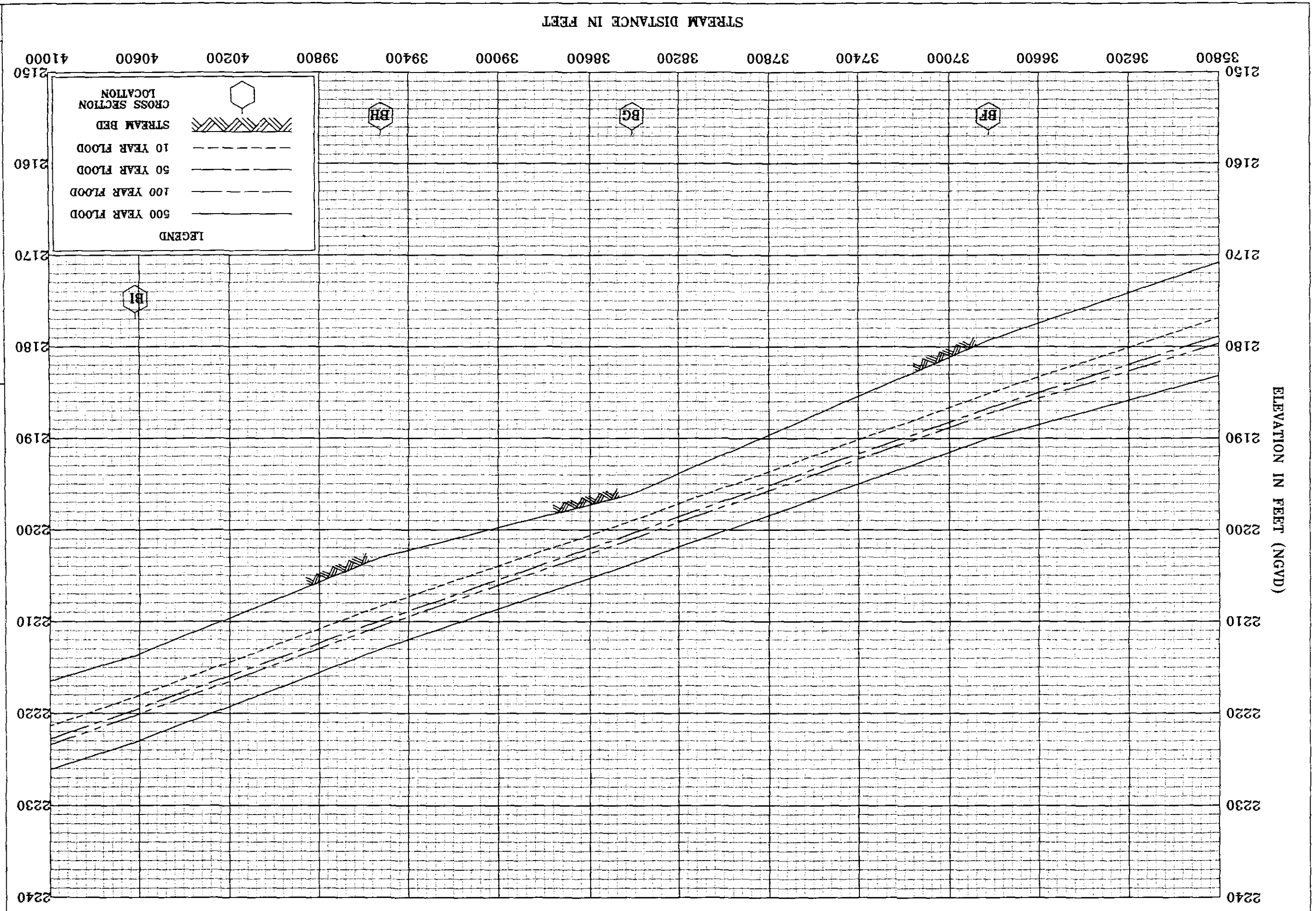
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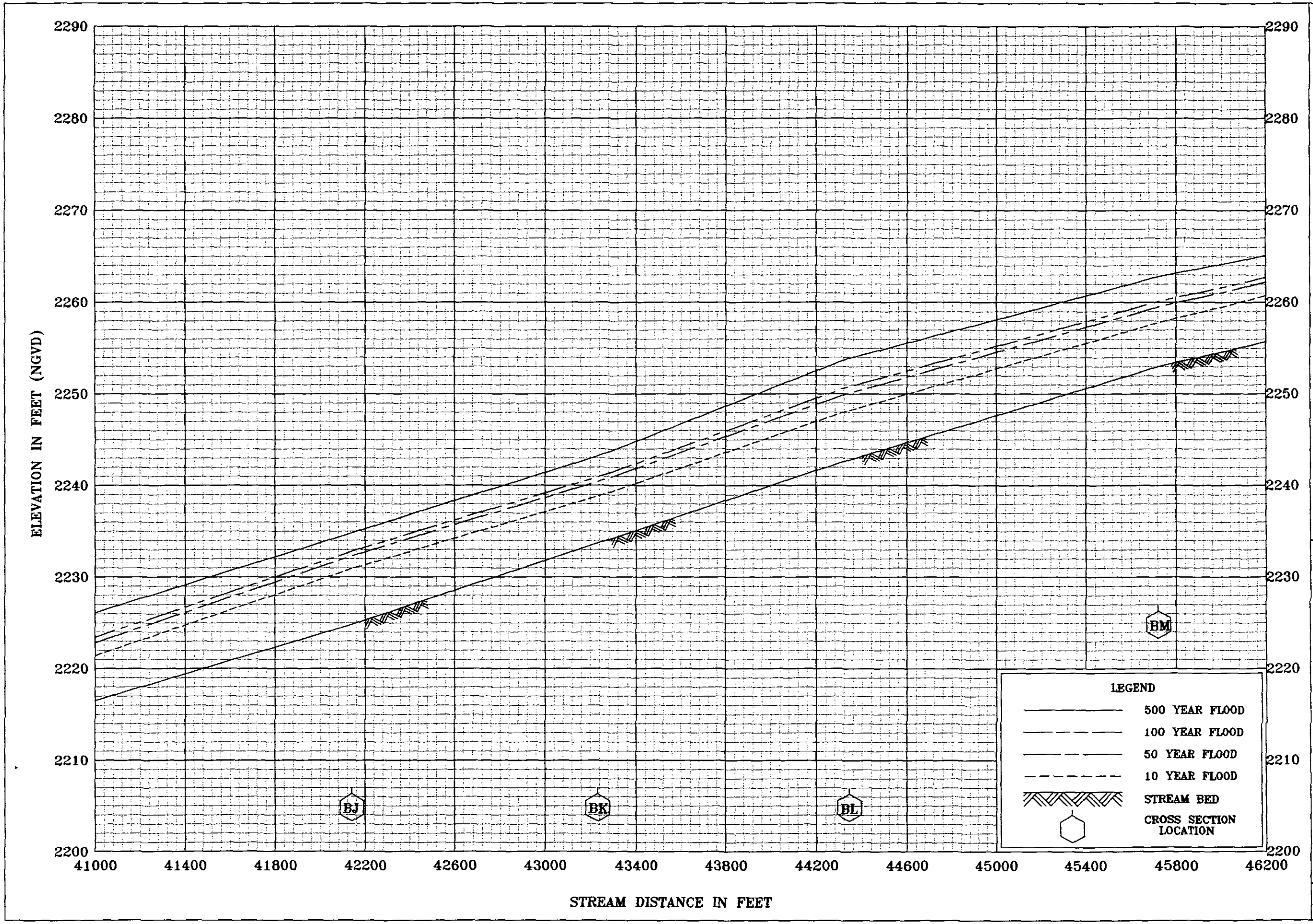
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CLARK COUNTY

Without North Las Vegas Detention Basin Diversion

UPPER LAS VEGAS WASH

FLOOD PROFILES





FLOOD PROFILES

UPPER LAS VEGAS WASH

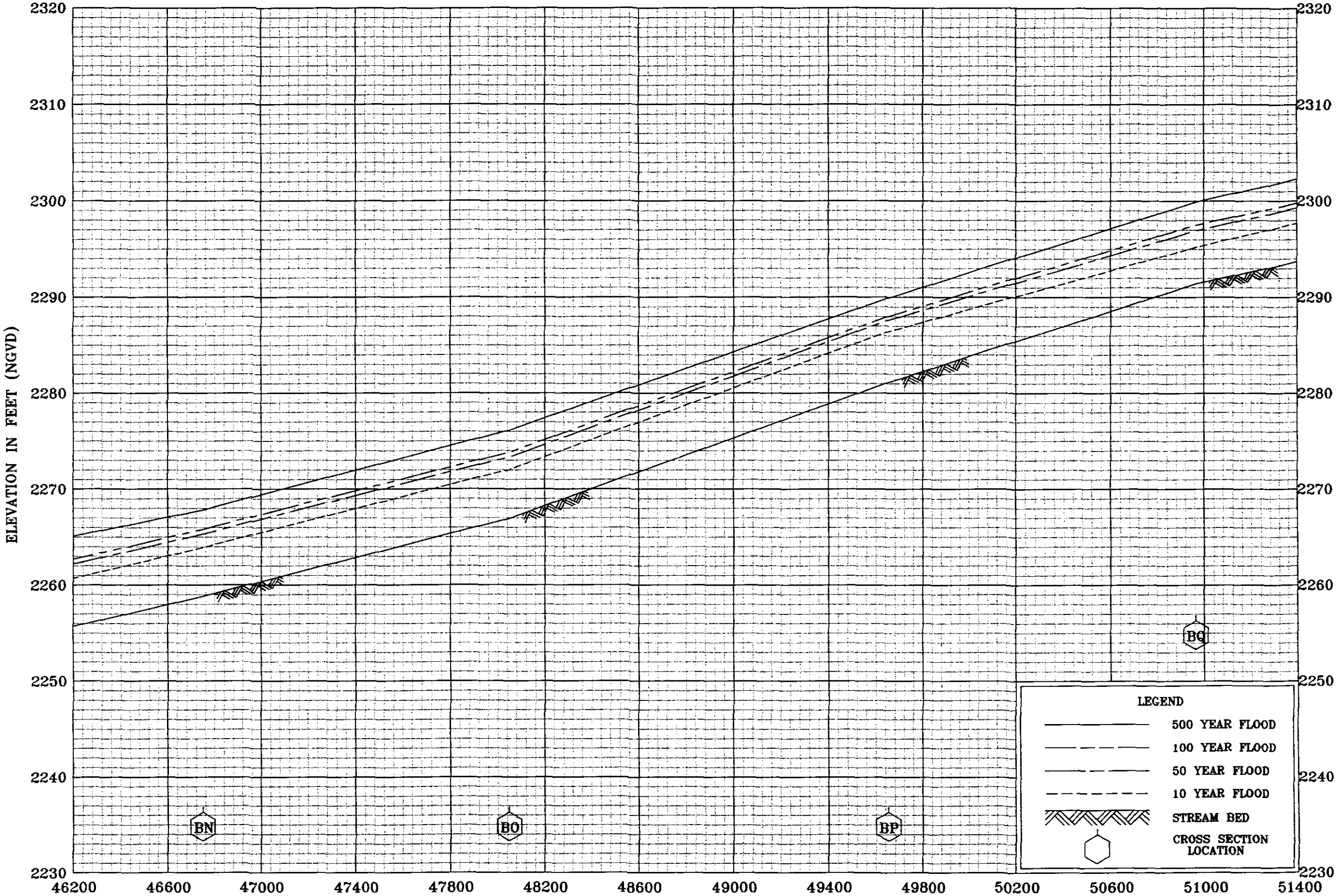
Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

9P



FLOOD PROFILES

UPPER LAS VEGAS WASH

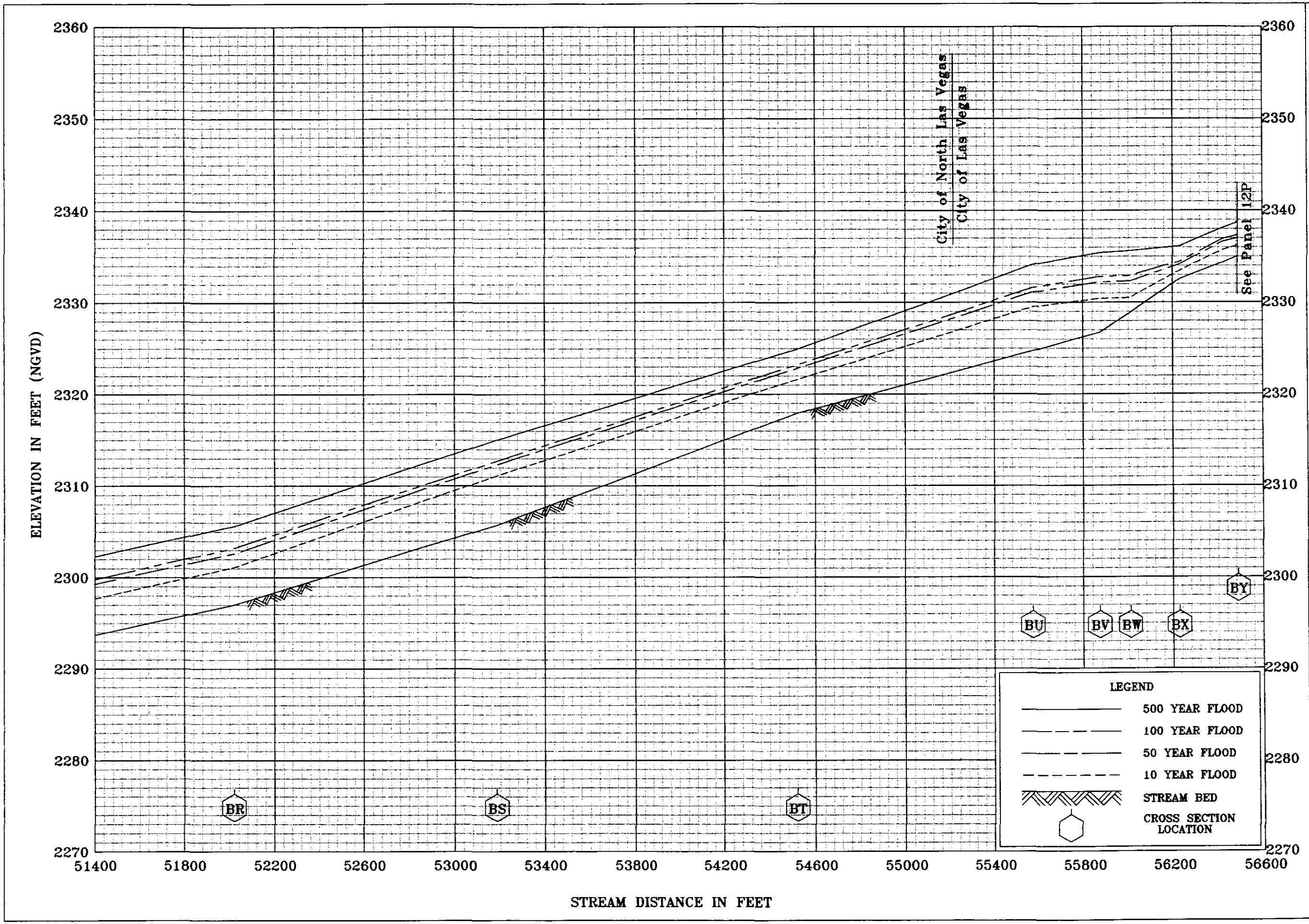
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FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas, City of Las Vegas and Clark Co., NV

CLARK COUNTY

10P



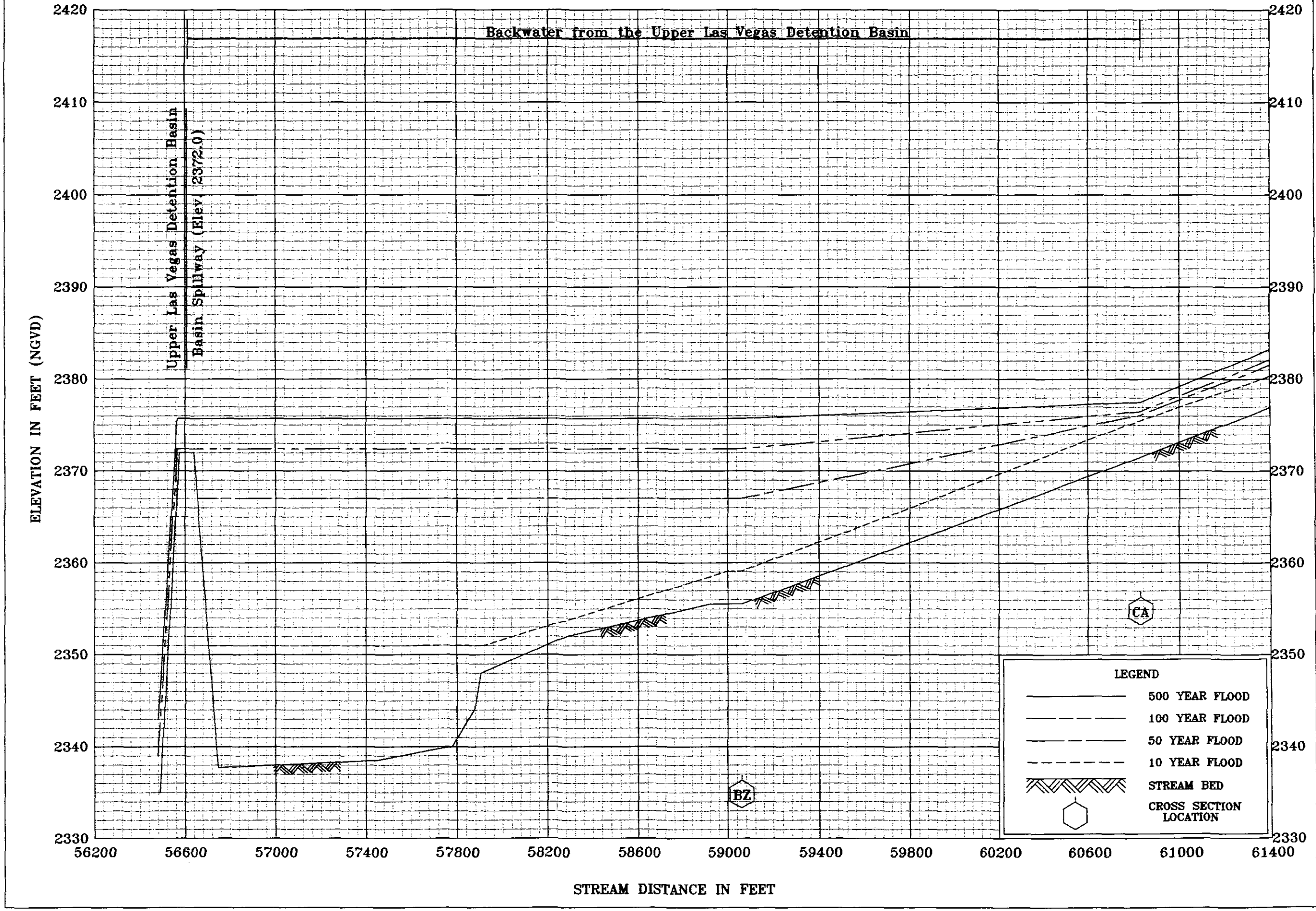
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

11P



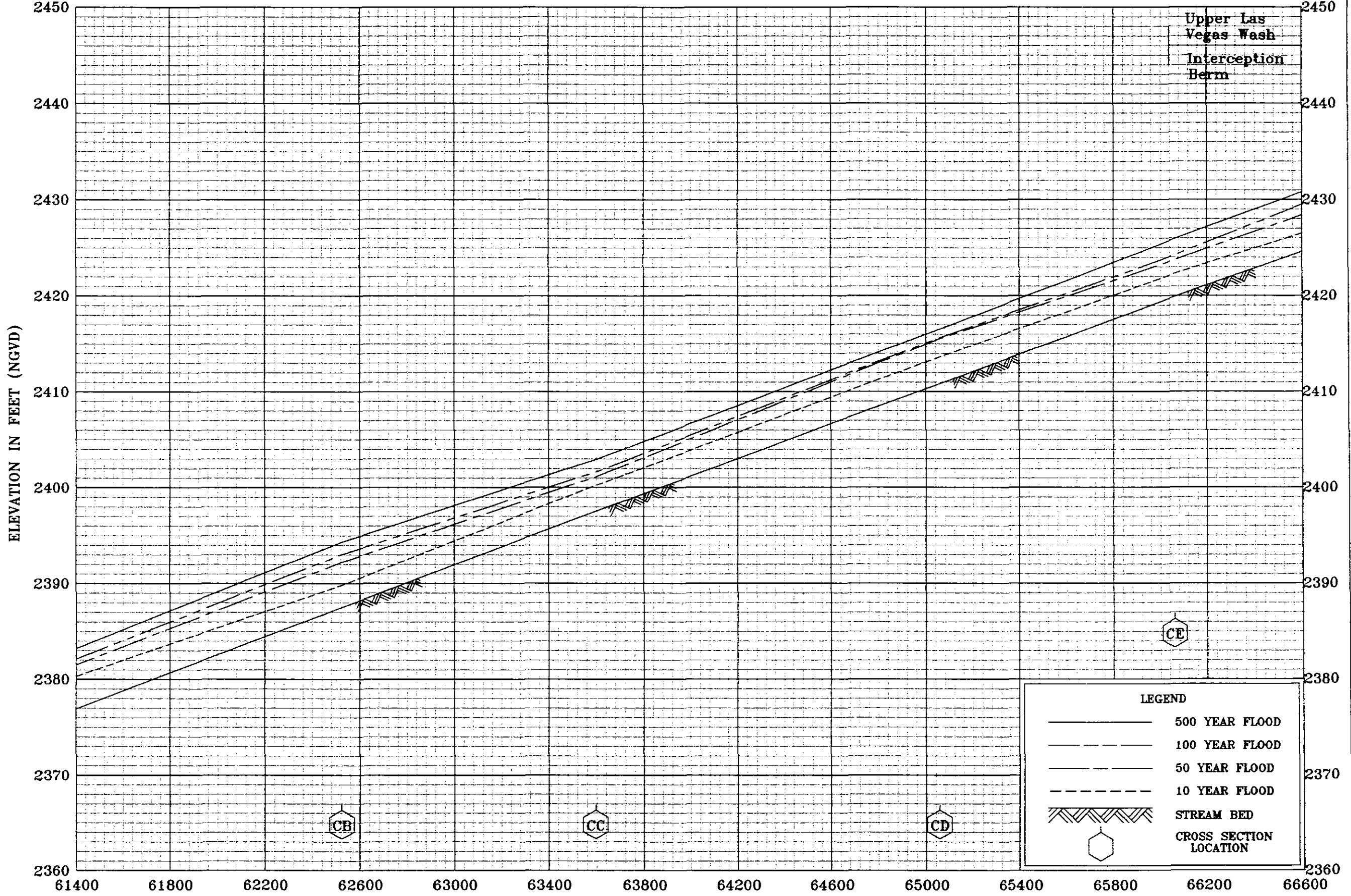
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas, City of Las Vegas and Clark Co., NV
CLARK COUNTY

12P



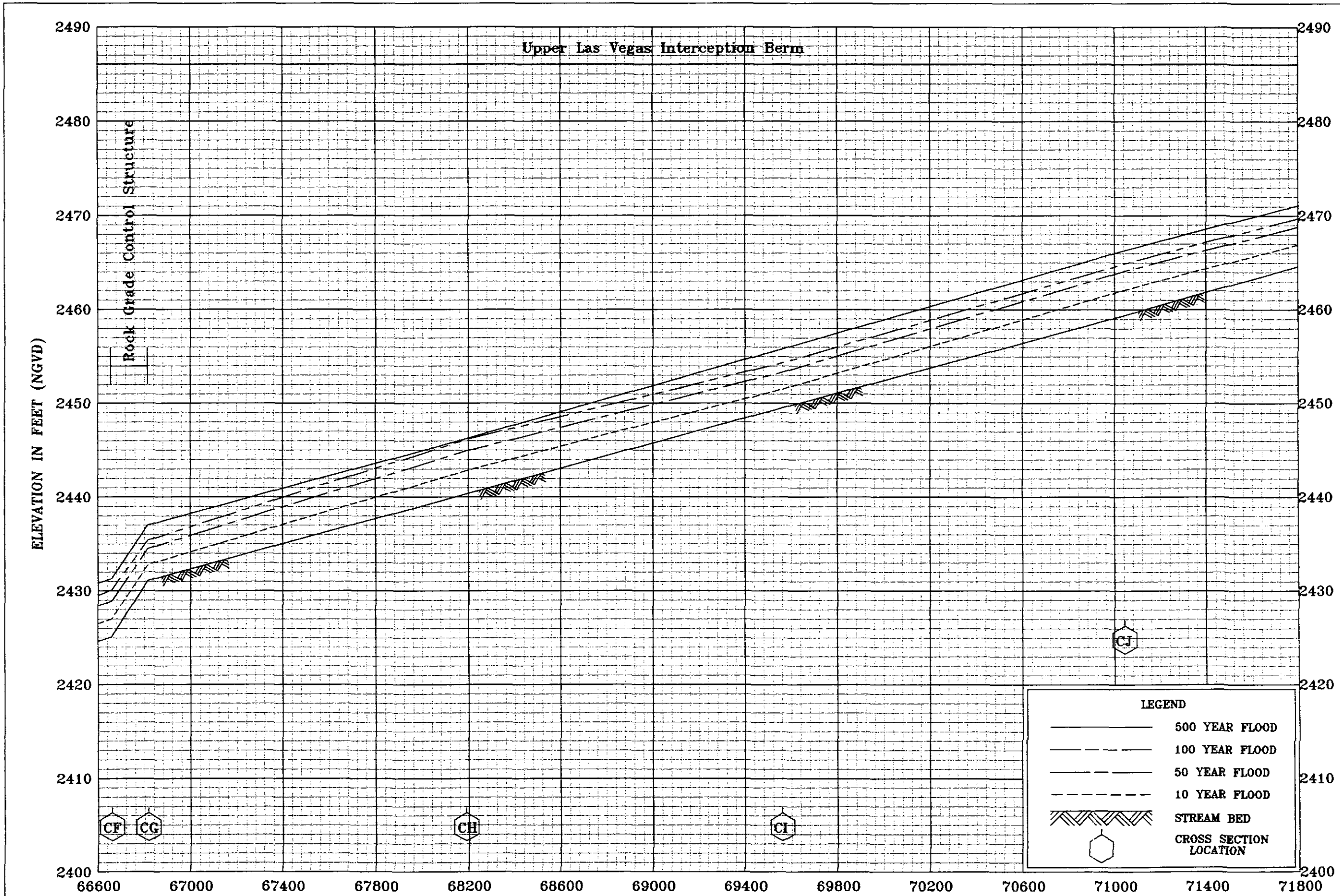
FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

13P

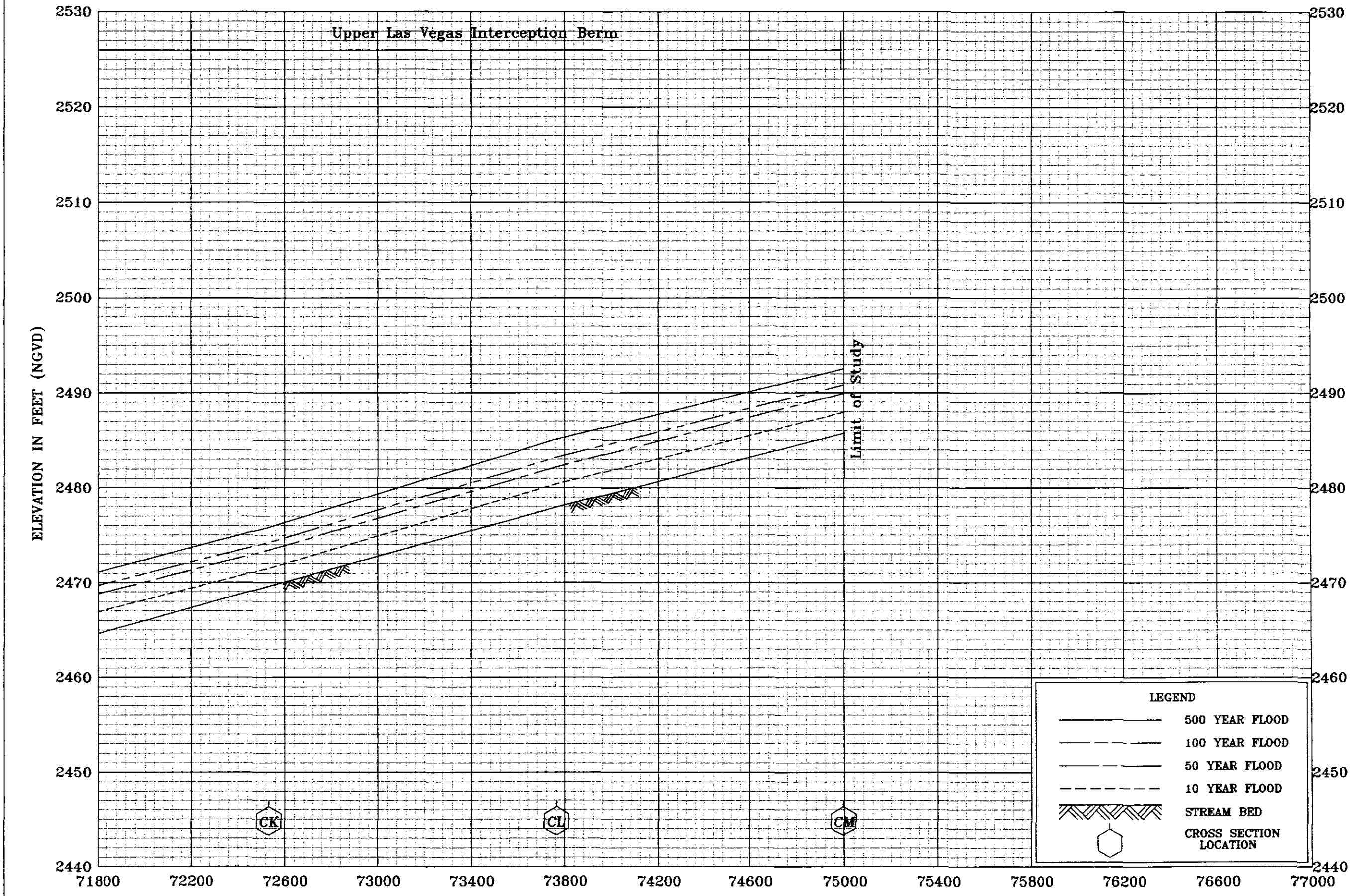


FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY



FLOOD PROFILES

UPPER LAS VEGAS WASH

Without North Las Vegas Detention Basin Diversion

FEDERAL EMERGENCY MANAGEMENT AGENCY
City of North Las Vegas,City of Las Vegas
and Clark Co., NV
CLARK COUNTY

15P

FEDERAL EMERGENCY MANAGEMENT AGENCY

City of North Las Vegas,City of Las Vegas and Clark Co., NV

CLARK COUNTY

STREAM DISTANCE IN FEET

0 100 200 300 400 500 600 700 800 900 1000 1100 1200

ELEVATION IN FEET (NGVD)

1880 1885 1890 1895 1900 1905 1910 1915 1920 1925

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

A B C D E F G H I J K

King Charles/"N" Channel Diversion

Upstream Face Interstate 15 Culvert

Limit of Study

Donovan Way

FLOOD PROFILES

UPPER LAS VEGAS WASH

"N" Channel

UPPER LAS VEGAS WASH VOLUME 7

Technical Support Data Notebook

Upper Las Vegas Wash
Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 7
Mapping Information

Study Contractor:	Northwest Hydraulic Consultants, Inc.
Contract:	EMW - 95 - C - 4840
Date Submitted:	April 20, 1998

TSDN - Flood Insurance Study
Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

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Mapping Information

A. Mapping Information Index

B. Description of Mapping and Mapping Sources

C. Base Maps

D. Aerial Photographs

E. Mapping Reference List

F. Photogrammetric Processes

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 7

This volume of the TSDN contains mapping information pertaining to the study, including a description of mapping sources, base maps, aerial photographs, a mapping reference list, and a description of the photogrammetric processes used in the study. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains mapping information relevant to both study cases.

Study Contractor: Northwest Hydraulic Consultants, Inc.

MAPPING INFORMATION INDEX

CNLV, CLV, and Clark County, NV
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

TYPE OF MAP	MAP DATE	NO. OF SHEETS	EXHIBIT ID.
Base Maps	4/98	8	Base Map,Volume 7
Aerial Photos	2/96	26	Aerial Photos, Volume 7
Work Maps	4/98	8	Work Maps, Volumes 8 and 9
E & B LMMP	1995	2	Reference Maps, Volumes 8 and 9
Azure breakout map	1997	1	Reference Maps, Volumes 8 and 9
Craig cross section map	1997	1	Reference Maps, Volumes 8 and 9

Mapping Information

Compilation of the work and base maps were developed from several sources. The NGVD 1929 datum was selected by NHC and the Project Officer as the datum for the FIS.

Kenney Aerial Mapping was subcontracted by NHC to develop 1 inch = 400 feet scale topographic maps at a contour interval of 4 feet, photography date February 1996. Initially, cross sections for the HEC-2 models were obtained from the February 1996 aerial photogrametry. Spot elevations at structures and along roads were obtained using both aerial photogrametry and field surveys. Additional cross sections were added using the 4' contour interval aerial topographic mapping and 2' contour interval aerial topographic mapping developed by Kenney Aerial Mapping for the City of North Las Vegas, March 1995. As-built plans for the Upper Las Vegas Detention Basin, North Las Vegas Detention Basin, Lone Mountain Road Bridge, 142 Acre Site at Losee and Craig Road, Craig Commercial Site, King Charles Diversion Channel from N-Channel Phase 1 and 2 were also used to develop cross sections and determine the potential flood routes in their respective areas. USGS quadrangle maps NE Las Vegas and Valley were used to map the Without Diversion Dike conditions for the 500-year flood event.

Sections, corporate and city limits were obtained from the City of North Las Vegas (CNLV) and the City of Las Vegas (CLV) GIS. The city limits between the these two cities did not coincide at many locations, overlapping in areas and leaving gaps between the limits in other areas. NHC discussed the discrepancies between the city limits with the GIS departments of both cities. The City of North Las Vegas GIS Specialist informed NHC the city limits for City of North Las Vegas were entered into GIS by digitizing limits from Accessors' Parcel Maps. NHC was told by the City of Las Vegas GIS that the CLV maps were determined by legal descriptions. Therefore, the CLV limits were used where possible. Additional mapping such as the effective firm maps for this area were used to confirm corporate and city limits.

Hydrologic modeling for this study was limited to revising adopted HEC-1 models to reflect current conditions. Therefore it was not necessary to obtain soil and vegetation maps for this study.

File name: MD_BWMW.ME

METADATA FILE
Upper Las Vegas Wash With
North Las Vegas Detention Basin Diversion Dike

Data Set Identity:	Base and Work Maps
County and State:	Clark County, Nevada
Theme Keywords:	Base and Work Maps
Representation Model:	Vector
Spatial Object Types:	Point, node, tic, arc, polyline & block
Data Set Size:	
Transfer Format:	DWG
Data Set Description:	Base and Work Maps Files
Intended Use:	Delineate Area of Flood Hazard
Data set extent:	36.316, 115.207, 36.336, 115.287 North American Datum of 1983
List of file names included:	ALIGN-W.DWG FP100W.DWG SHT1-W.DWG SHT2-W.DWG SHT3-W.DWG SHT4-W.DWG SHT5-W.DWG SHT6-W.DWG SHT7-W.DWG SHT8-W.DWG TITLE-W.DWG
Intended Scale of Use:	1 inch = 400 feet
Resolution of Data:	2.0'
Projection Name:	State Plane

Base1.Dwg
Base2
Base3
Base4
Base5
Base6 Base8
Base7

Horizontal Datum:	North American Datum of 1983
Vertical Datum:	National Geodetic Vertical Datum of 1929
Projection Units:	Feet
Zone Number:	NV E
Coordinate Precision:	Double
Contact Type:	Originator
Contact Organization:	Northwest Hydraulic Consultants
Contact Person and Title:	Edward E. Wallace, Principal
Contact Mailing Address:	3950 Industrial Blvd., Suite 100C West Sacramento, CA 95691
Contact Telephone:	916-371-7400
Transfer Mode:	Compact Disk
Transfer Instructions:	650 MB Compact Disk
Computer Type and Operating System:	DOS 6.22
Completion Status:	Draft FIS
Completion Date:	April 1998
Geographic Area Completed:	Upper Las Vegas Wash, Clark County City of North Las Vegas and City of Las Vegas
Hardcopy Product Availability:	Enclosed
Copyright Status:	Public domain

Policy Status:	N/A
Table Definition Source:	N/A
Attribute Definition Source:	FEMA, Guidelines and specifications for Study Contractors
Source Name:	AutoCad R12
Source Scale:	1:4800
Source Medium:	Paper, Compact Disk
Creator of Source:	Northwest Hydraulic Consultants
Date of Source Material:	22, April, 1998
Source Projection:	N/A
Processing Procedures:	N/A
Procedure Tolerances:	N/A
Positional Accuracy:	N/A
Positional Accuracy Method:	N/A
Attribute Accuracy:	N/A
Data Model Integrity:	N/A
Completeness:	N/A
Metadata Date:	22, April, 1998
Metadata Contact:	Edward E. Wallace

SHEET NAME	FILE NAME	REF FILES
BASE MAP 1	BASE1.DWG	NONE
BASE MAP 2	BASE2.DWG	NONE
BASE MAP 3	BASE3.DWG	NONE
BASE MAP 4	BASE4.DWG	NONE
BASE MAP 5	BASE5.DWG	NONE
BASE MAP 6	BASE6.DWG	NONE
BASE MAP 7	BASE7.DWG	NONE
BASE MAP 8	BASE8.DWG	NONE

ALIGN-WO.XLS

LAYER LIST FOR FILE: ALIGN-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
BASELINE	3	CENTER	CENTERLINE
STA	3	CONTINUOUS	STATION CALLOUT
STAINC	1	CONTINUOUS	STATIONING EVERY 100'
STA-INT	4	CONTINUOUS	STATION INCREMENT/HIGHLIGHT @ 1000'
X-SCTLBL	4	CONTINUOUS	X-SECTION LABELS
X-SECT	4	CONTINUOUS	X-SECTIONS AT THEIR LOCATIONS

FP100W-O.XLS

LAYER LIST FOR FILE: FP100W-O.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
25	4	CONTINUOUS	100 YEAR FLOOD LIMIT LINE
26	6	CENTER	500 YEAR FLOOD LIMIT LINE
41	6	CONTINUOUS	LIMIT OF STUDY
48	3	CONTINUOUS	BASE FLOOD ELEVATION LINE
ANNOBJ	2	CONTINUOUS	LEADERS
BASE-TX	3	CONTINUOUS	ANNOTATIONS/CALLOUTS
DEF_POINTS	7	CONTINUOUS	ALIGNMENT GRIDS
HIDDEN	3	HIDDEN	ZONE AE & AO SUBBOUNDARY
SHADING	113	CONTINUOUS	SHADING BETWEEN 100 & 500 YEAR FLOOD
TEXTL	3	CONTINUOUS	MISC. TEXT/CALLOUTS

BASE2.XLS

LAYER LIST FOR FILE: BASE2.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
5	1	DASHED	UNIMPROVED ROADS
12	51	DASHED	CORPORATE BOUNDARIES
21	4	CONTINUOUS	ANNOTATION (ROAD NAMES)
55	2	CONTINUOUS	CONTOUR LINES
63	2	CONTINUOUS	MISCELLANEOUS
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	2	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	3	PHANTOM2	INDEX CONTOUR LINES
LG-TXT	2	CONTINUOUS	TITLE BLOCK TEXT

LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	2	CONTINUOUS	TITLE BLOCK TEXT
ML	3	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	5	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	3	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	2	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CTEXT	1	CONTINUOUS	CONTOUR INDEX TEXT
TRL	1	CONTINUOUS	TRAIL
TXT	1	CONTINUOUS	MISCELLANEOUS TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

BASE3.XLS

LAYER LIST FOR FILE: BASE3.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	1	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	BUILDING
FENCE	1	CONTINUOUS	FENCE LINE
FENCTICK	1	CONTINUOUS	TEXT FOR ERM
PAVEMENT	1	CONTINUOUS	PAVEMENT
TXT	2	CONTINUOUS	MISC. TEXT

BASE4.XLS

LAYER LIST FOR FILE: BASE4.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES

55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
TRL	1	DASHED	TRAIL
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

BASE5.XLS

LAYER LIST FOR FILE: BASE5.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
RET	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XWALL	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES

BASE6.XLS

LAYER LIST FOR FILE: BASE6.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
2	1	CONTINUOUS	
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
NLV	3	DIVIDE2	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

BASE7.XLS

LAYER LIST FOR FILE: BASE7.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
1	1	CONTINUOUS	SHEET CORNERS/ROADS
2	1	CONTINUOUS	HOUSES/BUILDINGS
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
40	1	CONTINUOUS	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT

LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
PAVEMENT	1	CONTINUOUS	PAVEMENT
TXT	2	CONTINUOUS	MISC. TEXT

BASE8.XLS

LAYER LIST FOR FILE: BASE8.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
1	1	CONTINUOUS	SHEET CORNERS/ROADS
2	1	CONTINUOUS	HOUSES/BUILDINGS
5	1	DASHED	UNIMPROVED ROADS
8	1	CONTINUOUS	RAILROAD
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	1	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
40	1	CONTINUOUS	BRIDGES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
CHANNEL-EX	1	CONTINUOUS	EXISTING CHANNEL
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LN_MNT_CONT	6	CONTINUOUS	CONTOUR LINES FROM BSI SITE IMPROVEMENTS
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
CONC	1	CONTINUOUS	CONCRETE
FENCE	1	CONTINUOUS	FENCE
FENCTICK	1	CONTINUOUS	FENCE X
OBBLDG	1	HIDDEN	BUILDING
PAVEMENT	1	CONTINUOUS	PAVEMENT
PIPE	1	CONTINUOUS	PIPE

RET	1	CONTINUOUS	CHANNEL
TANK	1	CONTINUOUS	TANK
TXT	2	CONTINUOUS	MISC. TEXT
XMSIGN	1	CONTINUOUS	HIGHWAY SIGN
XSBKBK	1	CONTINUOUS	SIGN
XWALL	1	CONTINUOUS	WALL

Aerial Photographs

Included in Back Binder Pocket

Upper Las Vegas Wash
Mapping References

City of North Las Vegas, Shapefiles and Coverages from CLV GIS Database for the Las Vegas Valley, Compiled December 4, 1997

Kenney Aerials, City of North Las Vegas Topographic Maps, Scale 1:24000, Contour Elevevation 2', Photo Date March 15, 1995

U.S. Department of the Interior, Geological Survey, Tule Springs Park, Scale 1:24000, 1983

U.S. Department of the Interior, Geological Survey, Gass Peak, SW, Scale 1:24000, 1983

U.S. Department of the Interior, Geological Survey, Valley, Scale 1:24000, 1982

U.S. Department of the Interior, Geological Survey, Las Vegas NW, Scale 1:24000, 1983

U.S. Department of the Interior, Geological Survey, Las Vegas NE, Scale 1:24000, 1984

U.S. Department of the Interior, Geological Survey, Gass Peak, Scale 1:24000, 1986

U.S. Department of the Interior, Geological Survey, Corn Creek Springs, Scale 1:24000, 1974

U.S. Department of the Interior, Geological Survey, Corn Creek Springs NW, Scale 1:24000, 1974

U.S. Department of the Interior, Geological Survey, Gass Peak NE, Scale 1:24000, 1986

U.S. Department of the Interior, Geological Survey, Grapevine, Scale 1:24000, 1974

Upper Las Vegas Wash
Elevation Reference Mark Key

RM	Name	RM	Name	RM	Name
1	0802	13	FP04	25	FP16
2	0803	14	FP05	26	NE01 (A-1)
3	ER01	15	FP06	27	V169
4	ER02	16	FP07	28	C-2
5	ER03	17	FP08	29	C-3
6	ER04	18	FP09	30	C-4
7	ER05	19	FP10	31	C-5
8	ER06	20	FP11	32	C-6
9	ER07	21	FP12	33	E-5
10	FP01	22	FP13	34	E-6
11	FP02	23	FP14	35	G-6
12	FP03	24	FP15		

teresa/projects/50010/elev_key

Kenney Aerial Mapping Inc.



1130 West Fillmore, Phoenix, Arizona 85007
Phone (602) 258-6471 Fax: (602) 340-1877

6253 Industrial Road Suite G&H, Las Vegas NV 89118
Phone:(702) 260-3033 Fax: (702) 260-3035

Ellis O. Hyde, President, CP
John Cahoon, Marketing Mgr., CP
Leo Torres, General Mgr., Las Vegas
Peter A. Dyroff, Vice-President, CP
Gary Finnie, Production Manager

April 17, 1998

Mr. Joey Howard at Northwest Hydrology Consultants, Inc.

Re: Upper North Las Vegas Wash Metadata

Zeiss RMK TOP 15 with Gyromount and Forward Motion Compensation -- Focal Length 6"
"USGS Calibration Report Follows dated January 10, 1995"

Photo Scale 1:14400 Photo Date 2-6-96

An 1800 C Factor for Four Foot Contours

Manufacturers Recommended C Factor is 2400 for a Zeiss P3 Analytical Stereoplotters

P3's are self calibrating therefore the request is N/A

Please let me know if you need any additional information.

Sincerely,

John Cahoon
KENNEY AERIAL MAPPING, INC.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 22092

REPORT OF CALIBRATION
of Aerial Mapping Camera

January 10, 1995

Camera type: Zeiss RMK Top 15*
Lens type: Zeiss Pleogon A3/4
Nominal focal length: 153 mm

Camera serial no.: 141299
Lens serial no.: 141334
Maximum aperture: f/4
Test aperture: f/4

Submitted by: Kenney Aerial Mapping Company
Phoenix, Arizona

Reference: Carl Zeiss, Inc., purchase order No. 337-950024, dated January 11, 1995.

These measurements were made on Kodak Micro-flat glass plates, 0.25 inch thick, with spectroscopic emulsion type 157-01 Panchromatic, developed in D-19 at 68° F for 3 minutes with continuous agitation. These photographic plates were exposed on a multicollimator camera calibrator using a white light source rated at approximately 5200K.

I. Calibrated Focal Length: 153.966 mm

II. Lens Distortion

Field angle:	7.5°	15°	22.7°	30°	35°	40°
Symmetric radial (um)	0	0	1	1	1	-1
Decentering (um)	0	0	1	1	2	3

Symmetric radial distortion parameters

$K_0 = 0.2789 \times 10^{-5}$
$K_1 = -0.4689 \times 10^{-8}$
$K_2 = 0.3049 \times 10^{-12}$
$K_3 = 0.0000$
$K_4 = 0.0000$

Decentering distortion parameters

$P_1 = -0.1661 \times 10^{-6}$
$P_2 = -0.5452 \times 10^{-8}$
$P_3 = 0.0000$
$P_4 = 0.0000$

Calibrated principal point

$x_p = 0.005$ mm
$y_p = -0.005$ mm

The values and parameters for Calibrated Focal Length (CFL), Symmetric Radial Distortion (K_0, K_1, K_2, K_3, K_4), Decentering Distortion (P_1, P_2, P_3, P_4), and Calibrated Principal Point [point of symmetry] (x_p, y_p) were determined through a least-squares Simultaneous Multiframe Analytical Calibration (SMAC) adjustment. The x and y-coordinate measurements utilized in the adjustment of the above parameters have a standard deviation (σ) of ±3 microns.

* Equipped with Forward Motion Compensation

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 22092

REPORT OF CALIBRATION
of Aerial Mapping Camera

January 10, 1995

Camera type: Zeiss RMK Top 15*
Lens type: Zeiss Pleogon A3/4
Nominal focal length: 153 mm

Camera serial no.: 141299
Lens serial no.: 141334
Maximum aperture: f/4
Test aperture: f/4

Submitted by: Kenney Aerial Mapping Company
Phoenix, Arizona

Reference: Carl Zeiss, Inc., purchase order No. 337-950024, dated January 11, 1995.

These measurements were made on Kodak Micro-flat glass plates, 0.25 inch thick, with spectroscopic emulsion type 157-01 Panchromatic, developed in D-19 at 68° F for 3 minutes with continuous agitation. These photographic plates were exposed on a multicollimator camera calibrator using a white light source rated at approximately 5200K.

I. Calibrated Focal Length: 153.967 mm

This measurement is considered accurate within 0.005 mm

II. Radial Distortion

Field angle	$\bar{D}_c$	D_c for azimuth angle			
		0° A-C	90° A-D	180° B-D	270° B-C
degrees	um	um	um	um	um
7.5	0	0	0	-1	0
15	0	1	1	-1	-1
22.7	1	2	2	1	-2
30	1	3	0	3	-2
35	1	2	-1	4	-2
40	-2	2	-6	1	-3

The radial distortion is measured for each of four radii of the focal plane separated by 90° in azimuth. To minimize plotting error due to distortion, a full least-squares solution is used to determine the calibrated focal length. $\bar{D}_c$ is the average distortion for a given field angle. Values of distortion D_c based on the calibrated focal length referred to the calibrated principal point (point of symmetry) are listed for azimuths 0°, 90°, 180° and 270°. The radial distortion is given in micrometers and indicates the radial displacement away from the center of the field. These measurements are considered accurate within 5 um.

* Equipped with Forward Motion Compensation

III. Resolving Power in cycles/mm

Area-weighted average resolution: 89

Field angle:	0°	7.5°	15°	22.7°	30°	35°	40°
Radial Lines	134	159	134	95	95	80	95
Tangential lines	134	134	113	80	67	67	80

The resolving power is obtained by photographing a series of test bars and examining the resultant image with appropriate magnification to find the spatial frequency of the finest pattern in which the bars can be counted with reasonable confidence. The series of patterns has spatial frequencies from 5 to 268 cycles/mm in a geometric series having a ratio of the 4th root of 2. Radial lines are parallel to a radius from the center of the field, and tangential lines are perpendicular to a radius.

IV. Filter Parallelism

The two surfaces of KL-F (36%) No. 141519 filter accompanying this camera and the USGS TOP 15 test filter KL-F (60%) No. 142399 are within 10 seconds of being parallel. The USGS test filter, in conjunction with the internal "B" filter, was used for the calibration.

V. Shutter Calibration

Indicated exposure time	Effective exposure time	Efficiency
1/100	11.00 ms = 1/90 s	70%
1/200	5.25 ms = 1/190 s	70%
1/300	3.51 ms = 1/285 s	70%
1/400	2.75 ms = 1/365 s	70%
1/500	2.10 ms = 1/475 s	70%

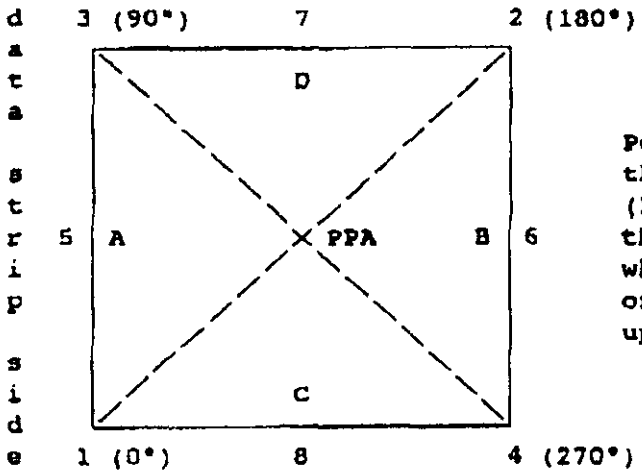
The effective exposure times were determined with the lens at aperture f/4. The method is considered accurate within 3 percent. The technique used is Method I described in American National Standard PH3.48-1972(R1978).

VI. Magazine Platen

The platen mounted in T-MC film magazine No. 137708 does not depart from a true plane by more than 13 um (0.0005 in).

The platen for this film magazine is equipped with an identification marker that will register "141630" in the data strip area for each exposure.

VII. Principal Points and Fiducial Coordinates



Positions of all points are referenced to the principal point of autocollimation (PPA) as origin. The diagram indicates the orientation of the reference points when the camera is viewed from the back, or a contact positive with the emulsion up. The data strip is to the left.

	X coordinate	Y coordinate
Indicated principal point, corner fiducials	-0.002 mm	-0.005 mm
Indicated principal point, midside fiducials	0.005	-0.010
Principal point of autocollimation (PPA)	0.0	0.0
Calibrated principal point (pt. of sym.) x_p, y_p	0.005	-0.005

Fiducial Marks

1	-112.988 mm	-113.004 mm
2	112.993	113.005
3	-113.003	112.985
4	113.008	-113.004
5	-112.993	-0.013
6	113.010	-0.008
7	-0.001	113.009
8	0.012	-112.992

VIII. Distances Between Fiducial Marks

Corner fiducials (diagonals)

1-2: 319.606 mm 3-4: 319.612 mm

Lines joining these markers intersect at an angle of 89° 59' 57"

Midside fiducials

5-6: 226.003 mm 7-8: 226.001 mm

Lines joining these markers intersect at an angle of 90° 00' 08"

Corner fiducials (perimeter)

1-3: 225.990 mm 2-3: 225.996 mm

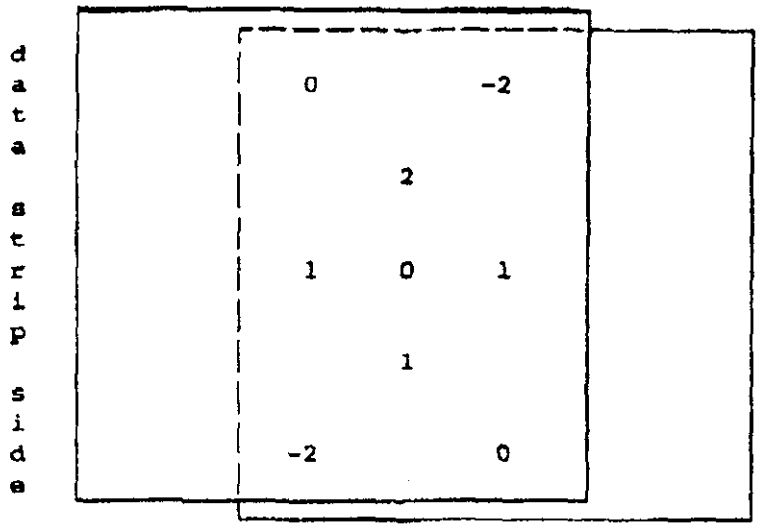
1-4: 225.996 mm 2-4: 226.009 mm

The method of measuring these distances is considered accurate within 0.003 mm

IX. Stereomodel Flatness

Magazine No.: 137708 Base/Height ratio: 0.6

Platen ID: 141630 Maximum angle of field tested: 40°



Stereomodel
Test point array
(values in micrometers)

The values shown on the diagram are the average departures from flatness (at negative scale) for two computer-simulated stereomodels based on comparator measurements on contact glass (Kodak Micro-flat) diapositives made from Kodak 2405 film exposures. These measurements are considered accurate within 5 um.

X. Lens/Film Resolving Power in cycles/mm

Area-weighted average resolution: 47 Film: Type 2405

Field angle:	0°	7.5°	15°	22.7°	30°	35°	40°
Radial Lines	67	57	57	48	48	48	48
Tangential lines	67	57	57	48	40	40	40

This aerial mapping camera calibration report supersedes the previously issued USGS Report No. OSL/1741, dated March 20, 1992.

Bradish F. Johnson

Bradish F. Johnson
Chief, Optical Science Laboratory
National Mapping Division

Kenney Aerial Mapping Inc.

[redacted] West Fillmore, Phoenix, Arizona 85007
[redacted] (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

received
FEB 09 1996

Mr. Ed Wallace
NORTHWEST HYDRAULIC CONSULTANTS, INC.
3950 Industrial Boulevard Suite 100C
West Sacramento, California 95691

Re: UPPER LAS VEGAS WASH

Dear Ed,

Enclosed are the survey notes for the GPS control and ERM's, provided to us by CRS and ASSOCIATED CONSULTING. I have also consolidated an ERM list combining the existing monuments within the City of North Las Vegas project and the "new area".

Compilation on the new area is complete and currently being edited. We should be delivering the final maps, CAD, 2x photos and others documents for this portion by February 19 or 20. At that time we can start looking at HECII locations and check profile locations.

We have had trouble re-flying the existing area within the City of North Las Vegas. Due to bad weather and military restrictions we have only completed one of three flight lines in this area. We expect to finish this flying by February 13, 1996 and will complete this mapping with all possible speed.

If you have any questions or if we can be of any further service please do not hesitate to call.

Sincerely,

John Cahoon

John Cahoon
KENNEY AERIAL MAPPING, INC.

Kenney Aerial Mapping Inc.

1[redacted]est Fillmore, Phoenix, Arizona 85007 — 3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Ph[redacted](602) 258-6471 Fax: (602) 340-1877 — Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT — *Peter A. Dyroff*, VICE-PRESIDENT

ELEVATION REFERENCE MONUMENTS FROM THE CITY OF NORTH LAS VEGAS

NAD83 NAVD88

UPPER LAS VEGAS WASH FLOOD INSURANCE STUDY
KENNEY AERIAL MAPPING, INC. Job Number 960104

The following monument locations and descriptions were originally furnished to KENNEY AERIAL MAPPING, INC. from the CITY OF NORTH LAS VEGAS for use as photogrammetric control. By prior agreement the monument elevations have been converted to NGVD29 by subtracting 2.43 feet from the NAVD88 elevation provided by the CITY. Please see FEMA 37 Appendix 6-2, page A6-5 "Conversion Factor" paragraphs 1 and 2.

Two points with known monument elevations for both datums were used to determine the divergence in the conversion factor between NGVD29 and NAVD88.

CNLV Point Number A-1 at Moccasin and Decatur:

NAVD88 - NGVD29 = 2414.69 - 2411.88= 2.41'+/-

CNLV Point Number L-7 at Pecos and Owens:

NAVD88 - NGVD29 = 1815.08 - 1812.62= 2.46'+/-

The average difference between these points is 2.43 feet which was used to convert the photogrammetric control and the ERM elevations. The greatest divergence is less than .1' (i.e. .05'), allowing us to use the average difference throughout the City of North Las Vegas. Some differences exist between Monument Elevations and Panel Point (Ground) Elevations. These differences are noted below.

The study area not covered by existing photography and control, i.e. everything west of Decatur Boulevard, has been controlled in the field by GPS methods to NAD83 and NGVD29. These points conform to First Order (Order C) specifications (1:100,000).

Mon. Num. (CNLV)	Northing	Easting	NAVD88 Elev.	NGVD29 Elev.
A-1	26,823,895.0256	767,012.1904	Panel 2414.29 Monu. 2414.69	2411.86 2412.26

Description: MOCCASIN/DECATUR FOUND BLM BRASS CAP MONUMENT, TOWNSHIP SECTION CORNER S36IS31/S1IS6, T18SIT19S,R60EIR61E, 1990 C.S.

C-1	26,813,276.6755	767,014.1924	Panel 2332.90 Monu. 2333.10	2330.47 2330.67

Description: GRAND TETON/DECATUR FOUND 2" BRASS CAP MONUMENT IN CONCRETE CYLINDER, SECTION *CORNER MONUMENT, S12IS7/S13IS18, T19S,R60EIR61E, RLS 1919 CLV 81, BLM 1990.*

Mon. Num.	Northing	Easting	NAVD88 Elev.	NGVD29 Elev.
C-2	26,813,133.0675	772,339.5075	Panel 2296.26 Monu. 2296.51	2293.83 2294.08

Description: GRAND TETON/ALLEN FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S7IS8/S18IS17, T19S,R61E, 1990

C-3	26,813,322.8925	777,690.8673	Panel 2258.88 Monu. 2259.28	2256.45 2256.85

Description: GRAND TETON/CLAYTON FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S8IS9/S17IS16, T19S,R60E,1991

C-4	26,813,333.4382	783,079.6540	Panel 2214.04 Monu. 2214.34	2211.61 2211.91

Description: GRAND TETON/REVERE FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S9IS10/S16IS15, T19S,R61E, 1991

C-5	26,813,239.0908	788,446.9337	Panel 2197.28 Monu. 2198.48	2194.85 2196.05

Description: GRAND TETON/NORTH 5TH FOUND 3.5" CAPPED PIPE (CNLV), SECTION CORNER MONUMENT, S10I11/S15I14, T19S,R61E, BLM 1991

C-6	26,813,182.9116	793,610.6336	Panel 2221.64 Monu. 2221.64	2219.21 2219.21

Description: GRAND TETON/LOSEE SET HUB AND TACK FOR SECTION CORNER LOCATION FROM FOUND TIES (PLS9399) ON TOP OF NEW DIVERSION DIKE, S11IS12/S14IS13, T19S,R61E

E-5	26,802,511.9913	788,322.9267	Panel 2049.16 Monu. 2049.91	2046.73 2047.48

Description: CENTENNIAL/NORTH 5TH FOUND 3.5" CAPPED PIPE (BLM), SECTION CORNER MONUMENT, S22IS23/S27IS26, T19S,R61E, 1991

E-6	26,802,500.2282	793,588.9443	Panel 2039.67 Monu. 2040.17	2037.24 2037.74

Description: CENTENNIAL/LOSEE FOUND 3.5" CAPPED PIPE MARKED DEPT. OF THE INTERIOR, BLM, CADASTRAL SURVEY RM 66FT NE TO NE S26, T19S,R61E, 1991 (SW REF. MON.)

G-6	26,791,853.9181	793,700.0325	Panel 1948.34 Monu. 1947.89	1945.91 1945.46

Description: LONE MOUNTAIN/LOSEE FOUND 2" BRASS CAP IN WELL MONUMENT AT CENTERLINE INTERSECTION, MARKED PLS 8431, POINT USED FOR SECTION CORNER S35IS36/S2IS1, T19SIT20S,R61E

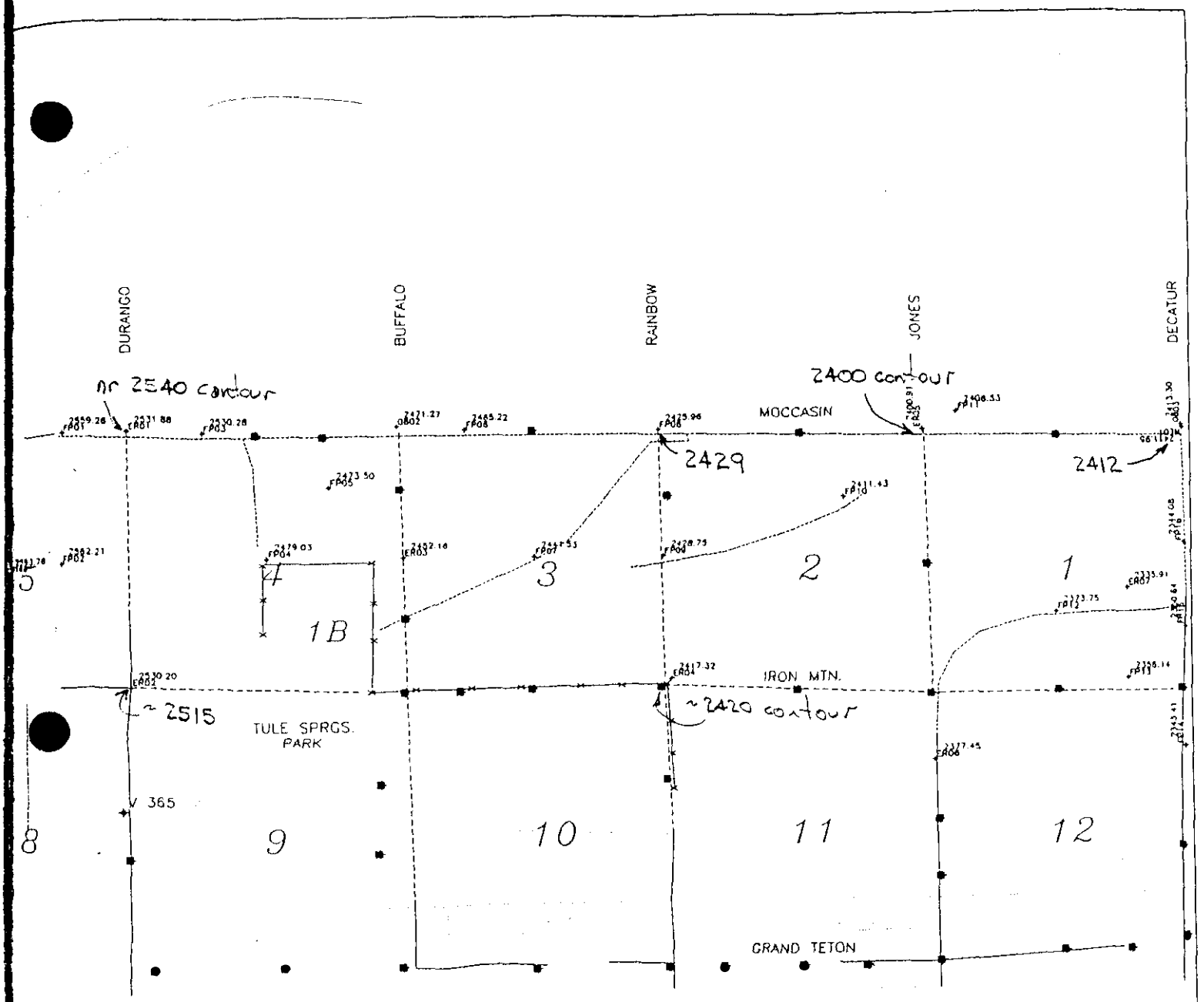
J-6	26,781,174.3348	793,796.6934	Panel 1883.42 Monu. 1883.42	1880.99 1880.99

Description: CHEYENNE/MARY DEE FOUND 4" CNLV ALUM MON AT CENTERLINE INTERSECTION, POINT USED FOR SECTION CORNER MONUMENT S11IS12/S14IS13, T20S,R61E

NEW ELEVATION REFERENCE MONUMENTS

Provided by CRS CONSULTING ENGINEERS, INC. and ASSOCIATED CONSULTING, INC.

Mon. Num.	Northing	Easting	NAVD88	NGVD29
0802	26,824,094.985	751,153.821	2473.68	2471.27
Description:	CLARK COUNTY GIS MON. IN CONCRETE MARKED "0802"AT BUFFALO/MOCCASIN			
0803	26,823,954.499	766,991,119	2415.71	2413.30
Description:	CLARK COUNTY GIS MON. IN CONCRETE MARKED "0803" AT DECATUR/MOCCASIN			
ER01	26,824,067.479	745,909.424	2534.29	2531.88
Description:	BRASS CAP IN CONCRETE MARKED " L.S.1919". CLV BM 1LV90 5NES			
ER02	26,818,722.004	745,953.589	2532.60	2530.20
Description:	BLM BC MARKED "S5/S8IS4/S9 T19S R60E 1990 CLVBM" IN A/C. CLV BM 1L90 8NES			
ER03	26,821,354.112	751,267.417	2454.57	2452.16
Description:	ALUMINUM MON. MARKED "CLV1/4 S4IS3". BM 1LV90 3W4			
ER04	26,818,793.210	756,682.406	2419.73	2417.32
Description:	CLV BM. RIVET AND PLATE IN CONCRETE MARKED "CITY OF LAS VEGAS BM NO." (NOT THE BM LISTED IN CLV BENCH BOOK.)			
ER05	26,823,937.102	761,736.590	2403.32	2400.91
Description:	BRASS CAP IN 3/4" I.P. MARKED "35/2I36/1 RLS 1919 1990 T18S R60E". CLV BM 1LV90 2NES			
ER06	26,817,040.122	761,915.926	2379.85	2377.45
Desription:	CLV BM. RIVET AND PLATE IN CONCRETE MARKED " CLV BM NO." (NOT THE BM LISTED IN CLV BENCH BOOK.)			
ER07	26,820,580.802	765,820.496	2338.32	2335.91
Description:	SET LEAD AND BRASS TAG IN SE CORNER OF OUTFLOW MARKED "LS5876".			



STATE PLANE COORDINATE CONVERSION FACTORS

Mean Radius of Curvature (Ra): (Meters)	6371707.699
Mean Geoid Height	−27.200
Mean Surface Elevation: (Meters)	744.000
Max. (Meters)	790.600
Min. (Meters)	712.000
Mean Elevation Factor:	0.99988755
Mean Scale Factor:	0.99991160
Combined Factor:	0.99979916

To Convert an SPC Grid Distance to a Surface Distance
Multiply GRID * 1.00020088

N

1" = 3000'

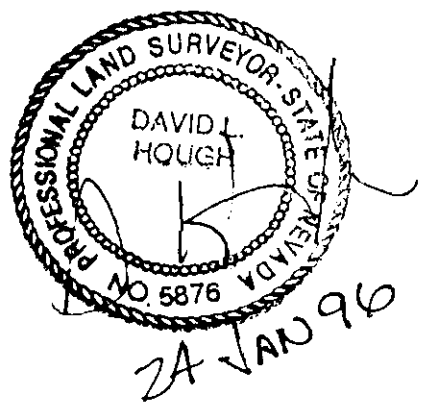
ASSOCIATED CONSULTING INC.
2245 N. DECATUR BLVD.
LAS VEGAS, NEVADA 89108
TEL. (702) 647-9265

received
FEB 09 1996

LAS VEGAS WASH PHOTOCONTROL

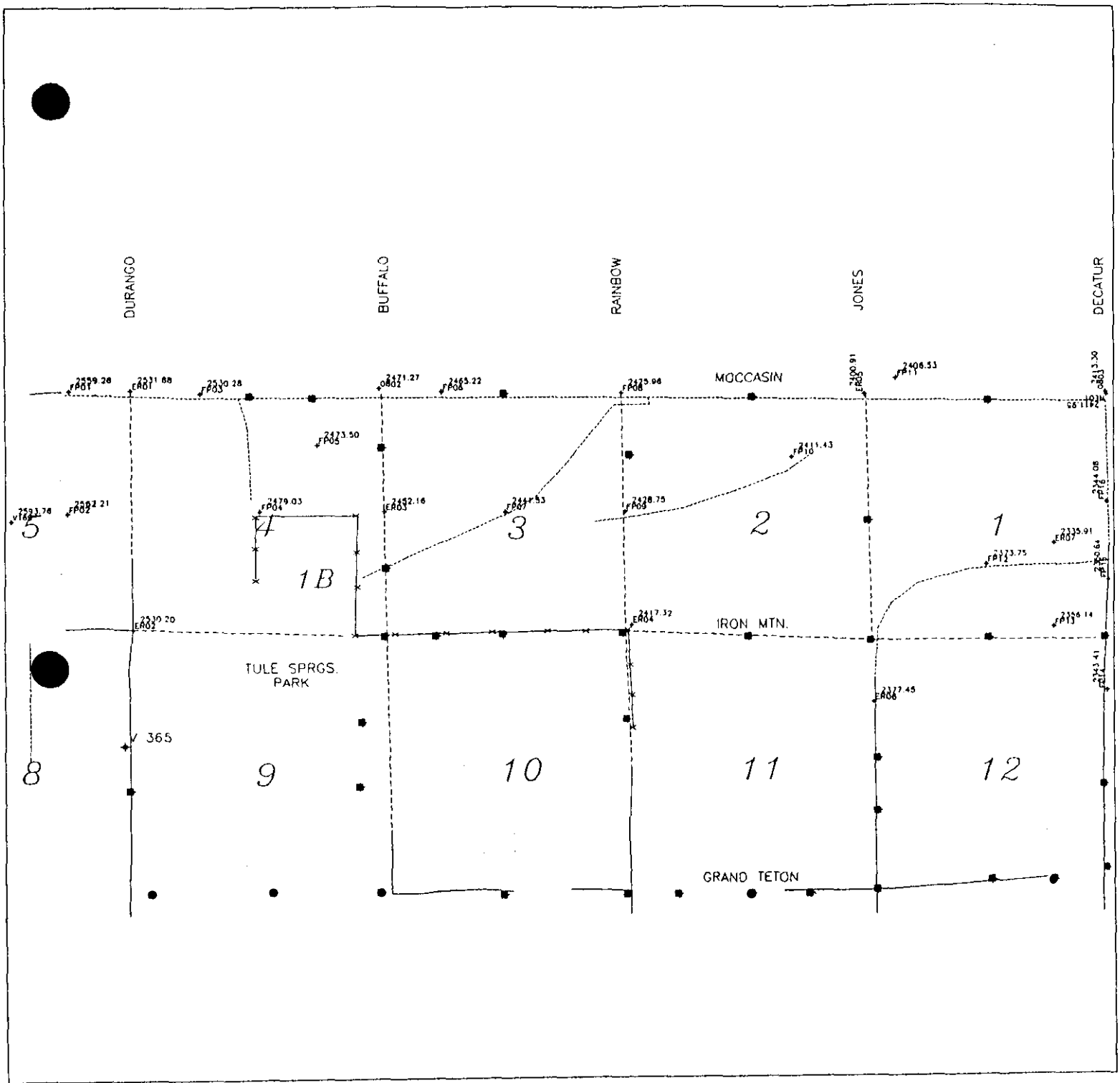
For
CRS Consulting Engineers Inc.

Sections 1-5 & 12, T.19 S., R.60 E.



24 JAN 96

ASSOCIATED CONSULTING INC. • 2245 N. DECATUR BLVD. • LAS VEGAS, NEVADA



STATE PLANE COORDINATE CONVERSION FACTORS

Mean Radius of Curvature (Ra): (Meters)	6371707.699
Mean Geoid Height	-27.200
Mean Surface Elevation: (Meters)	744.000
Max. (Meters)	790.600
Min. (Meters)	712.000
Mean Elevation Factor:	0.99988755
Mean Scale Factor:	0.99991160
Combined Factor:	0.99979916

To Convert an SPC Grid Distance to a Surface Distance
Multiply GRID * 1.00020088

N

1" = 3000'

ASSOCIATED CONSULTING INC.
2245 N. DECATUR BLVD.
LAS VEGAS, NEVADA 89108
TEL. (702) 647-9265

LEAST SQUARES ADJUSTMENTS

FILLNET(tm) is a least squares adjustment program written by T. Vincenty, formerly a geodesist with the Geodetic Research and Development Laboratory, National Geodetic Survey, NOS, NOAA, specifically for adjusting GPS observations in support of geodetic network densifications.

A thorough treatment of the concepts and mathematical model behind **FILLNET** can be found in an article on page 103 of the ACSM publication "Surveying and Mapping", June 1987.

FILLNET(tm) is unique in 2 significant respects. First it properly treats the type of work we've performed for you as an extension of the National Geodetic Reference System (NGRS). Secondly it uses **a-priori** weight estimations instead of the incomplete covariance model developed during initial GPS vector reductions, for modeling measurement errors. This is important because of deformations existing in and between the NGRS and the GPS satellite frame. Error in GPS vectors is treated as having a fixed component in x,y,z and a length dependent proportional component.

The most important information contained in the results of your adjusted GPS vectors are organized in 7 sections of data output and will be briefly explained in the following paragraphs.

SECTION 1.

PRELIMINARY COORDINATES:

	LAT.	LON.	ELEV.	G.H.	CONSTR.

LAT., LON. and ELEV. are initial estimates of the geodetic coordinates obtained either from published information or from the baseline reduction software. G.H., if present, is an estimate of the geoid height obtained from the NGS North American model. A geoid model has 2 components; an actual height above or below the ellipsoid and a tilt or slope between points. In rare circumstances standard errors will be assigned to a preliminary coordinate allowing that point to change. An example might occur when including NGRS 1st Order and 3rd Order points in a network; we might want the 3rd Order point to float within given limits.

SECTION 2.

VECTORS:

	DX	DY	DZ	LENGTH	ERROR CODES

Here are the measured Earth Centered Fixed (E.C.F.) coordinate differences in meters between the base and roving receiver obtained from postprocessing. The line length is a mark-to-mark 3-D value. Error codes express the **a-priori** fixed and proportional parts-per-million in the $\Delta x, \Delta y, \Delta z$ and length components. Weighting is very similar to the method used for EDM line lengths.

SECTION 3.

SHIFTS:

Shifts are expressed in meters in your local North, East, Elevation system. They indicate how much the preliminary coordinate has moved to get to its adjusted value. These numbers are usually small. One exception is when the initial reduction was done on the ellipsoid and the final elevations are linked to geoid heights and benchmarks. Then shifts are usually in the 20 to 30 meter range.

When verifying a number of NGRS stations we enter published values for preliminary coordinates, hold a minimum number fixed and examine the shifts as part of the quality control testing of fixed control.

SECTION 4.

ADJUSTED VECTORS, GROUP 1:

DX,DY,DZ V DN,DE,DU v v'

DX,DY,DZ express adjusted vector differences relative to measured values and are expressed in E.C.F. coordinate terms. V is the residual, which is the difference between the adjusted and measured values. These should be very small, 0.050 meter or less. E.C.F. coordinates are very hard to visualize because X,Y,Z only translate directly into values on the ground how a user would picture them at the North and South poles. FILLNET has computed the center of your project and rotated the vectors into the local geodetic horizon system. DN,DE,DU are the X,Y,Z, vectors translated into meaningful values along with their residuals, v. v' is the normalized residual which is a function of the weighted residual. v' is extremely useful in detecting bad vector components. We normally like to see any v' less than 3.0.

SECTION 5.

S.E. OF UNIT WEIGHT = 1.006

NUMBER OF -

OBS. EQUATIONS	115
UNKNOWNS	58
DEGREES OF FREEDOM	57
ITERATIONS	0

Standard Error of Unit Weight is the sum of the residuals squared divided by the degrees of freedom (redundancy), $_v /(m-n)$. The closer to 1.000 this value is, we then can say with a high degree of confidence we've weighted the vectors and developed the error model correctly. When comparing a minimally and fully fully constrained adjustment this value will usually show an increase under full constraint. If there are no systematic errors in the local coordinate system this value should not increase by more than 1.5 times the minimally constrained value.

OBS. EQUATIONS are the total GPS $_x,_y,_z$ values observed, UNKNOWNS are the number of new LAT.,

LON., ELEV. triplets being solved for and DEGREES OF FREEDOM are the number of observations minus the number of unknowns (m-n). Conventional surveying takes measured angles and distances and forms a series of nonlinear equations that are iterated in an adjustment until they converge in a solution. GPS observations are simple differences and the model is closely linear therefore iteration is rarely necessary. If the shifts indicate the PRELIMINARY COORDINATES were off by 50 meters or so, an iteration may be necessary and will be indicated in the ITERATIONS.

SECTION 6.

ADJUSTED POSITIONS:

LAT. LON. ELEV. STD. ERRORS (m)

LAT., LON. and ELEV. are the final adjusted coordinates. ELEV. may be either ellipsoidal or orthometric heights, depending on your project specifications. ***WARNING*** Elevations may appear to be orthometric elevations when in fact they are not. When specifications don't require precise elevations, we usually approximate orthometric heights in order to obtain the best state plane coordinate conversion factors possible. STD. ERRORS (m) are the linear components of the 3 error ellipsis centering on each point for the 1_ or 68.3% probability level. The 2_ or 95% confidence level is obtained by multiplying these standard errors by 1.96. 10ppm 2_ would be met by 5.1 ppm 1_ accuracies.

SECTION 7.

ACCURACIES (m):

D. LAT. D. LON. VERT.

The accuracies are the 1_ estimates of the error in each of the 3 components of the selected baselines. Baseline lengths are reduced to their mark-to-mark slope distances by the postprocessing software in the E.C.F. coordinate system. FILLNET rotates and translates these into the more meaningful differences of LAT., LON. and ELEV.

FULLY CONSTRAINED
LEAST SQUARES ADJUSTMENT

Used to connect the GPS network to the local control and test for distortions and systematic error.

This adjustment produces the final geodetic coordinates which are then converted to State Plane Coordinates in the selected State and Zone.

VERTICAL CONTROL ANALYSIS

PN 1269 - CRS CONSULTING ENGINEERS - FEMA PHOTOCONTROL

Vertical control for this project is referred exclusively to benchmark V 169.

V 169 is a National Geodetic Survey First Order benchmark and part of the level line running from Las Vegas through the Nevada Test Site, Beatty, Tonopah to Reno. It is published in both NVD29 and NVD88 datums.

The City of Las Vegas ran level loops through the project area in 1990. Table 1 indicates the published elevations of 8 City benchmarks observed as part of this project.

City benchmarks were established on BLM brass cap monuments attached to a 2"x 24" aluminum pipe set approximately 2' into the ground. The NGS benchmark is a 12"x 12" concrete column sunk over 4' down. Long term stability is a prime factor when NGS establishes a monument.

We've noted the published City elevations average 0.11' higher than our measurements, indicating either a settlement or ground subsidence on the City monuments or the NGS monument has risen in elevation; we belive the former has occurred.

Additionally, we are aware of a 0.08' closure discrepency between the City benchmarks with a line of leveling run by Clark County along Tonopah Highway. This occurrs at Ann Road.

If there is reason to adopt the City datum in preference to the NGS datum for this project we will be pleased to readjust the entire network at no additional charge.

PHOTO PANEL HEIGHTS

NAME	NORTH (Y)	EAST (X)	MEAS. HEIGHT	PUB. HEIGHT	MEAS - PUB
0802	26824094.985	751153.821	2471.27		
0803	26823954.499	766991.119	2413.30		
ER01	26824067.479	745909.424	2531.88	2531.96	-0.08
ER02	26818722.004	745953.589	2530.20	2530.28	-0.08
ER03	26821354.112	751267.417	2452.16	2452.25	-0.09
ER04	26818793.210	756682.406	2417.32		
ER05	26823937.102	761736.590	2400.91	2401.02	-0.11
ER06	26817040.122	761915.926	2377.45		
ER07	26820580.802	765820.496	2335.91		
FP01	26824063.930	744621.954	2559.26		
FP02	26821334.277	744582.768	2562.21		
FP03	26823993.881	747383.847	2530.28		
FP04	26821360.970	748635.244	2479.03		
FP05	26822826.726	749840.584	2473.50		
FP06	26824012.094	752506.019	2465.22	2465.32	-0.10
FP07	26821350.163	753904.022	2441.53		
FP08	26823979.378	756461.427	2425.96	2426.06	-0.10
FP09	26821346.556	756540.667	2428.75	2428.87	-0.12
FP10	26822535.560	760179.977	2411.43		
FP11	26824294.654	762391.395	2406.53		
FP12	26820091.119	764343.598	2373.75		
FP13	26818697.214	765817.995	2356.14		
FP14	26817258.290	767014.180	2343.41	2343.56	-0.15
FP15	26819745.683	767049.395	2350.64		
FP16	26821493.422	767013.491	2344.08		
NE01	26823895.010	767012.700	2411.95		
V169	26821170.367	743347.184	2593.77		0.00

PROGRAM FILLNET, Version 3.0.00
LICENSED TO: ASHTECH INC.

Fillnet Input File PN 1269 MAX 36.3 115.2

a = 6378137.000 1/f = 298.2572221 W Longitude positive WEST

PRELIMINARY COORDINATES:

			LAT.	LON.	ELEV.	G.H.	CONSTR.
1	FF	0802	36 20 9.67158	115 15 38.95760	751.952	-27.143	
2	FF	0803	36 20 7.71636	115 12 25.38609	736.120	-27.207	
3		ER01	36 20 9.56892	115 16 43.06210	770.437	-27.109	
4		ER02	36 19 16.70394	115 16 42.72776	769.924	-27.168	
5		ER03	36 19 42.74525	115 15 37.66369	743.859	-27.180	
6		ER04	36 19 17.05311	115 14 31.61086	737.557	-27.254	
7		ER05	36 20 7.74165	115 13 29.61206	732.565	-27.192	
8		ER06	36 18 59.52850	115 13 27.73327	725.401	-27.309	
9		ER07	36 19 34.39760	115 12 39.85315	712.726	-27.265	
10		FP01	36 20 9.57364	115 16 58.79889	778.778	-27.098	
11		FP02	36 19 42.76191	115 16 59.36321	777.403	-27.128	
12		FP03	36 20 8.79474	115 16 25.04296	769.945	-27.119	
13		FP04	36 19 42.89863	115 16 9.83343	752.049	-27.160	
14		FP05	36 19 57.35522	115 15 55.04305	750.366	-27.151	
15		FP06	36 20 8.80799	115 15 22.43367	750.120	-27.152	
16		FP07	36 19 42.61800	115 15 5.43974	740.620	-27.198	
17		FP08	36 20 8.34817	115 14 34.08807	740.177	-27.174	
18		FP09	36 19 42.30842	115 14 33.23290	741.039	-27.214	
19		FP10	36 19 53.93782	115 13 48.70089	735.755	-27.214	
20		FP11	36 20 11.25345	115 13 21.59232	734.260	-27.188	
21		FP12	36 19 29.61071	115 12 57.92548	724.273	-27.273	
22		FP13	36 19 15.77024	115 12 39.97230	718.908	-27.303	
23		FP14	36 19 1.49436	115 12 25.42234	715.026	-27.332	
24		FP15	36 19 26.09178	115 12 24.87372	717.229	-27.290	
25		FP16	36 19 43.37713	115 12 25.22963	715.229	-27.253	
26		NE01	36 20 7.12721	115 12 25.12513	735.914	-27.208	
27	F	V169	36 19 40.99684	115 17 14.48843	790.581	-27.118	

GROUP 1, NO. OF VECTORS AND BIAS CONSTRAINTS:

90 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000

VECTORS:

		DX	DY	DZ	LENGTH	ERROR CODES		
V169	ER02	533.610	-725.342	-614.860	1090.373	3 51.0	51.0	2
V169	FP01	580.392	312.419	703.468	964.016	3 51.0	51.0	2
V169	ER01	938.139	150.804	698.403	1179.243	3 51.0	51.0	2
V169	FP03	1338.674	-53.516	678.880	1501.929	3 51.0	51.0	2
V169	0802	2391.173	-516.502	690.015	2541.772	3 51.0	51.0	2
V169	FP06	2757.814	-705.320	667.442	2923.781	3 51.0	51.0	2
V169	ER04	3506.304	-2090.210	-626.593	4129.863	3 51.0	51.0	2
V169	ER06	4815.610	-3050.084	-1069.106	5799.664	3 51.0	51.0	2
FP07	ER04	568.516	-773.920	-634.808	1151.149	3 51.0	51.0	2
FP07	FP09	727.387	-342.070	-5.457	803.824	3 51.0	51.0	2
FP07	FP08	911.182	97.780	640.745	1118.198	3 51.0	51.0	2
FP07	FP06	-179.976	610.983	659.233	916.668	3 51.0	51.0	2
FP07	0802	-546.618	799.764	681.801	1184.595	3 51.0	51.0	2
FP07	FP03	-1599.102	1262.768	670.669	2145.112	3 51.0	51.0	2
FP07	ER01	-1999.630	1467.086	690.184	2574.338	3 51.0	51.0	2
FP07	FP01	-2357.386	1628.698	695.255	2948.441	3 51.0	51.0	2
FP07	FP02	-2581.385	1188.490	25.406	2841.954	3 51.0	51.0	2
FP07	V169	-2937.782	1316.297	-8.211	3219.203	3 51.0	51.0	2
FP07	ER02	-2404.169	590.957	-623.079	2552.937	3 51.0	51.0	2
FP07	FP04	-1454.398	681.715	13.763	1606.300	3 51.0	51.0	2
FP07	FP05	-1007.499	764.229	371.796	1318.079	3 51.0	51.0	2
FP07	ER03	-727.087	342.678	5.089	803.809	3 51.0	51.0	2
V169	ER06	4815.609	-3050.083	-1069.106	5799.662	3 51.0	51.0	2
V169	ER04	3506.304	-2090.209	-626.592	4129.862	3 51.0	51.0	2
V169	FP06	2757.814	-705.320	667.441	2923.780	3 51.0	51.0	2
V169	0802	2391.174	-516.501	690.015	2541.772	3 51.0	51.0	2
V169	FP03	1338.674	-53.517	678.881	1501.929	3 51.0	51.0	2
V169	ER01	938.139	150.805	698.402	1179.242	3 51.0	51.0	2
V169	FP01	580.391	312.418	703.468	964.016	3 51.0	51.0	2
V169	ER02	533.611	-725.342	-614.859	1090.373	3 51.0	51.0	2
FP07	ER03	-727.087	342.678	5.090	803.809	3 51.0	51.0	2
FP07	FP05	-1007.499	764.229	371.797	1318.079	3 51.0	51.0	2
FP07	FP04	-1454.395	681.717	13.767	1606.298	3 51.0	51.0	2
FP07	ER02	-2404.169	590.957	-623.077	2552.936	3 51.0	51.0	2
FP07	V169	-2937.782	1316.296	-8.212	3219.203	3 51.0	51.0	2
FP07	FP02	-2581.384	1188.491	25.405	2841.953	3 51.0	51.0	2
FP07	FP01	-2357.384	1628.699	695.253	2948.440	3 51.0	51.0	2
FP07	ER01	-1999.630	1467.087	690.184	2574.338	3 51.0	51.0	2
FP07	FP03	-1599.104	1262.769	670.668	2145.114	3 51.0	51.0	2
FP07	0802	-546.618	799.765	681.802	1184.597	3 51.0	51.0	2
FP07	FP06	-179.977	610.983	659.231	916.666	3 51.0	51.0	2
FP07	FP08	911.181	97.780	640.744	1118.197	3 51.0	51.0	2
FP07	FP09	727.385	-342.072	-5.457	803.823	3 51.0	51.0	2
FP07	ER04	568.518	-773.919	-634.808	1151.149	3 51.0	51.0	2
0803	NE01	1.448	-12.207	-14.876	19.298	3 51.0	51.0	2
0803	FP11	-1240.070	657.160	86.624	1406.107	3 51.0	51.0	2
0803	ER05	-1447.769	685.625	-1.604	1601.911	3 51.0	51.0	2
0803	FP08	-2900.359	1375.644	17.992	3210.109	3 51.0	51.0	2
0803	FP09	-3084.163	935.775	-628.199	3283.652	3 51.0	51.0	2
0803	ER04	-3243.025	503.941	-1257.538	3514.622	3 51.0	51.0	2
0803	ER06	-1933.739	-455.934	-1700.052	2614.842	3 51.0	51.0	2

0803	FP10	-1987.030	658.156	-342.515	2121.031	3	51.0	51.0	2
0803	FP12	-1026.606	-275.072	-953.525	1427.864	3	51.0	51.0	2
0803	FP13	-727.230	-690.570	-1300.477	1642.252	3	51.0	51.0	2
0803	FP14	-508.499	-1078.147	-1657.381	2041.540	3	51.0	51.0	2
0803	FP15	-305.611	-679.259	-1045.106	1283.370	3	51.0	51.0	2
0803	ER07	-577.548	-379.618	-841.473	1088.921	3	51.0	51.0	2
0803	FP16	-178.536	-388.451	-616.971	750.615	3	51.0	51.0	2
ER04	FP10	1255.987	154.231	915.045	1561.601	3	51.0	51.0	2
ER04	ER05	1795.241	181.687	1255.958	2198.484	3	51.0	51.0	2
ER04	FP11	2002.952	153.227	1344.186	2417.050	3	51.0	51.0	2
ER04	FP16	3064.483	-892.382	640.584	3255.418	3	51.0	51.0	2
ER04	ER07	2665.468	-883.577	416.096	2838.761	3	51.0	51.0	2
ER04	FP15	2937.403	-1183.185	212.448	3173.862	3	51.0	51.0	2
ER04	FP14	2734.522	-1582.068	-399.821	3184.401	3	51.0	51.0	2
ER04	FP13	2515.801	-1194.498	-42.928	2785.305	3	51.0	51.0	2
ER04	FP12	2216.413	-778.999	304.030	2368.915	3	51.0	51.0	2
0803	FP16	-178.536	-388.451	-616.971	750.615	3	51.0	51.0	2
0803	ER07	-577.548	-379.616	-841.472	1088.919	3	51.0	51.0	2
0803	FP15	-305.612	-679.259	-1045.106	1283.370	3	51.0	51.0	2
0803	FP14	-508.501	-1078.146	-1657.380	2041.539	3	51.0	51.0	2
0803	FP13	-727.227	-690.572	-1300.477	1642.251	3	51.0	51.0	2
0803	FP12	-1026.607	-275.072	-953.527	1427.866	3	51.0	51.0	2
0803	FP10	-1987.030	658.155	-342.519	2121.032	3	51.0	51.0	2
0803	ER06	-1933.737	-455.933	-1700.052	2614.840	3	51.0	51.0	2
0803	ER04	-3243.025	503.939	-1257.539	3514.622	3	51.0	51.0	2
0803	FP09	-3084.163	935.774	-628.199	3283.652	3	51.0	51.0	2
0803	FP08	-2900.358	1375.644	17.990	3210.109	3	51.0	51.0	2
0803	ER05	-1447.767	685.625	-1.605	1601.909	3	51.0	51.0	2
0803	FP11	-1240.071	657.159	86.622	1406.107	3	51.0	51.0	2
0803	NE01	1.448	-12.206	-14.875	19.296	3	51.0	51.0	2
ER04	FP12	2216.414	-778.999	304.029	2368.916	3	51.0	51.0	2
ER04	FP13	2515.799	-1194.498	-42.928	2785.303	3	51.0	51.0	2
ER04	FP14	2734.522	-1582.069	-399.822	3184.401	3	51.0	51.0	2
ER04	FP15	2937.402	-1183.185	212.449	3173.861	3	51.0	51.0	2
ER04	ER07	2665.466	-883.575	416.096	2838.758	3	51.0	51.0	2
ER04	FP16	3064.487	-892.383	640.584	3255.423	3	51.0	51.0	2
ER04	FP11	2002.949	153.227	1344.183	2417.046	3	51.0	51.0	2
ER04	ER05	1795.240	181.686	1255.957	2198.482	3	51.0	51.0	2
ER04	FP10	1255.990	154.229	915.045	1561.603	3	51.0	51.0	2

SHIFTS:

1	0.000	0.000	1.294
2	0.000	0.000	-0.544
3	-0.035	0.030	1.283
4	-0.031	0.020	1.281
5	-5.638	-0.431	3.560
6	-0.009	0.008	-0.756
7	0.002	-0.002	-0.765
8	0.004	0.006	-0.754
9	0.001	0.000	-0.739
10	-0.035	0.028	1.286
11	-5.635	-0.426	3.559
12	-0.035	0.027	1.287
13	-5.634	-0.428	3.560
14	-5.638	-0.429	3.559
15	-0.033	0.013	1.281
16	-5.640	-0.433	3.560
17	0.005	0.004	-0.743
18	0.009	0.003	-0.756
19	0.007	-0.001	-0.751
20	0.004	0.002	-0.749
21	0.004	-0.003	-0.753
22	0.002	0.000	-0.755
23	0.006	-0.007	-0.753
24	0.002	-0.007	-0.751
25	0.001	-0.002	-0.751
26	0.000	-0.000	-0.751
27	-0.031	0.023	0.000

ADJUSTED VECTORS, GROUP 1:

			DX,DY,DZ	V	DN,DE,DU	v	v'
V169	ER02	0236B	533.609	0.002	-749.570	0.001	0.5
			-725.337	0.005	791.658	-0.000	-0.1
			-614.862	-0.002	-18.179	-0.005	-1.0
V169	FP01	0236B	580.395	0.002	880.592	-0.002	-0.5
			312.413	-0.004	392.138	0.004	0.7
			703.466	-0.000	-10.520	0.002	0.4
V169	ER01	0236B	938.145	0.006	880.113	-0.002	-0.6
			150.800	-0.002	784.652	0.007	1.3
			698.398	-0.003	-18.428	-0.002	-0.4
V169	FP03	0236B	1338.676	0.003	855.894	0.000	0.1
			-53.520	-0.002	1234.058	0.003	0.6
			678.878	0.001	-18.430	0.001	0.3
V169	0802	0236B	2391.166	-0.005	882.150	-0.008	-2.1
			-516.517	-0.012	2383.514	0.001	0.2
			690.010	-0.001	-35.371	0.010	1.8
V169	FP06	0236B	2757.806	-0.004	855.244	0.005	1.3
			-705.314	0.009	2795.646	-0.008	-1.3
			667.439	0.002	-36.869	-0.003	-0.6
V169	ER04	0236B	3506.298	0.001	-740.836	-0.001	-0.3
			-2090.211	0.000	4062.561	0.001	0.2
			-626.601	-0.002	-49.898	-0.002	-0.3
V169	ER06	0236B	4815.585	-0.014	-1281.606	0.007	1.1
			-3050.080	0.005	5655.932	-0.015	-1.9
			-1069.104	0.010	-61.183	0.007	0.9
FP07	ER04	0236A	568.520	0.007	-782.871	0.000	0.1
			-773.920	-0.001	843.932	0.007	1.3
			-634.809	-0.001	-6.539	-0.002	-0.4
FP07	FP09	0236A	727.383	-0.003	-4.287	-0.002	-0.5
			-342.075	-0.005	803.804	-0.001	-0.1
			-5.456	0.002	-3.380	0.006	1.1
FP07	FP08	0236A	911.183	0.001	798.448	-0.000	-0.1
			97.782	0.004	782.829	-0.001	-0.1
			640.739	-0.003	-4.649	-0.005	-1.0
FP07	FP06	0236A	-179.971	0.003	813.209	-0.004	-1.3
			610.976	-0.006	-422.984	0.005	1.1
			659.231	-0.002	6.490	0.002	0.4
FP07	0802	0236A	-546.612	0.004	840.115	0.006	2.0
			799.773	0.010	-835.116	-0.001	-0.2
			681.801	-0.000	7.988	-0.009	-1.7
FP07	FP03	0236A	-1599.101	-0.004	813.859	-0.001	-0.2
			1262.770	0.002	-1984.572	-0.004	-0.8
			670.670	-0.001	24.929	-0.001	-0.2

FP07	ER01	0236A	-1999.632	-0.007	838.078	0.003	0.7
			1467.090	0.004	-2433.978	-0.008	-1.5
			690.190	0.003	24.931	0.001	0.2
FP07	FP01	0236A	-2357.382	-0.002	838.557	0.002	0.5
			1628.704	0.005	-2826.492	-0.004	-0.8
			695.258	-0.000	32.839	-0.003	-0.6
FP07	FP02	0236A	-2581.380	0.001	6.437	-0.000	-0.0
			1188.492	0.001	-2841.738	0.000	0.0
			25.410	-0.000	34.158	-0.001	-0.1
FP07	V169	0236A	-2937.777	-0.001	-42.035	-0.007	-1.5
			1316.290	-0.009	-3218.629	0.003	0.5
			-8.208	-0.002	43.359	0.005	0.8
FP07	ER02	0236A	-2404.168	-0.002	-791.606	-0.001	-0.2
			590.954	-0.006	-2426.972	0.001	0.2
			-623.071	0.004	25.180	0.007	1.2
FP07	FP04	0236A	-1454.394	0.001	9.666	0.003	0.7
			681.717	0.001	-1606.236	0.001	0.2
			13.768	0.002	10.097	-0.000	-0.0
FP07	FP05	0236A	-1007.496	-0.000	455.060	0.000	0.1
			764.229	-0.000	-1237.003	0.000	0.0
			371.798	0.000	8.534	0.000	0.1
FP07	ER03	0236A	-727.086	0.000	4.391	0.000	0.1
			342.678	0.000	-803.792	0.000	0.0
			5.091	0.001	2.622	0.000	0.1
V169	ER06	0236B	4815.585	-0.013	-1281.606	0.007	1.1
			-3050.080	0.004	5655.932	-0.014	-1.8
			-1069.104	0.010	-61.183	0.007	0.9
V169	ER04	0236B	3506.298	0.001	-740.836	-0.003	-0.5
			-2090.211	-0.001	4062.561	0.002	0.2
			-626.601	-0.003	-49.898	-0.002	-0.3
V169	FP06	0236B	2757.806	-0.004	855.244	0.006	1.5
			-705.314	0.009	2795.646	-0.008	-1.3
			667.439	0.003	-36.869	-0.003	-0.5
V169	0802	0236B	2391.166	-0.006	882.150	-0.009	-2.3
			-516.517	-0.013	2383.514	0.001	0.1
			690.010	-0.001	-35.371	0.011	2.0
V169	FP03	0236B	1338.676	0.003	855.894	0.000	0.1
			-53.520	-0.001	1234.058	0.003	0.6
			678.878	0.000	-18.430	0.000	0.0
V169	ER01	0236B	938.145	0.006	880.113	-0.002	-0.5
			150.800	-0.003	784.652	0.007	1.4
			698.398	-0.002	-18.428	-0.001	-0.1

V169	FP01	0236B	580.395	0.003	880.592	-0.001	-0.3
			312.413	-0.003	392.138	0.004	0.8
			703.466	-0.000	-10.520	0.001	0.2
V169	ER02	0236B	533.609	0.001	-749.570	0.000	0.1
			-725.337	0.005	791.658	-0.001	-0.2
			-614.862	-0.003	-18.179	-0.005	-1.1
FP07	ER03	0236A	-727.086	0.000	4.391	-0.000	-0.1
			342.678	0.000	-803.792	0.000	0.0
			5.091	-0.000	2.622	-0.000	-0.1
FP07	FP05	0236A	-1007.496	-0.000	455.060	-0.000	-0.1
			764.229	-0.000	-1237.003	0.000	0.0
			371.798	-0.001	8.534	-0.000	-0.1
FP07	FP04	0236A	-1454.394	-0.002	9.666	-0.003	-0.7
			681.717	-0.001	-1606.236	-0.001	-0.2
			13.768	-0.002	10.097	0.000	0.0
FP07	ER02	0236A	-2404.168	-0.002	-791.606	-0.002	-0.6
			590.954	-0.006	-2426.972	0.001	0.2
			-623.071	0.002	25.180	0.006	1.0
FP07	V169	0236A	-2937.777	-0.001	-42.035	-0.005	-1.2
			1316.290	-0.008	-3218.629	0.003	0.5
			-8.208	-0.001	43.359	0.005	0.8
FP07	FP02	0236A	-2581.380	-0.000	6.437	0.000	0.0
			1188.492	-0.000	-2841.738	-0.000	-0.0
			25.410	0.001	34.158	0.001	0.1
FP07	FP01	0236A	-2357.382	-0.004	838.557	0.003	0.6
			1628.704	0.004	-2826.492	-0.006	-1.0
			695.258	0.002	32.839	-0.001	-0.1
FP07	ER01	0236A	-1999.632	-0.007	838.078	0.002	0.6
			1467.090	0.003	-2433.978	-0.008	-1.4
			690.190	0.003	24.931	0.002	0.4
FP07	FP03	0236A	-1599.101	-0.002	813.859	0.000	0.0
			1262.770	0.001	-1984.572	-0.002	-0.4
			670.670	-0.000	24.929	-0.000	-0.1
FP07	0802	0236A	-546.612	0.004	840.115	0.005	1.6
			799.773	0.009	-835.116	-0.000	-0.1
			681.801	-0.001	7.988	-0.009	-1.7
FP07	FP06	0236A	-179.971	0.004	813.209	-0.002	-0.7
			610.976	-0.006	-422.984	0.006	1.2
			659.231	-0.000	6.490	0.003	0.6
FP07	FP08	0236A	911.183	0.002	798.448	0.001	0.2
			97.782	0.004	782.829	0.000	0.1
			640.739	-0.002	-4.649	-0.005	-1.0

FP07	FP09	0236A	727.383	-0.001	-4.287	-0.000	-0.0
			-342.075	-0.003	803.804	0.000	0.0
			-5.456	0.002	-3.380	0.004	0.7
FP07	ER04	0236A	568.520	0.005	-782.871	-0.001	-0.2
			-773.920	-0.002	843.932	0.005	1.0
			-634.809	-0.001	-6.539	-0.001	-0.1
0803	NE01	0226A	1.448	0.000	-18.162	0.001	0.2
			-12.206	0.001	6.507	-0.000	-0.0
			-14.875	0.000	-0.402	-0.000	-0.0
0803	FP11	0226A	-1240.068	-0.001	109.256	0.001	0.3
			657.160	-0.000	-1401.852	-0.001	-0.1
			86.628	0.002	-2.407	0.001	0.3
0803	ER05	0226A	-1447.771	-0.005	1.044	-0.000	-0.1
			685.623	-0.002	-1601.907	-0.004	-0.7
			-1.599	0.003	-4.121	0.005	1.0
0803	FP08	0226A	-2900.355	-0.002	20.311	-0.001	-0.2
			1375.640	-0.005	-3210.039	0.001	0.1
			18.000	0.003	2.754	0.006	1.1
0803	FP09	0226A	-3084.156	0.003	-782.424	0.001	0.3
			935.783	0.005	-3189.065	0.001	0.1
			-628.196	-0.002	4.024	-0.006	-1.0
0803	ER04	0226A	-3243.018	0.004	-1561.008	-0.017	-3.7
			503.937	-0.008	-3148.937	0.007	1.1
			-1257.549	-0.017	0.864	-0.006	-1.0
0803	ER06	0226A	-1933.731	0.009	-2101.778	-0.002	-0.5
			-455.932	-0.001	-1555.566	0.008	1.5
			-1700.052	-0.004	-10.421	-0.004	-0.8
0803	FP10	0226A	-1987.029	-0.001	-424.345	0.003	0.8
			658.161	0.004	-2078.149	-0.003	-0.5
			-342.510	0.002	-0.875	-0.001	-0.2
0803	FP12	0226A	-1026.607	-0.001	-1174.590	0.000	0.1
			-275.067	0.003	-811.784	-0.002	-0.4
			-953.524	-0.001	-11.635	-0.002	-0.5
0803	FP13	0226A	-727.227	0.005	-1601.316	-0.000	-0.0
			-690.565	0.002	-363.986	0.004	0.7
			-1300.478	-0.003	-16.776	-0.005	-0.9
0803	FP14	0226A	-508.503	-0.001	-2041.430	0.004	1.2
			-1078.138	0.005	-1.058	-0.003	-0.6
			-1657.377	0.002	-20.491	-0.003	-0.5
0803	FP15	0226A	-305.617	-0.004	-1283.171	0.000	0.1
			-679.254	0.003	12.682	-0.005	-0.9
			-1045.105	-0.000	-18.515	-0.001	-0.3

0803	ER07	0226A	-577.552	-0.003	-1027.096	-0.001	-0.3
			-379.626	-0.010	-360.947	0.002	0.4
			-841.465	0.007	-23.140	0.012	2.4
0803	FP16	0226A	-178.537	-0.000	-750.318	0.000	0.1
			-388.449	0.001	3.848	-0.000	-0.1
			-616.970	-0.000	-20.723	-0.001	-0.1
ER04	FP10	0226B	1255.990	0.003	1136.663	-0.004	-1.3
			154.224	-0.005	1070.788	0.005	0.9
			915.039	-0.003	-1.739	0.001	0.1
ER04	ER05	0226B	1795.247	0.006	1562.052	-0.000	-0.1
			181.686	0.002	1547.030	0.005	0.8
			1255.950	-0.004	-4.986	-0.006	-1.1
ER04	FP11	0236B	2002.950	-0.001	1670.264	-0.005	-1.2
			153.223	-0.001	1747.084	-0.001	-0.2
			1344.177	-0.005	-3.271	-0.002	-0.3
ER04	FP16	0236B	3064.481	0.002	810.690	-0.000	-0.0
			-892.387	-0.002	3152.785	0.003	0.4
			640.578	0.000	-21.587	0.001	0.1
ER04	ER07	0236B	2665.467	0.003	533.912	0.003	0.8
			-883.564	0.015	2787.990	-0.004	-0.7
			416.084	-0.007	-24.004	-0.016	-2.8
ER04	FP15	0236B	2937.402	0.004	277.837	-0.001	-0.1
			-1183.191	-0.004	3161.619	0.005	0.9
			212.444	0.001	-19.379	0.002	0.4
ER04	FP14	0236B	2734.516	-0.001	-480.422	-0.006	-1.4
			-1582.076	-0.007	3147.879	0.002	0.4
			-399.828	-0.003	-21.356	0.004	0.6
ER04	FP13	0236B	2515.791	-0.005	-40.309	-0.000	-0.1
			-1194.503	-0.004	2784.951	-0.003	-0.5
			-42.929	0.003	-17.640	0.006	1.1
ER04	FP12	0236B	2216.411	0.001	386.418	-0.002	-0.6
			-779.004	-0.004	2337.152	0.002	0.4
			304.025	-0.001	-12.499	0.002	0.3
0803	FP16	0226A	-178.537	-0.000	-750.318	0.000	0.1
			-388.449	0.001	3.848	-0.000	-0.1
			-616.970	-0.000	-20.723	-0.001	-0.1
0803	ER07	0226A	-577.552	-0.003	-1027.096	-0.003	-0.8
			-379.626	-0.012	-360.947	0.003	0.5
			-841.465	0.006	-23.140	0.013	2.5
0803	FP15	0226A	-305.617	-0.003	-1283.171	0.001	0.2
			-679.254	0.003	12.682	-0.004	-0.7
			-1045.105	-0.000	-18.515	-0.002	-0.3

0803	FP14	0226A	-508.503	0.001	-2041.430	0.003	0.9
			-1078.138	0.004	-1.058	-0.001	-0.1
			-1657.377	0.001	-20.491	-0.003	-0.6
0803	FP13	0226A	-727.227	0.002	-1601.316	0.000	0.1
			-690.565	0.004	-363.986	-0.000	-0.0
			-1300.478	-0.003	-16.776	-0.005	-1.0
0803	FP12	0226A	-1026.607	-0.000	-1174.590	0.002	0.7
			-275.067	0.003	-811.784	-0.001	-0.3
			-953.524	0.001	-11.635	-0.002	-0.3
0803	FP10	0226A	-1987.029	-0.001	-424.345	0.007	1.8
			658.161	0.005	-2078.149	-0.003	-0.6
			-342.510	0.006	-0.875	0.000	0.1
0803	ER06	0226A	-1933.731	0.007	-2101.778	-0.003	-0.8
			-455.932	-0.002	-1555.566	0.007	1.2
			-1700.052	-0.004	-10.421	-0.003	-0.5
0803	ER04	0226A	-3243.018	0.004	-1561.008	-0.015	-3.3
			503.937	-0.006	-3148.937	0.006	1.0
			-1257.549	-0.016	0.864	-0.007	-1.2
0803	FP09	0226A	-3084.156	0.003	-782.424	0.002	0.4
			935.783	0.006	-3189.065	0.000	0.0
			-628.196	-0.002	4.024	-0.007	-1.1
0803	FP08	0226A	-2900.355	-0.003	20.311	0.000	0.1
			1375.640	-0.005	-3210.039	-0.000	-0.0
			18.000	0.005	2.754	0.008	1.3
0803	ER05	0226A	-1447.771	-0.007	1.044	-0.000	-0.0
			685.623	-0.002	-1601.907	-0.005	-1.0
			-1.599	0.004	-4.121	0.006	1.2
0803	FP11	0226A	-1240.068	0.000	109.256	0.003	1.0
			657.160	0.001	-1401.852	-0.000	-0.0
			86.628	0.004	-2.407	0.001	0.3
0803	NE01	0226A	1.448	0.000	-18.162	-0.001	-0.2
			-12.206	-0.000	6.507	0.000	0.0
			-14.875	-0.001	-0.402	0.000	0.0
ER04	FP12	0236B	2216.411	0.000	386.418	-0.002	-0.4
			-779.004	-0.004	2337.152	0.002	0.3
			304.025	0.000	-12.499	0.003	0.5
ER04	FP13	0236B	2515.791	-0.003	-40.309	0.000	0.0
			-1194.503	-0.004	2784.951	-0.001	-0.2
			-42.929	0.003	-17.640	0.006	1.0
ER04	FP14	0236B	2734.516	-0.001	-480.422	-0.005	-1.1
			-1582.076	-0.006	3147.879	0.002	0.3
			-399.828	-0.002	-21.356	0.004	0.6

ER04	FP15	0236B	2937.402	0.005	277.837	-0.001	-0.3
			-1183.191	-0.004	3161.619	0.006	1.0
			212.444	-0.000	-19.379	0.002	0.3
ER04	ER07	0236B	2665.467	0.005	533.912	0.003	0.6
			-883.564	0.013	2787.990	-0.002	-0.3
			416.084	-0.007	-24.004	-0.015	-2.7
ER04	FP16	0236B	3064.481	-0.002	810.690	-0.001	-0.2
			-892.387	-0.001	3152.785	-0.001	-0.2
			640.578	0.000	-21.587	0.001	0.2
ER04	FP11	0236B	2002.950	0.002	1670.264	-0.001	-0.4
			153.223	-0.001	1747.084	0.002	0.3
			1344.177	-0.002	-3.271	-0.001	-0.2
ER04	ER05	0226B	1795.247	0.007	1562.052	0.001	0.3
			181.686	0.003	1547.030	0.005	0.9
			1255.950	-0.003	-4.986	-0.006	-1.2
ER04	FP10	0226B	1255.990	-0.000	1136.663	-0.004	-1.2
			154.224	-0.003	1070.788	0.001	0.2
			915.039	-0.003	-1.739	0.000	0.1

S.E. OF UNIT WEIGHT = 1.014

NUMBER OF -

OBS. EQUATIONS	272
UNKNOWNS	80
DEGREES OF FREEDOM	192
ITERATIONS	0

GROUP 1 ROT. ANGLES (sec.) AND SCALE DIFF. (ppm):

HOR. SYSTEM	0.000	0.000	0.403	-1.285
STD. ERRORS	0.001	0.001	0.105	0.752
XYZ SYSTEM	-0.138	-0.294	0.239	

ADJUSTED POSITIONS:

		LAT.	LON.	ELEV.	STD. ERRORS (m)		
1	0802	36 20 9.67158	115 15 38.95760	753.246	0.000	0.000	0.003
2	0803	36 20 7.71636	115 12 25.38609	735.576	0.000	0.000	0.003
3	ER01	36 20 9.56777	115 16 43.06088	771.720	0.003	0.005	0.003
4	ER02	36 19 16.70294	115 16 42.72696	771.208	0.003	0.005	0.003
5	ER03	36 19 42.56235	115 15 37.68097	747.419	0.003	0.005	0.004
6	ER04	36 19 17.05283	115 14 31.61055	736.801	0.002	0.003	0.003
7	ER05	36 20 7.74172	115 13 29.61213	731.800	0.002	0.003	0.004
8	ER06	36 18 59.52862	115 13 27.73301	724.647	0.003	0.004	0.004
9	ER07	36 19 34.39763	115 12 39.85314	711.987	0.002	0.003	0.004
10	FP01	36 20 9.57250	115 16 58.79776	780.064	0.003	0.005	0.003
11	FP02	36 19 42.57913	115 16 59.38029	780.962	0.004	0.006	0.005
12	FP03	36 20 8.79361	115 16 25.04190	771.232	0.003	0.004	0.003
13	FP04	36 19 42.71587	115 16 9.85061	755.609	0.003	0.005	0.004
14	FP05	36 19 57.17233	115 15 55.06025	753.925	0.003	0.005	0.004
15	FP06	36 20 8.80692	115 15 22.43315	751.401	0.002	0.004	0.003
16	FP07	36 19 42.43505	115 15 5.45710	744.180	0.002	0.002	0.002
17	FP08	36 20 8.34835	115 14 34.08791	739.434	0.002	0.003	0.003
18	FP09	36 19 42.30871	115 14 33.23277	740.283	0.002	0.003	0.003
19	FP10	36 19 53.93806	115 13 48.70094	735.004	0.002	0.003	0.004
20	FP11	36 20 11.25359	115 13 21.59225	733.511	0.002	0.003	0.004
21	FP12	36 19 29.61083	115 12 57.92560	723.520	0.002	0.003	0.004
22	FP13	36 19 15.77032	115 12 39.97229	718.153	0.002	0.003	0.004
23	FP14	36 19 1.49456	115 12 25.42262	714.273	0.003	0.003	0.004
24	FP15	36 19 26.09184	115 12 24.87402	716.478	0.002	0.003	0.004
25	FP16	36 19 43.37716	115 12 25.22970	714.478	0.002	0.003	0.004
26	NE01	36 20 7.12722	115 12 25.12513	735.163	0.002	0.004	0.004
27	V169	36 19 40.99582	115 17 14.48751	790.581	0.003	0.004	0.000

ADJUSTED COORDINATE DATA

NAD83 HORIZONTAL AND NVD29 VERTICAL

Contains Geographic and State Plane Coordinates

Additional coordinate information including;
precise and mean scale, elevation and combined factors.

Program NAD83 RUN DATE: 01/23/1996 RUN TIME: 16:51:25

PROJECT: PN 1269 - CRS Conulting Engineers - FEMA Mapping Control
SURVEYED BY: Associated Consulting Inc. - Las Vegas, Nevada
DATES OBSERVED: 20-23 January 1996
POSTPROCESSED: 22-23 January 1996

HORIZONTAL GEODETIC DATA BASED ON THE NAD83 DATUM
VERTICAL GEODETIC DATA BASED ON THE NVD29 DATUM

NAME	LATITUDE	LONGITUDE	ZONE	CONVERGENCE
0802	36 20 9.67158	115 15 38.95760	NV E	0 11 27.95
0803	36 20 7.71636	115 12 25.38609	NV E	0 13 22.63
ER01	36 20 9.56777	115 16 43.06088	NV E	0 10 49.96
ER02	36 19 16.70294	115 16 42.72696	NV E	0 10 49.93
ER03	36 19 42.56235	115 15 37.68097	NV E	0 11 28.58
ER04	36 19 17.05283	115 14 31.61055	NV E	0 12 7.60
ER05	36 20 7.74172	115 13 29.61213	NV E	0 12 44.58
ER06	36 18 59.52862	115 13 27.73301	NV E	0 12 45.35
ER07	36 19 34.39763	115 12 39.85314	NV E	0 13 13.89
FP01	36 20 9.57250	115 16 58.79776	NV E	0 10 40.64
FP02	36 19 42.57913	115 16 59.38029	NV E	0 10 40.18
FP03	36 20 8.79361	115 16 25.04190	NV E	0 11 .64
FP04	36 19 42.71587	115 16 9.85061	NV E	0 11 9.52
FP05	36 19 57.17233	115 15 55.06025	NV E	0 11 18.35
FP06	36 20 8.80692	115 15 22.43315	NV E	0 11 37.73
FP07	36 19 42.43505	115 15 5.45710	NV E	0 11 47.67
FP08	36 20 8.34835	115 14 34.08791	NV E	0 12 6.38
FP09	36 19 42.30871	115 14 33.23277	NV E	0 12 6.76
FP10	36 19 53.93806	115 13 48.70094	NV E	0 12 33.20
FP11	36 20 11.25359	115 13 21.59225	NV E	0 12 49.35
FP12	36 19 29.61083	115 12 57.92560	NV E	0 13 3.16
FP13	36 19 15.77032	115 12 39.97229	NV E	0 13 13.72
FP14	36 19 1.49456	115 12 25.42262	NV E	0 13 22.26
FP15	36 19 26.09184	115 12 24.87402	NV E	0 13 22.72
FP16	36 19 43.37716	115 12 25.22970	NV E	0 13 22.60
NE01	36 20 7.12722	115 12 25.12513	NV E	0 13 22.78
V169	36 19 40.99582	115 17 14.48751	NV E	0 10 31.22

NAME	NORTH (y) METERS	EAST (x) METERS	HEIGHT METERS	GEOID METERS	ELLIPS HT METERS
0802	8176000.503	228952.143	753.25	-27.14	726.10
0803	8175957.683	233779.360	735.58	-27.21	708.37
ER01	8175992.120	227353.647	771.72	-27.11	744.61
ER02	8174362.815	227367.109	771.21	-27.17	744.04
ER03	8175165.084	228986.767	747.42	-27.18	720.24
ER04	8174384.519	230637.259	736.80	-27.25	709.55
ER05	8175952.380	232177.777	731.80	-27.19	704.61
ER06	8173850.177	232232.439	724.65	-27.31	697.34
ER07	8174929.378	233422.554	711.99	-27.26	684.72
FP01	8175991.038	226961.225	780.06	-27.10	752.97
FP02	8175159.038	226949.281	780.96	-27.13	753.83
FP03	8175969.687	227803.052	771.23	-27.12	744.11
FP04	8175167.174	228184.479	755.61	-27.16	728.45
FP05	8175613.937	228551.867	753.92	-27.15	726.77
FP06	8175975.238	229364.293	751.40	-27.15	724.25
FP07	8175163.880	229790.405	744.18	-27.20	716.98
FP08	8175965.266	230569.904	739.43	-27.17	712.26
FP09	8175162.781	230594.056	740.28	-27.21	713.07
FP10	8175525.190	231703.320	735.00	-27.21	707.79
FP11	8176061.363	232377.362	733.51	-27.19	706.32
FP12	8174780.123	232972.395	723.52	-27.27	696.25
FP13	8174355.260	233421.792	718.15	-27.30	690.85
FP14	8173916.675	233786.390	714.27	-27.33	686.94
FP15	8174674.834	233797.123	716.48	-27.29	689.19
FP16	8175207.545	233786.180	714.48	-27.25	687.23
NE01	8175939.551	233785.939	735.16	-27.21	707.96
V169	8175109.078	226572.675	790.58	-27.12	763.46

1 METER = 3.2808333333 FEET U.S. Survey Foot

NAME	NORTH (y) FEET	EAST (x) FEET	HEIGHT FEET	GEOID FEET	ELLIPS HT FEET
0802	26824094.985	751153.821	2471.27	-89.05	2382.22
0803	26823954.499	766991.119	2413.30	-89.26	2324.04
ER01	26824067.479	745909.424	2531.88	-88.94	2442.94
ER02	26818722.004	745953.589	2530.20	-89.13	2441.06
ER03	26821354.112	751267.417	2452.16	-89.17	2362.98
ER04	26818793.210	756682.406	2417.32	-89.42	2327.91
ER05	26823937.102	761736.590	2400.91	-89.21	2311.70
ER06	26817040.122	761915.926	2377.45	-89.60	2287.85
ER07	26820580.802	765820.496	2335.91	-89.45	2246.46
FP01	26824063.930	744621.954	2559.26	-88.90	2470.36
FP02	26821334.277	744582.768	2562.21	-89.00	2473.20
FP03	26823993.881	747383.847	2530.28	-88.97	2441.31
FP04	26821360.970	748635.244	2479.03	-89.11	2389.92
FP05	26822826.726	749840.584	2473.50	-89.08	2384.42
FP06	26824012.094	752506.019	2465.22	-89.08	2376.14
FP07	26821350.163	753904.022	2441.53	-89.23	2352.30
FP08	26823979.378	756461.427	2425.96	-89.15	2336.81
FP09	26821346.556	756540.667	2428.75	-89.28	2339.46
FP10	26822535.560	760179.977	2411.43	-89.28	2322.14
FP11	26824294.654	762391.395	2406.53	-89.20	2317.33
FP12	26820091.119	764343.598	2373.75	-89.48	2284.27
FP13	26818697.214	765817.995	2356.14	-89.58	2266.56
FP14	26817258.290	767014.180	2343.41	-89.67	2253.74
FP15	26819745.683	767049.395	2350.64	-89.53	2261.11
FP16	26821493.422	767013.491	2344.08	-89.41	2254.67
NE01	26823895.010	767012.700	2411.95	-89.26	2322.68
V169	26821170.367	743347.184	2593.76	-88.97	2504.79

NAME	SCALE FACTOR	ELEVATION FACTOR	COMBINED FACTOR
0802	.99991032	.99988606	.99979639
0803	.99991405	.99988884	.99980290
ER01	.99990922	.99988315	.99979238
ER02	.99990922	.99988324	.99979248
ER03	.99991035	.99988698	.99979733
ER04	.99991156	.99988865	.99980022
ER05	.99991275	.99988943	.99980219
ER06	.99991280	.99989057	.99980337
ER07	.99991376	.99989255	.99980632
FP01	.99990895	.99988184	.99979080
FP02	.99990895	.99988170	.99979066
FP03	.99990952	.99988323	.99979276
FP04	.99990978	.99988569	.99979548
FP05	.99991004	.99988595	.99979600
FP06	.99991062	.99988635	.99979698
FP07	.99991093	.99988749	.99979843
FP08	.99991151	.99988823	.99979975
FP09	.99991153	.99988810	.99979964
FP10	.99991238	.99988893	.99980132
FP11	.99991291	.99988916	.99980208
FP12	.99991339	.99989074	.99980414
FP13	.99991376	.99989159	.99980535
FP14	.99991406	.99989220	.99980627
FP15	.99991407	.99989185	.99980593
FP16	.99991406	.99989216	.99980622
NE01	.99991406	.99988890	.99980297
V169	.99990870	.99988019	.99978890

STATE PLANE COORDINATE CONVERSION FACTORS

Mean Radius of Curvature (Ra)	=	6371707.699	Mtrs.
Mean Geoid Height	=	-27.2	Mtrs.
Mean Surface Elevation	=	744.	Mtrs.
Max. Elevation	=	790.6	Mtrs.
Min. Elevation	=	712.0	Mtrs.
Mean Elevation Factor	=	.99988755	
Mean Scale Factor	=	.99991160	
Combined Factor	=	.99979916	

To Convert an SPC Grid Distance to A Surface Distance
Multiply GRID * (1.00020088)

PHOTO PANEL HEIGHTS

NAME	NORTH (y)	EAST (X)	MON. HEIGHT	VERT. OFFSET	PANEL HEIGHT
0802	26824094.985	751153.821	2471.27		
0803	26823954.499	766991.119	2413.30		
ER01	26824067.479	745909.424	2531.88		
ER02	26818722.004	745953.589	2530.20		
ER03	26821354.112	751267.417	2452.16		
ER04	26818793.210	756682.406	2417.32		
ER05	26823937.102	761736.590	2400.91		
ER06	26817040.122	761915.926	2377.45		
ER07	26820580.802	765820.496	2335.91		
FP01	26824063.930	744621.954	2559.26		2559.26
FP02	26821334.277	744582.768	2562.21		2562.21
FP03	26823993.881	747383.847	2530.28		2530.28
FP04	26821360.970	748635.244	2479.03		2479.03
FP05	26822826.726	749840.584	2473.50		2473.50
FP06	26824012.094	752506.019	2465.22	0.50	2464.72
FP07	26821350.163	753904.022	2441.53	0.50	2441.03
FP08	26823979.378	756461.427	2425.96	0.50	2424.46
FP09	26821346.556	756540.667	2428.75	0.50	2428.25
FP10	26822535.560	760179.977	2411.43		2411.43
FP11	26824294.654	762391.395	2406.53		2406.53
FP12	26820091.119	764343.598	2373.75		2373.75
FP13	26818697.214	765817.995	2356.14		2356.14
FP14	26817258.290	767014.180	2343.41	0.50	2342.91
FP15	26819745.683	767049.395	2350.64		2350.64
FP16	26821493.422	767013.491	2344.08		2344.08
NE01	26823895.010	767012.700	2411.95		2411.95
V169	26821170.367	743347.184	2593.76		2593.76

ADJUSTED COORDINATE DATA

NAD83 HORIZONTAL AND NVD88 VERTICAL

Contains Geographic and State Plane Coordinates

Additional coordinate information including;
precise and mean scale, elevation and combined factors.

Program NAD83 RUN DATE: 01/24/1996 RUN TIME: 09:42:08

PROJECT: PN 1269 - CRS CONSULTING ENGINEERS - FEMA PHOTOCONTROL
SURVEYED BY: Associated Consulting Inc. - Las Vegas, Nevada
DATES OBSERVED: 20-22 January 1996
POSTPROCESSED: 20-23 January 1996

HORIZONTAL GEODETIC DATA BASED ON THE NAD83 DATUM
VERTICAL GEODETIC DATA BASED ON THE NVD88 DATUM

NAME	LATITUDE	LONGITUDE	ZONE	CONVERGENCE
0802	36 20 9.67158	115 15 38.95760	NV E	0 11 27.95
0803	36 20 7.71636	115 12 25.38609	NV E	0 13 22.63
ER01	36 20 9.56777	115 16 43.06088	NV E	0 10 49.96
ER02	36 19 16.70294	115 16 42.72696	NV E	0 10 49.93
ER03	36 19 42.56235	115 15 37.68097	NV E	0 11 28.58
ER04	36 19 17.05283	115 14 31.61055	NV E	0 12 7.60
ER05	36 20 7.74172	115 13 29.61213	NV E	0 12 44.58
ER06	36 18 59.52862	115 13 27.73301	NV E	0 12 45.35
ER07	36 19 34.39763	115 12 39.85314	NV E	0 13 13.89
FP01	36 20 9.57250	115 16 58.79776	NV E	0 10 40.64
FP02	36 19 42.57913	115 16 59.38029	NV E	0 10 40.18
FP03	36 20 8.79361	115 16 25.04190	NV E	0 11 .64
FP04	36 19 42.71587	115 16 9.85061	NV E	0 11 9.52
FP05	36 19 57.17233	115 15 55.06025	NV E	0 11 18.35
FP06	36 20 8.80692	115 15 22.43315	NV E	0 11 37.73
FP07	36 19 42.43505	115 15 5.45710	NV E	0 11 47.67
FP08	36 20 8.34835	115 14 34.08791	NV E	0 12 6.38
FP09	36 19 42.30871	115 14 33.23277	NV E	0 12 6.76
FP10	36 19 53.93806	115 13 48.70094	NV E	0 12 33.20
FP11	36 20 11.25359	115 13 21.59225	NV E	0 12 49.35
FP12	36 19 29.61083	115 12 57.92560	NV E	0 13 3.16
FP13	36 19 15.77032	115 12 39.97229	NV E	0 13 13.72
FP14	36 19 1.49456	115 12 25.42262	NV E	0 13 22.26
FP15	36 19 26.09184	115 12 24.87402	NV E	0 13 22.72
FP16	36 19 43.37716	115 12 25.22970	NV E	0 13 22.60
NE01	36 20 7.12722	115 12 25.12513	NV E	0 13 22.78
V169	36 19 40.99582	115 17 14.48751	NV E	0 10 31.22

NAME	NORTH (y) METERS	EAST (x) METERS	HEIGHT METERS	GEOID METERS	ELLIPS HT METERS
0802	8176000.503	228952.143	753.98	-27.14	726.84
0803	8175957.683	233779.360	736.31	-27.21	709.10
ER01	8175992.120	227353.647	772.45	-27.11	745.34
ER02	8174362.815	227367.109	771.94	-27.17	744.77
ER03	8175165.084	228986.767	748.15	-27.18	720.97
ER04	8174384.519	230637.259	737.53	-27.25	710.28
ER05	8175952.380	232177.777	732.53	-27.19	705.34
ER06	8173850.177	232232.439	725.38	-27.31	698.07
ER07	8174929.378	233422.554	712.72	-27.26	685.46
FP01	8175991.038	226961.225	780.80	-27.10	753.70
FP02	8175159.038	226949.281	781.70	-27.13	754.57
FP03	8175969.687	227803.052	771.97	-27.12	744.85
FP04	8175167.174	228184.479	756.34	-27.16	729.18
FP05	8175613.937	228551.867	754.66	-27.15	727.51
FP06	8175975.238	229364.293	752.14	-27.15	724.98
FP07	8175163.880	229790.405	744.91	-27.20	717.72
FP08	8175965.266	230569.904	740.17	-27.17	712.99
FP09	8175162.781	230594.056	741.02	-27.21	713.80
FP10	8175525.190	231703.320	735.74	-27.21	708.52
FP11	8176061.363	232377.362	734.24	-27.19	707.06
FP12	8174780.123	232972.395	724.25	-27.27	696.98
FP13	8174355.260	233421.792	718.89	-27.30	691.58
FP14	8173916.675	233786.390	715.01	-27.33	687.68
FP15	8174674.834	233797.123	717.21	-27.29	689.92
FP16	8175207.545	233786.180	715.21	-27.25	687.96
NE01	8175939.551	233785.939	735.90	-27.21	708.69
V169	8175109.078	226572.675	791.32	-27.12	764.20

1 METER = 3.2808333333 FEET U.S. Survey Foot

NAME	NORTH (y) FEET	EAST (x) FEET	HEIGHT FEET	GEOID FEET	ELLIPS HT FEET
0802	26824094.985	751153.821	2473.68	-89.05	2384.63
0803	26823954.499	766991.119	2415.71	-89.26	2326.45
ER01	26824067.479	745909.424	2534.29	-88.94	2445.35
ER02	26818722.004	745953.589	2532.60	-89.13	2443.47
ER03	26821354.112	751267.417	2454.57	-89.17	2365.39
ER04	26818793.210	756682.406	2419.73	-89.42	2330.31
ER05	26823937.102	761736.590	2403.32	-89.21	2314.11
ER06	26817040.122	761915.926	2379.85	-89.60	2290.26
ER07	26820580.802	765820.496	2338.32	-89.45	2248.87
FP01	26824063.930	744621.954	2561.67	-88.90	2472.76
FP02	26821334.277	744582.768	2564.61	-89.00	2475.61
FP03	26823993.881	747383.847	2532.69	-88.97	2443.72
FP04	26821360.970	748635.244	2481.44	-89.11	2392.33
FP05	26822826.726	749840.584	2475.91	-89.08	2386.83
FP06	26824012.094	752506.019	2467.63	-89.08	2378.55
FP07	26821350.163	753904.022	2443.94	-89.23	2354.71
FP08	26823979.378	756461.427	2428.37	-89.15	2339.21
FP09	26821346.556	756540.667	2431.15	-89.28	2341.87
FP10	26822535.560	760179.977	2413.83	-89.28	2324.55
FP11	26824294.654	762391.395	2408.94	-89.20	2319.74
FP12	26820091.119	764343.598	2376.16	-89.48	2286.68
FP13	26818697.214	765817.995	2358.55	-89.58	2268.97
FP14	26817258.290	767014.180	2345.82	-89.67	2256.15
FP15	26819745.683	767049.395	2353.05	-89.53	2263.52
FP16	26821493.422	767013.491	2346.49	-89.41	2257.08
NE01	26823895.010	767012.700	2414.36	-89.26	2325.09
V169	26821170.367	743347.184	2596.17	-88.97	2507.20

NAME	SCALE FACTOR	ELEVATION FACTOR	COMBINED FACTOR
0802	.99991032	.99988594	.99979628
0803	.99991405	.99988872	.99980279
ER01	.99990922	.99988304	.99979226
ER02	.99990922	.99988313	.99979236
ER03	.99991035	.99988686	.99979722
ER04	.99991156	.99988854	.99980011
ER05	.99991275	.99988931	.99980208
ER06	.99991280	.99989045	.99980326
ER07	.99991376	.99989243	.99980620
FP01	.99990895	.99988173	.99979069
FP02	.99990895	.99988159	.99979055
FP03	.99990952	.99988311	.99979265
FP04	.99990978	.99988557	.99979537
FP05	.99991004	.99988584	.99979589
FP06	.99991062	.99988623	.99979686
FP07	.99991093	.99988737	.99979831
FP08	.99991151	.99988811	.99979963
FP09	.99991153	.99988799	.99979952
FP10	.99991238	.99988881	.99980120
FP11	.99991291	.99988904	.99980197
FP12	.99991339	.99989063	.99980403
FP13	.99991376	.99989147	.99980524
FP14	.99991406	.99989209	.99980615
FP15	.99991407	.99989173	.99980581
FP16	.99991406	.99989204	.99980611
NE01	.99991406	.99988879	.99980286
V169	.99990870	.99988008	.99978879

STATE PLANE COORDINATE CONVERSION FACTORS

Mean Radius of Curvature (Ra)	=	6371707.699	Mtrs.
Mean Geoid Height	=	-27.2	Mtrs.
Mean Surface Elevation	=	745.	Mtrs.
Max. Elevation	=	791.3	Mtrs.
Min. Elevation	=	712.7	Mtrs.
Mean Elevation Factor	=	.99988743	
Mean Scale Factor	=	.99991160	
Combined Factor	=	.99979904	

To Convert an SPC Grid Distance to A Surface Distance
Multiply GRID * (1.00020100)

PHOTO PANEL HEIGHTS

NAME	NORTH (mtr)	EAST (mtr)	MON. HEIGHT	VERT. OFFSET	PANEL HEIGHT
0802	8176000.503	228952.143	753.98		
0803	8175957.683	233779.360	736.31		
ER01	8175992.120	227353.647	772.45		
ER02	8174362.815	227367.109	771.94		
ER03	8175165.084	228986.767	748.15		
ER04	8174384.519	230637.259	737.53		
ER05	8175952.380	232177.777	732.53		
ER06	8173850.177	232232.439	725.38		
ER07	8174929.378	233422.554	712.72		
FP01	8175991.038	226961.225	780.80		
FP02	8175159.038	226949.281	781.70		
FP03	8175969.687	227803.052	771.97		
FP04	8175167.174	228184.479	756.34		
FP05	8175613.937	228551.867	754.66		
FP06	8175975.238	229364.293	752.14	0.15	751.99
FP07	8175163.880	229790.405	744.91	0.15	744.76
FP08	8175965.266	230569.904	740.17	0.15	740.02
FP09	8175162.781	230594.056	741.02	0.15	741.87
FP10	8175525.190	231703.320	735.74		
FP11	8176061.363	232377.362	734.24		
FP12	8174780.123	232972.395	724.25		
FP13	8174355.260	233421.792	718.89		
FP14	8173916.675	233786.390	715.01	0.15	714.86
FP15	8174674.834	233797.123	717.21		
FP16	8175207.545	233786.180	715.21		
NE01	8175939.551	233785.939	735.90		
V169	8175109.078	226572.675	791.32		

MONUMENT DESCRIPTIONS

MONUMENT DESCRIPTIONS

PN 1269 - CRS CONSULTING ENGINEERS - FEMA PHOTOCONTROL

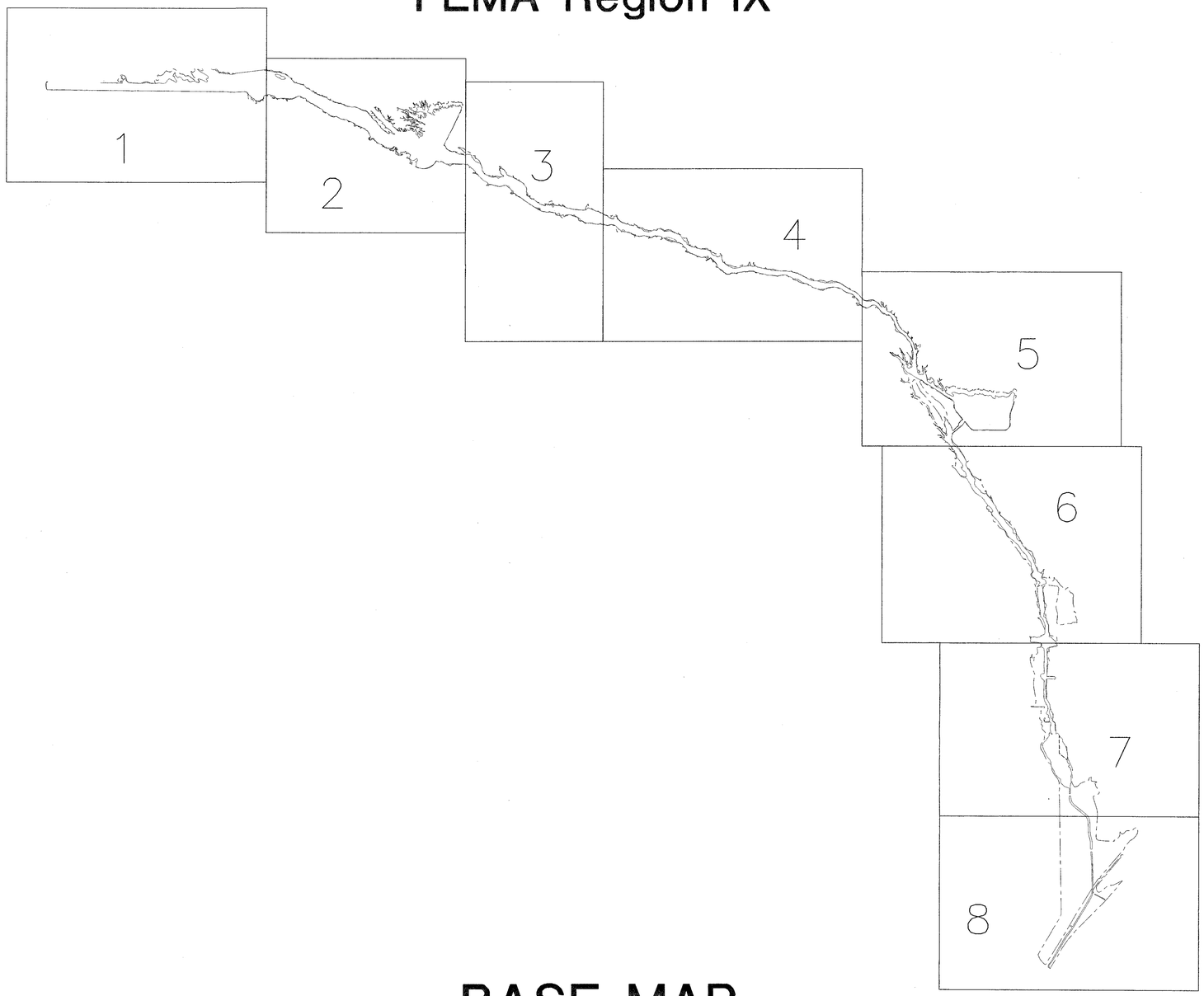
23 January 1996

POINT	DESCRIPTION	NVD88 m.	NVD29 ft.
0802	Clark Co. GIS mon. in conc. marked "0802" at Buffalo/Moccasin.		
0803	Clark Co. GIS mon. in conc. marked "0803" at Decatur/Moccasin.		
ER01	Brass cap in conc. marked "LS 1919". CLV BM 1LV90 5NES	772.477	2531.96
ER02	BLM B/C marked " S5/S8|S4/S9 T19S R60E 1990 CLV BM " in A/C. CLV BM 1LV90 8NES	771.970	2530.28
ER03	Alum. mon..marked " CLV 1/4 S4|S3 ". BM 1LV90 3W4	748.183	2452.25
ER04	CLV BM. Rivet and plate in conc. marked " CITY OF LAS VEGAS BM NO." (Not the BM listed in CLV bench book.)		
ER05	Brass cap in 3/4" I.P.. marked " 35/2|36/1 RLS 1919 1990 T18S R60E ". CLV BM 1LV90 2NES	732.566	2401.02
ER06	CLV BM. Rivet and plate in conc. marked " CLV BM NO. " (Not the BM listed in CLV bench book.)		
ER07	Set lead and brass tag in SE cor. of outflow marked " LS 5876 ".		
FP01	#5 Rebar w/ plastic cap marked "LS 5876". Flush w/ surf.		
FP02	#5 Rebar w/ plastic cap marked "LS 5876". Flush w/ surf.		
FP03	#5 Rebar w/ plastic cap marked "LS 5876". Flush w/ surf.		
FP04	#5 Rebar w/ plastic cap marked "LS 5876". Flush w/ surf.		
FP05	#5 Rebar w/ plastic cap marked "LS 5876". Flush w/ surf.		
FP06	BLM B/C marked " W1/16 S34|S3 1990 ". CLV BM 1LV90 3NNW6. 15cm. above surf.	752.165	2465.32
FP07	BLM B/C.marked " C1/4 S3 1990 ". 15cm. above surf.		
FP08	BLM B/C marked " S3/S34|S2/S35 T18S T19S R60E 1990 ". CLV BM 1LV90 3NES. 10cm. above surf.	740.199	2426.06
FP09	BLM B/C marked " 1/4 S3|S2 T19S R60E 1990 ". CLV BM 1LV90 2W4. 15cm above surf.	741.056	2428.87
FP10	#5 Rebar w/ plastic cap marked "LS 5876".		
FP11	#5 Rebar w/ plastic cap marked "LS 5876".		
FP12	#5 Rebar w/ plastic cap marked "LS 5876".		
FP13	#5 Rebar w/ plastic cap marked "LS 5876".		
FP14	BLM B/C marked " N1/16 S12|S7 1190 ". CLV BM 1LV90 12NEE6. 15cm. above surf.	715.054	2343.56
FP15	#5 Rebar w/ plastic cap marked "LS 5876".		
FP16	#5 Rebar w/ plastic cap marked "LS 5876".		
NE01	BLM B/C marked " S36/S1|S31/S6 T18S R60E T19S R61E 1990 " 10cm above surf.		
V169	USC&GS B/C in conc. marked " V169 1935 ".	791.316	790.582 (2593.77)

NOTES:

1. Points ER01 through ER07 are the ERM reference monuments.
2. Points FP01 through FP16 are the photocontrol panel points.
3. NE01 is the BLM brass cap at the NE cor. of Sec. 1 at Decatur/Moccasin which is a check point with other photocontrol.

Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County, Nevada
EMW-95-C-4840
FEMA Region IX



BASE MAP

UPPER LAS VEGAS WASH

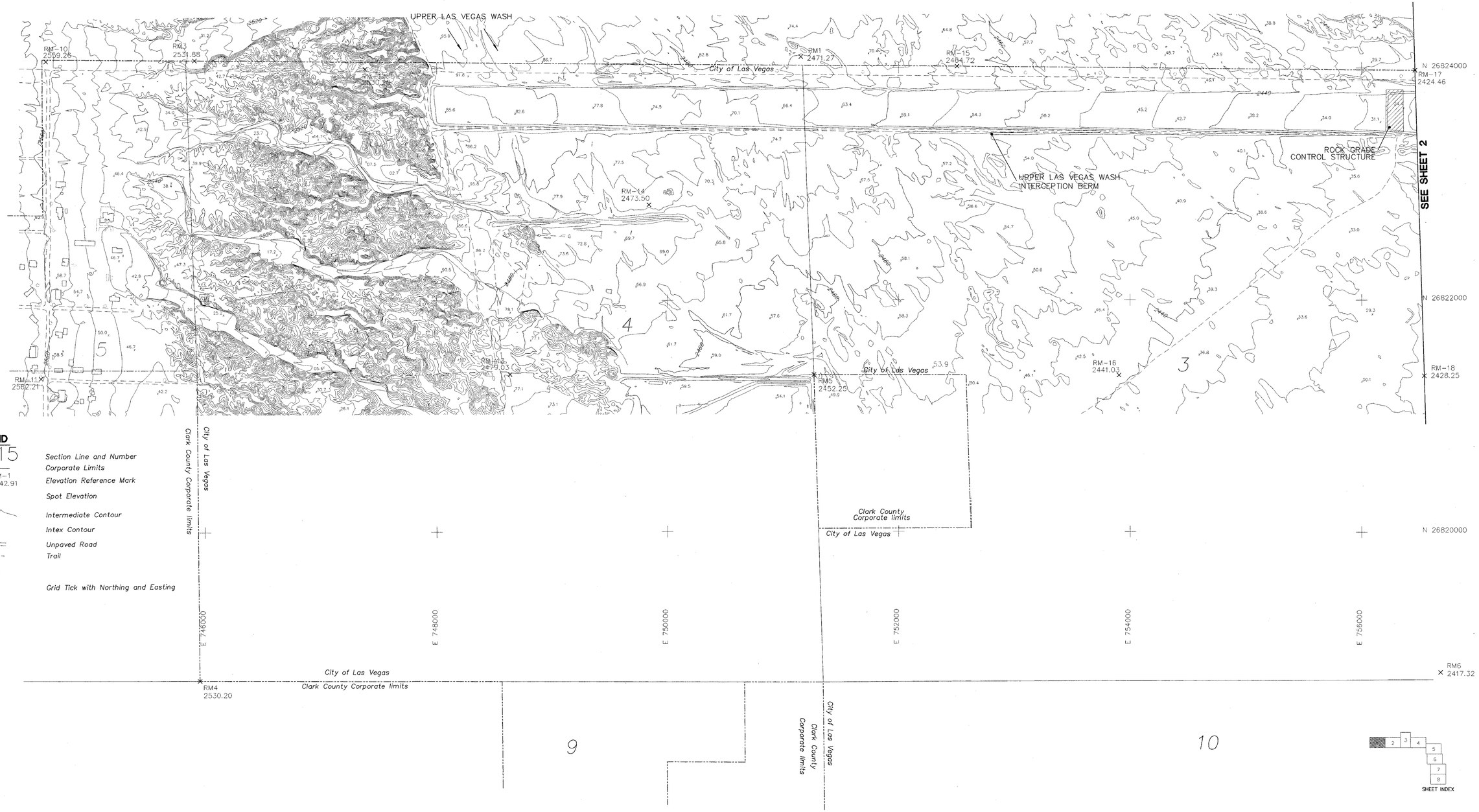
KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

JOB NUMBER: 50010.10

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691–3430
west sacramento tukwila
edmonton vancouver

RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING



LEGEND

- 15 — Section Line and Number
- Corporate Limits
- RM-1 × 2342.91 — Elevation Reference Mark
- 46.7 — Spot Elevation
- Intermediate Contour
- 2360 — Intex Contour
- Unpaved Road
- Trail
- N 26818000 E 766000 — Grid Tick with Northing and Easting

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE1.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver

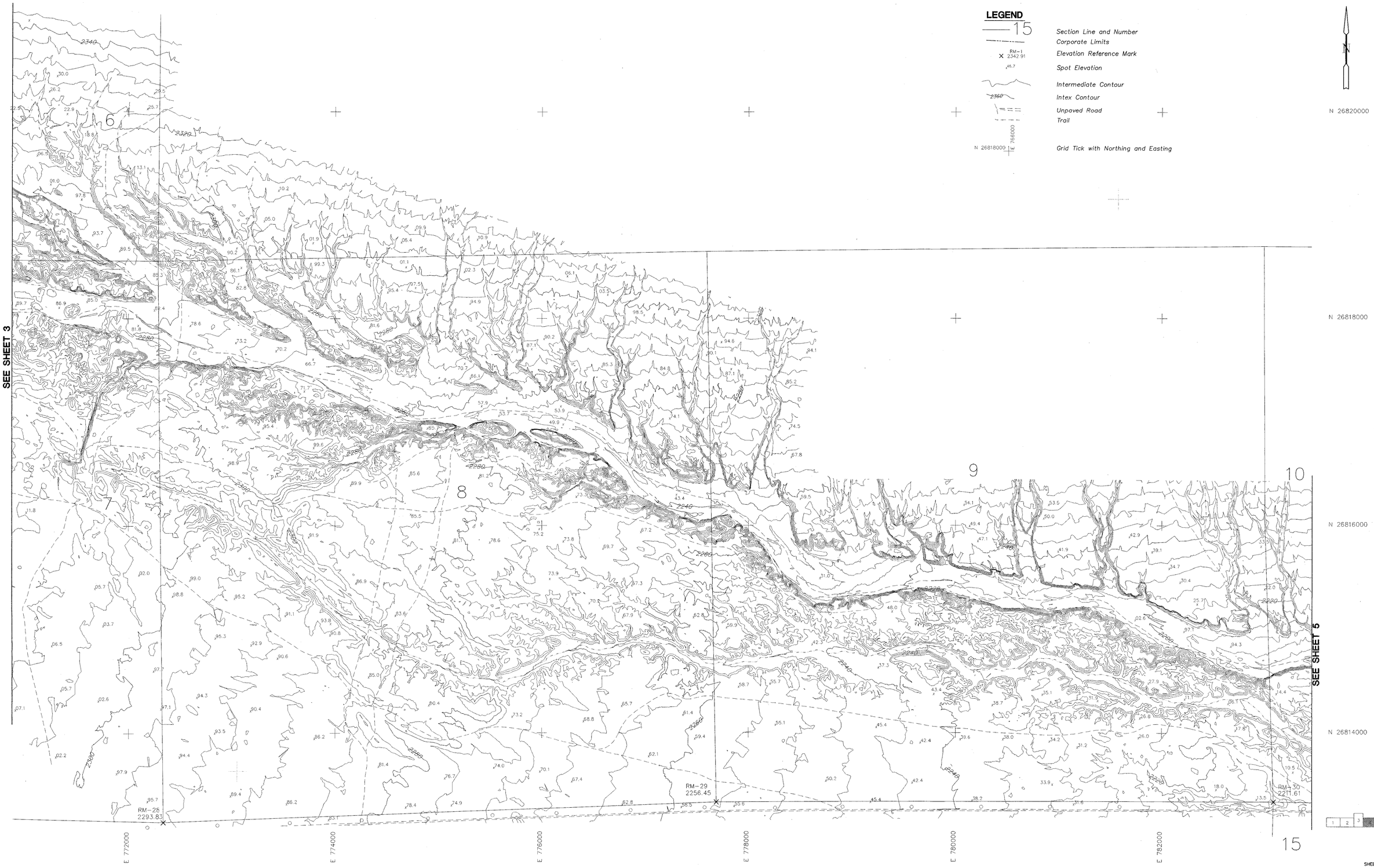
Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 1 OF 8

DATE: 4/6/98



REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE4.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 Industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING / HYDRAULIC MODEL TESTING / HYDRAULIC ANALYSIS AND DESIGN / COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING

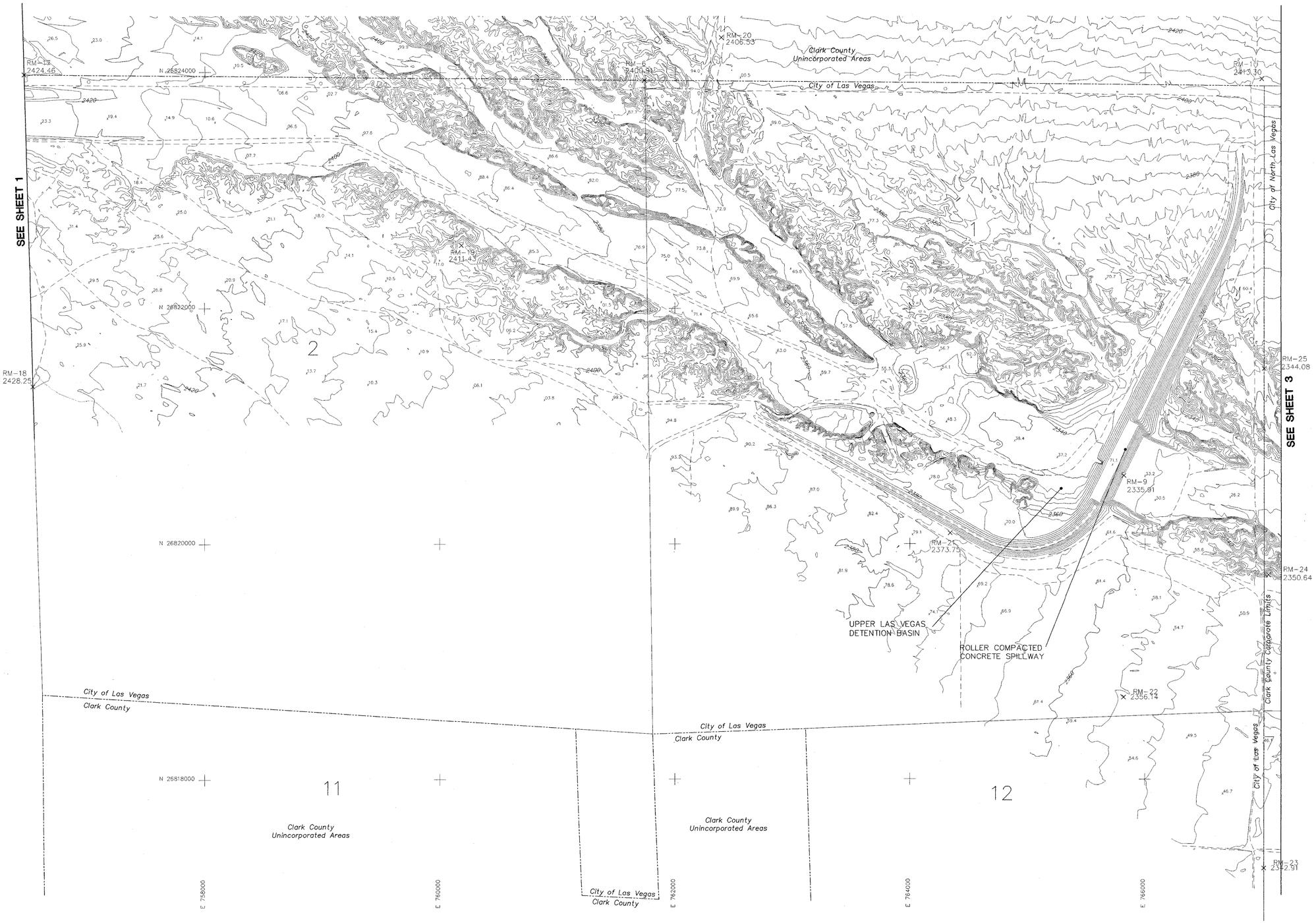
Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 4 OF 8

DATE: 4/6/98



REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE2.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/HYDRAULIC ENGINEERING

Flood Insurance Study of City of Las Vegas, City of North Las Vegas,
Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 2 OF 8

DATE: 4/6/98

RM-26
2411.86

Clark County
Unincorporated Areas

City of North Las Vegas

N 26824000

N 26822000

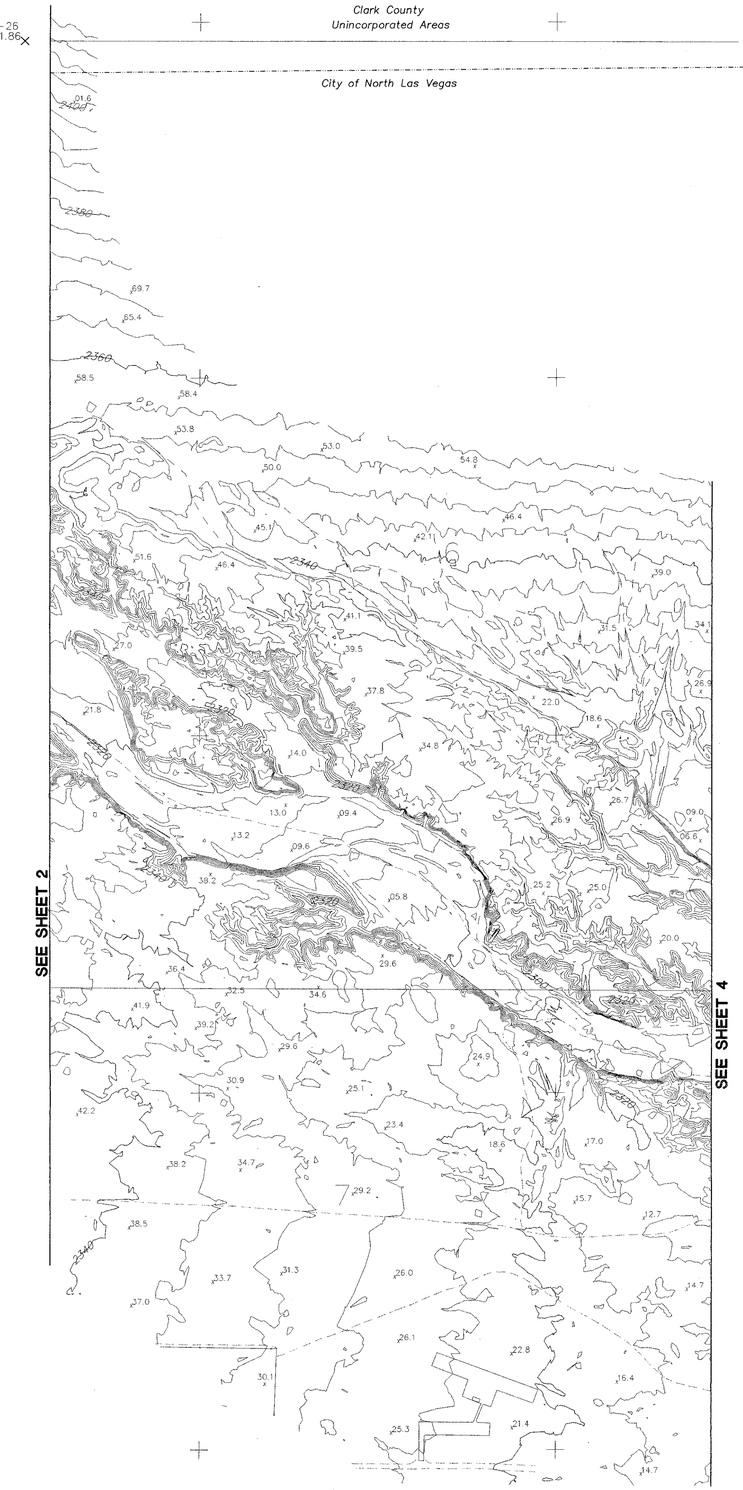
N 26820000

N 26818000

N 26816000

SEE SHEET 2

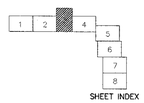
SEE SHEET 4



N

LEGEND

15	Section Line and Number
	Corporate Limits
RM-1 × 2342.91	Elevation Reference Mark
48.7	Spot Elevation
	Intermediate Contour
2360	Intex Contour
	Unpaved Road
	Trail
N 26818000 765000 E	Grid Tick with Northing and Easting



REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE3.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver

RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/HYDROGEOLOGY ENGINEERING

Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 3 OF 8

DATE: 4/6/98

SEE SHEET 5

N 26808000

N 26806000

N 26804000

N 26802000

N 26800000

E 786000

E 788000

E 790000

E 792000

E 794000

22

23

24

25

26

27

14

15

16022
× 2058.09

80023
× 2107.41

RM-33
2046.76

RM-34
2037.24

City of North Las Vegas

Las Vegas City of North Clark County Corporate Limits

Clark County Unincorporated Areas

CENTENNIAL PARKWAY

LOSEE ROAD

AZURE

BRUCE STREET

LEGEND

- 15 — Section Line and Number
- Corporate Limits
- RM-1 × 2342.91 — Elevation Reference Mark
- 46.7 — Spot Elevation
- Intermediate Contour
- 2360 — Intex Contour
- Unpaved Road
- Trail
- N 26818000 E 766000 — Grid Tick with Northing and Easting

SHEET INDEX: 1 2 3 4 5 7 8

SEE SHEET 7

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE6.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING

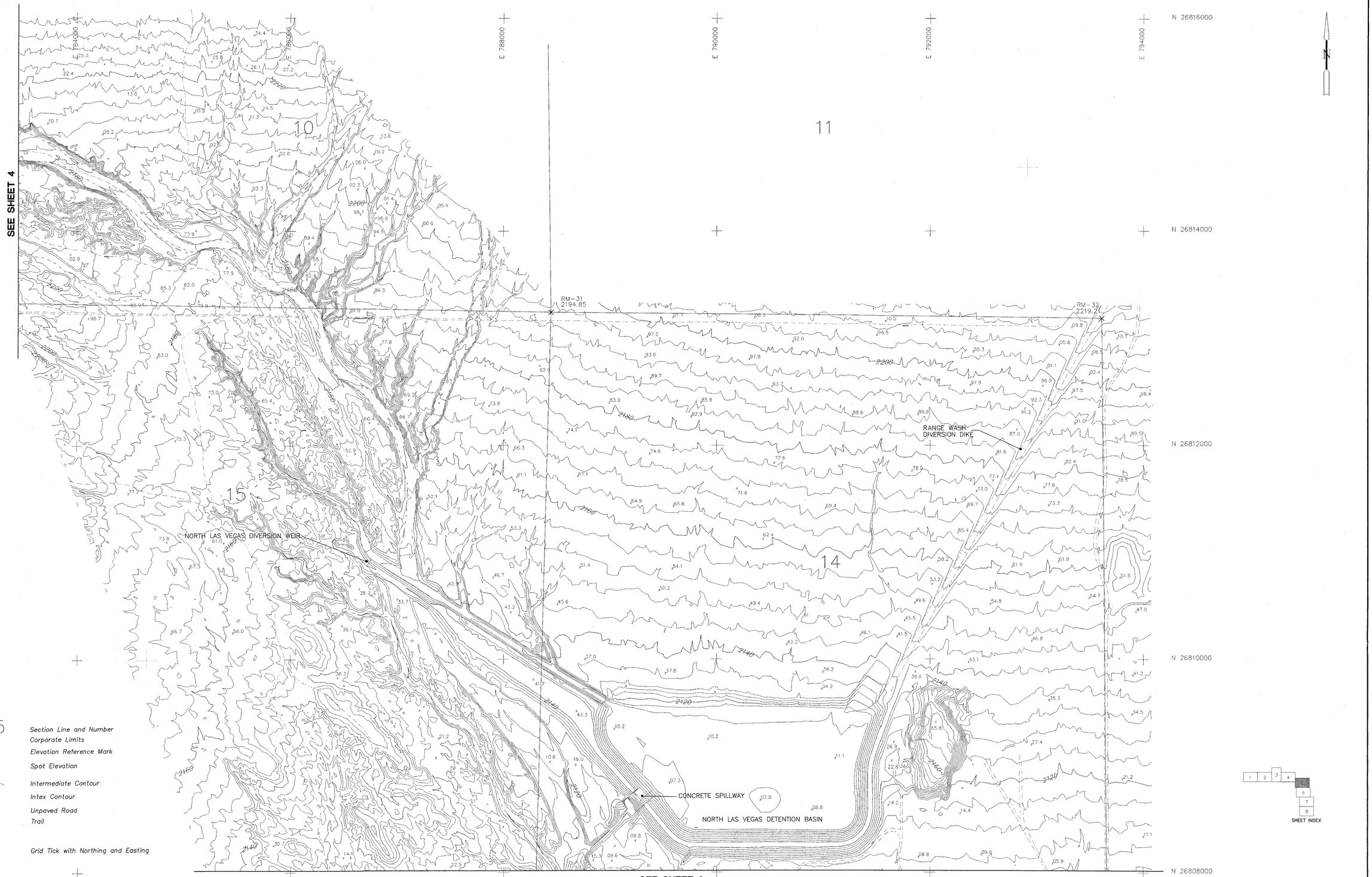
Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 6 OF 8

DATE: 4/6/98



LEGEND

- 15 — *Section Line and Number*
- *Corporate Limits*
- RM-1 × 2342.91 — *Elevation Reference Mark*
- 46.7 — *Spot Elevation*
- *Intermediate Contour*
- 2360 — *Intex Contour*
- *Unpaved Road*
- *Trail*
- N 26818000 766000 — *Grid Tick with Northing and Easting*

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE5.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING / HYDRAULIC MODEL TESTING / HYDRAULIC ANALYSIS AND DESIGN / COASTAL ENGINEERING
HYDROLOGY/STORM WATER ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING

Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

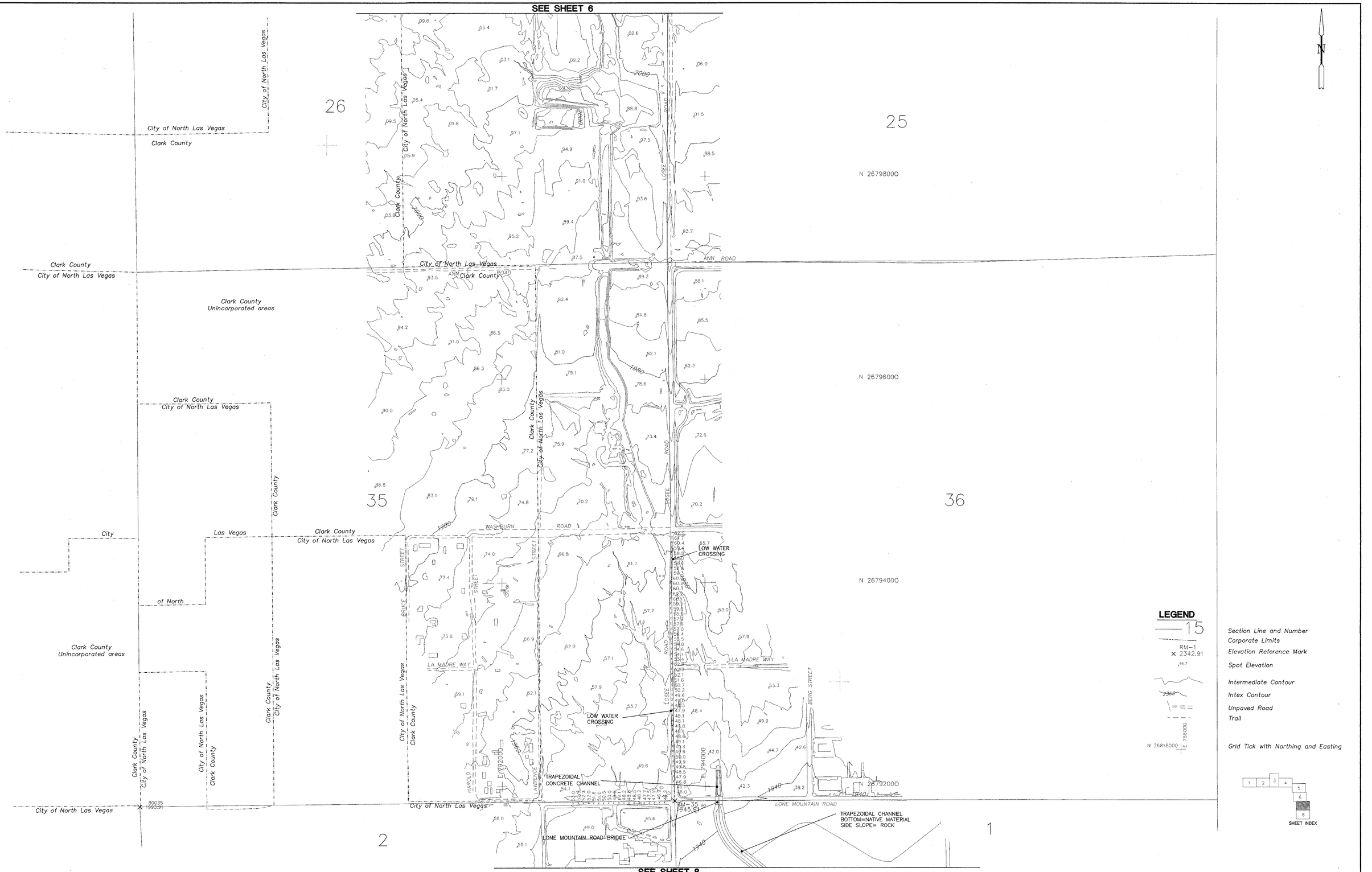
BASE MAP

UPPER LAS VEGAS WASH

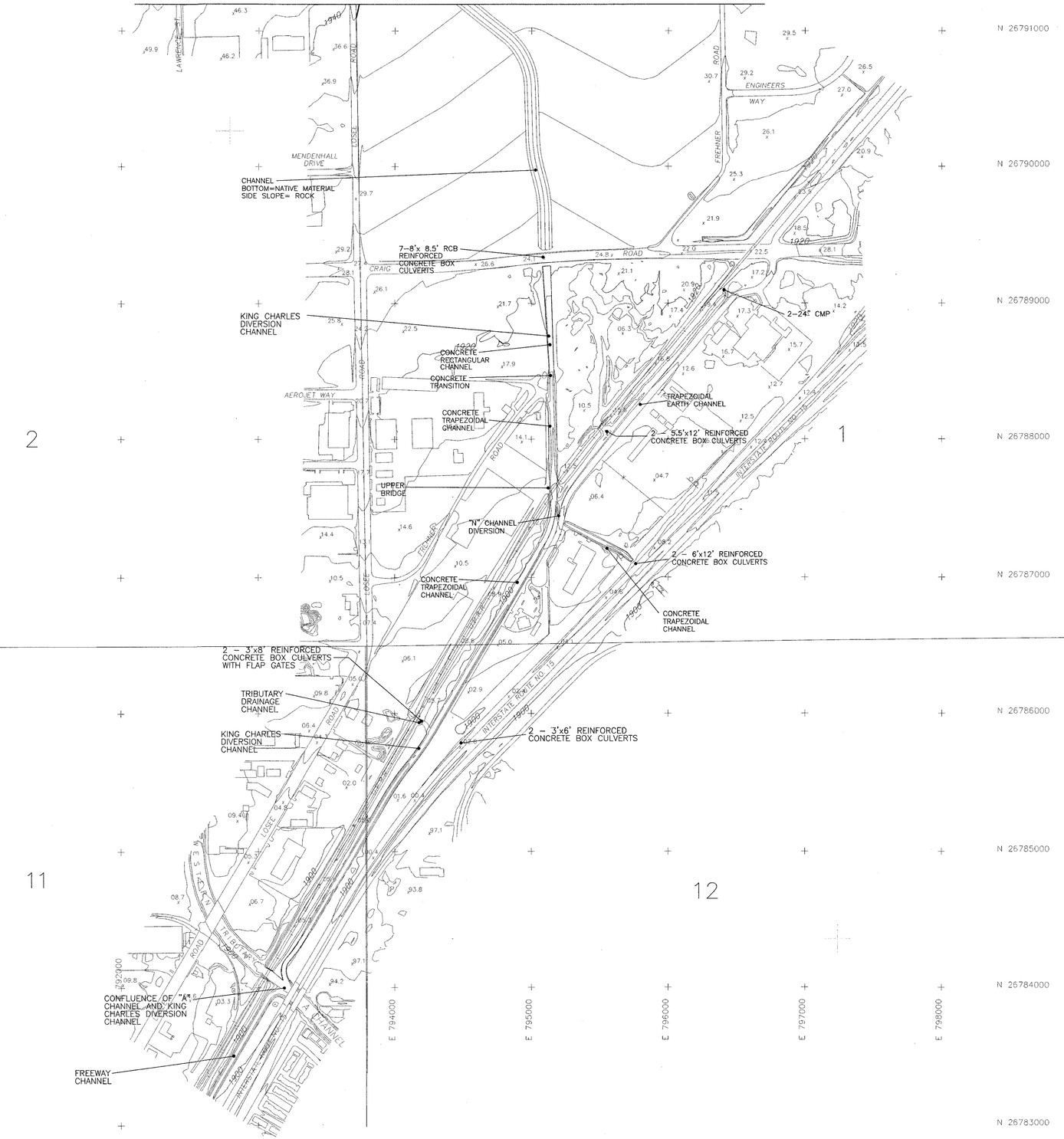
SHEET 5 OF 8

DATE: 4/6/98

SEE SHEET 6

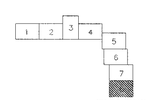

City of North Las Vegas
Clark County
City of North Las Vegas
Clark County
City of North Las Vegas
Clark County
Unincorporated areas
Clark County
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Clark County
City of North Las Vegas

SEE SHEET 7



LEGEND

- 15 — Section Line and Number
- Corporate Limits
- × RM-1 2342.91 — Elevation Reference Mark
- 46.7 — Spot Elevation
- Intermediate Contour
- 2350 — Intex Contour
- Unpaved Road
- Trail
- N 26818000 E 156000 — Grid Tick with Northing and Easting



SHEET INDEX

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: BASE8.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING

Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

BASE MAP

UPPER LAS VEGAS WASH

SHEET 8 OF 8

DATE: 4/6/98

UPPER LAS VEGAS WASH VOLUME 8

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 8
Work Maps
with North Las Vegas Detention Basin Diversion Dike

Study Contractor:	Northwest Hydraulic Consultants, Inc.
Contract:	EMW - 95 - C - 4840
Date Submitted:	April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 8
Work Maps - with North Las Vegas Detention Basin Diversion Dike

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A. Introduction to Volume 8

B. Work Maps

C. Reference Maps

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 8

This volume of the TSDN contains copies of the work maps and reference maps. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the work maps and reference maps for the '**With North Las Vegas Detention Basin Diversion Dike**' case. Volume 9 contains similar information for the "Without North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

SHEET NAME	FILE NAME	REF FILE
WORK MAP 1	SHT1-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 2	SHT2-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 3	SHT3-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 4	SHT4-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 5	SHT5-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 6	SHT6-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 7	SHT7-W.DWG	ALIGN-W.DWG, FP100-W.DWG
WORK MAP 8	SHT8-W.DWG	ALIGN-W.DWG, FP100-W.DWG

LAYER LIST FOR FILE: SHT1-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
2	2	CONTINUOUS	HOUSES/BUILDINGS
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
6	1	CONTINUOUS	
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	CONTINUOUS	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	TEXT FOR ERM
DEF_POINTS	255	CONTINUOUS	ALIGNMENT GRID FOR MATCHING
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS
SPTEXT	1	CONTINUOUS	SPOT ELEVATION TEXT
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	50	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	7	CONTINUOUS	CANOPY
FENCE	50	CONTINUOUS	FENCE
POOL	1	CONTINUOUS	POOL
TEXTL	3	CONTINUOUS	MISC. ANNOTATION
TXT	2	CONTINUOUS	MISC. ANNOTATION
UTIL	7	CONTINUOUS	MISC. UTILITIES
XPOLE	40	CONTINUOUS	EXISTING POLE
XWALL	50	CONTINUOUS	EXISTING WALL

-

LAYER LIST FOR FILE: SHT2-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
5	1	DASHED	UNIMPROVED ROADS
12	51	DASHED	CORPORATE BOUNDARIES
21	4	CONTINUOUS	ANNOTATION (ROAD NAMES)
55	2	CONTINUOUS	CONTOUR LINES
63	2	CONTINUOUS	MISCELLANEOUS
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	2	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	3	PHANTOM2	INDEX CONTOUR LINES
LG-TXT	2	CONTINUOUS	TITLE BLOCK TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	2	CONTINUOUS	TITLE BLOCK TEXT
ML	3	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	5	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	3	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	2	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CTEXT	1	CONTINUOUS	CONTOUR INDEX TEXT
TRL	1	CONTINUOUS	TRAIL
TXT	1	CONTINUOUS	MISCELLANEOUS TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

-

LAYER LIST FOR FILE: SHT3-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT

LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	1	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	BUILDING
FENCE	1	CONTINUOUS	FENCE LINE
FENCTICK	1	CONTINUOUS	TEXT FOR ERM
PAVEMENT	1	CONTINUOUS	PAVEMENT
TXT	2	CONTINUOUS	MISC. TEXT

-

LAYER LIST FOR FILE: SHT4-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
TRL	1	DASHED	TRAIL
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

-

LAYER LIST FOR FILE: SHT5-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
RET	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XWALL	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES

-

LAYER LIST FOR FILE: SHT6-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
2	1	CONTINUOUS	
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT

HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
NLV	3	DIVIDE2	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

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LAYER LIST FOR FILE: SHT7-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
1	1	CONTINUOUS	SHEET CORNERS/ROADS
2	1	CONTINUOUS	HOUSES/BUILDINGS
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
40	1	CONTINUOUS	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE

BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
PAVEMENT	1	CONTINUOUS	PAVEMENT
TXT	2	CONTINUOUS	MISC. TEXT

-

LAYER LIST FOR FILE: SHT8-W.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
1	1	CONTINUOUS	SHEET CORNERS/ROADS
2	1	CONTINUOUS	HOUSES/BUILDINGS
5	1	DASHED	UNIMPROVED ROADS
8	1	CONTINUOUS	RAILROAD
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	1	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
40	1	CONTINUOUS	BRIDGES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
CHANNEL-EX	1	CONTINUOUS	EXISTING CHANNEL
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LN_MNT_CONT	6	CONTINUOUS	CONTOUR LINES FROM BSI SITE IMPROVEMENTS
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
CONC	1	CONTINUOUS	CONCRETE
FENCE	1	CONTINUOUS	FENCE
FENCTICK	1	CONTINUOUS	FENCE X
OBBLDG	1	HIDDEN	BUILDING
PAVEMENT	1	CONTINUOUS	PAVEMENT
PIPE	1	CONTINUOUS	PIPE
RET	1	CONTINUOUS	CHANNEL
TANK	1	CONTINUOUS	TANK
TXT	2	CONTINUOUS	MISC. TEXT

XMSIGN	1	CONTINUOUS	HIGHWAY SIGN
XSBKBK	1	CONTINUOUS	SIGN
XWALL	1	CONTINUOUS	WALL

-

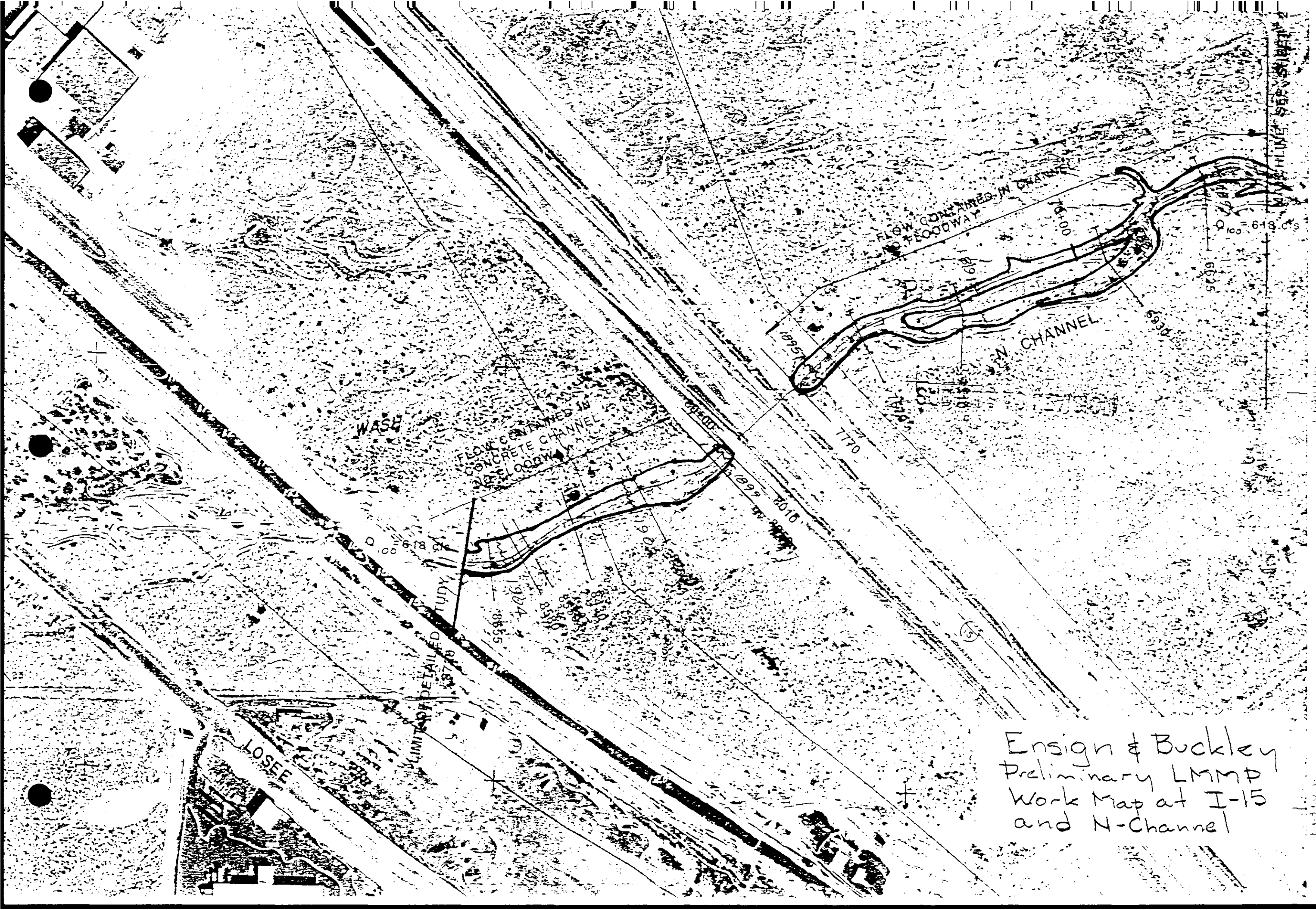
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LAYER	COLOR	LINETYPE	DESCRIPTION
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BASELINE	3	CENTER	X-SECTION LABELS
STA-INT	4	CONTINUOUS	X-SECTIONS AT THEIR LOCATIONS
STA	3	CONTINUOUS	STATION INCREMENT/HIGHLIGHT @ 1000'
X-SCTLBL	4	CONTINUOUS	STATION CALLOUT
X-SECTS	4	CONTINUOUS	CENTERLINE

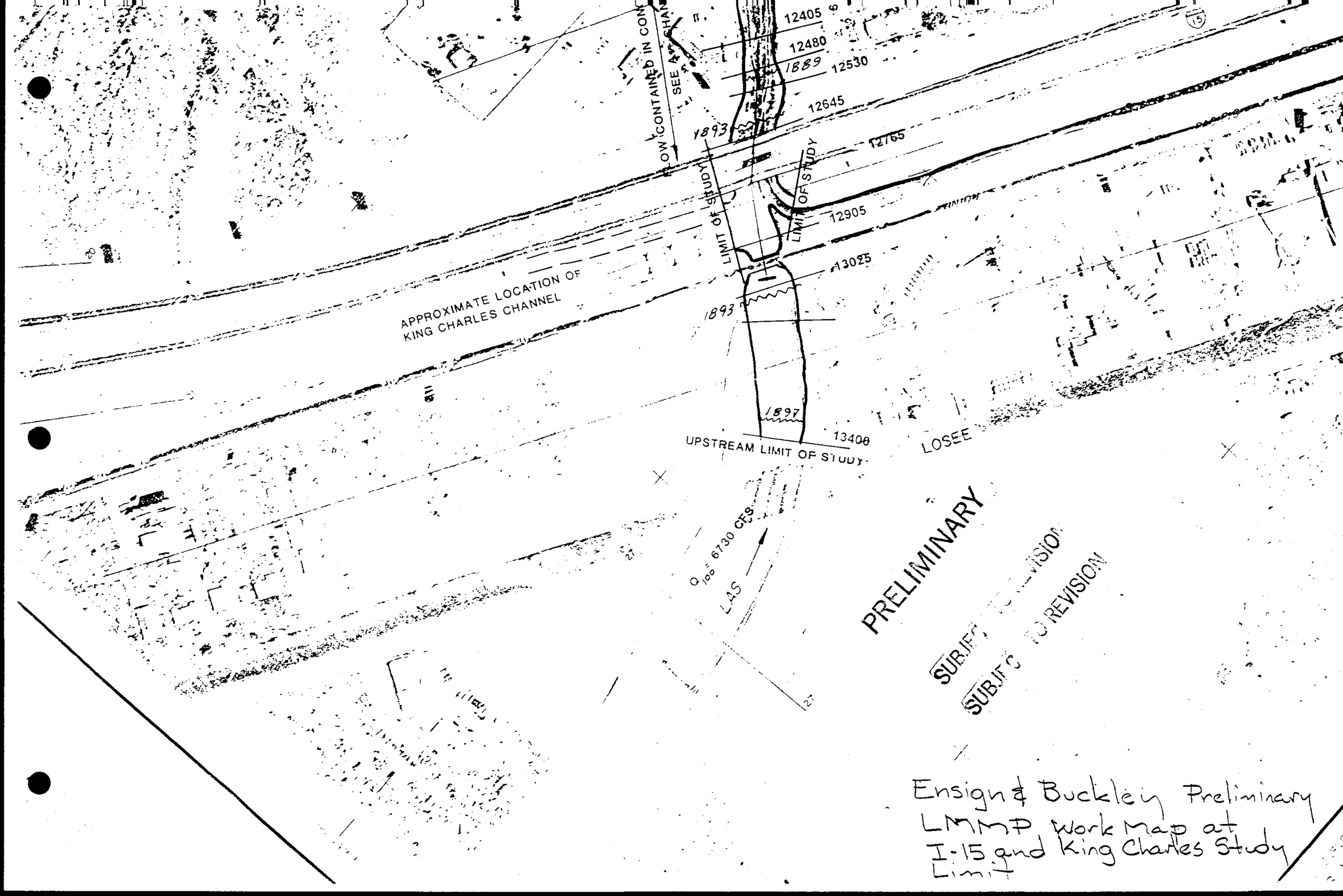
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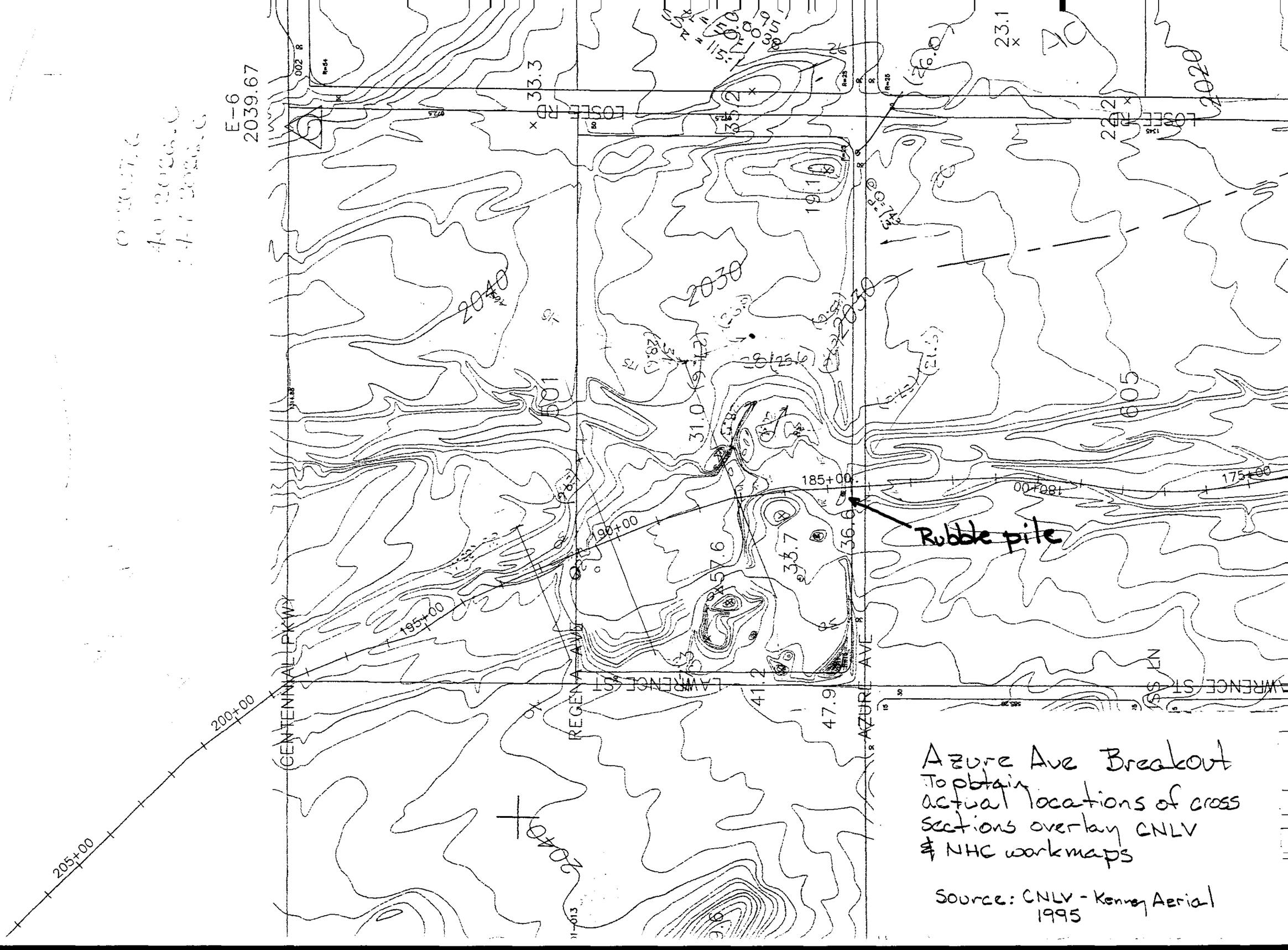
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25	4	CONTINUOUS	100 YEAR FLOOD LIMIT LINE
26	6	CENTER	500 YEAR FLOOD LIMIT LINE
41	6	CONTINUOUS	LIMIT OF STUDY
48	3	CONTINUOUS	BASE FLOOD ELEVATION LINE
ANNOBJ	2	CONTINUOUS	LEADERS
BASE-TX	3	CONTINUOUS	ANNOTATIONS/CALLOUTS
DEF_POINTS	7	CONTINUOUS	ALIGNMENT GRIDS
HIDDEN	3	HIDDEN	ZONE AE & AO SUBBOUNDARY
SHADING	113	CONTINUOUS	SHADING BETWEEN 100 & 500 YEAR FLOOD
TEXTL	3	CONTINUOUS	MISC. TEXT/CALLOUTS



Ensign & Buckley
Preliminary LMMP
Work Map at I-15
and N-Channel



Ensign & Buckley Preliminary LMMP Work Map at I-15 and King Charles Study Limit



Azure Ave Breakout
To obtain actual locations of cross sections overlay CNLV & NHC workmaps

Source: CNLV - Kenney Aerial 1995

BSI Mapping and Craig Site Improvements overlain on CNLV Topo

Scale: 1"=200'
NAVD 1988

C-4
C-5
C-6
C-7
C-8
C-9
C-10
C-11
C-12
C-13
C-14

ROAD
MOUNTAIN

Reference Map CDs in other binder

UPPER LAS VEGAS WASH VOLUME 9

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 9
Work Maps
without North Las Vegas Detention Basin Diversion Dike

Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Index to Volume 9
Work Maps - without North Las Vegas Detention Basin Diversion Dike

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A. Introduction to Volume 9

B. Work Maps

C. Reference Maps

TSDN - Flood Insurance Study

Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

Introduction to Volume 9

This volume of the TSDN contains copies of the work maps and reference maps. The study was completed for two cases due to uncertainty regarding the performance of the North Las Vegas Detention Basin Diversion Dike during a major flood event. This volume contains the work maps and reference maps for the '**Without North Las Vegas Detention Basin Diversion Dike**' case. Volume 9 contains similar information for the "With North Las Vegas Detention Basin Diversion Dike'. A discussion of the evaluation of the diversion dike and other flood control structures in the study area is included in Volume 2.

SHEET NAME	FILE NAME	REF FILES
WORK MAP 1	SHT1-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 2	SHT2-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 3	SHT3-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 4	SHT4-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 5	SHT5-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 6	SHT6-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 7	SHT7-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG
WORK MAP 8	SHT8-WO.DWG	ALIGN-WO.DWG, FP100-WO.DWG

LAYER LIST FOR FILE: ALIGN-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
BASELINE	3	CENTER	CENTERLINE
STA	3	CONTINUOUS	STATION CALLOUT
STAINC	1	CONTINUOUS	STATIONING EVERY 100'
STA-INT	4	CONTINUOUS	STATION INCREMENT/HIGHLIGHT @ 1000'
X-SCTLBL	4	CONTINUOUS	X-SECTION LABELS
X-SECT	4	CONTINUOUS	X-SECTIONS AT THEIR LOCATIONS

LAYER LIST FOR FILE: FP100W-O.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
25	4	CONTINUOUS	100 YEAR FLOOD LIMIT LINE
26	6	CENTER	500 YEAR FLOOD LIMIT LINE
41	6	CONTINUOUS	LIMIT OF STUDY
48	3	CONTINUOUS	BASE FLOOD ELEVATION LINE
ANNOBJ	2	CONTINUOUS	LEADERS
BASE-TX	3	CONTINUOUS	ANNOTATIONS/CALLOUTS
DEF_POINTS	7	CONTINUOUS	ALIGNMENT GRIDS
HIDDEN	3	HIDDEN	ZONE AE & AO SUBBOUNDARY
SHADING	113	CONTINUOUS	SHADING BETWEEN 100 & 500 YEAR FLOOD
TEXTL	3	CONTINUOUS	MISC. TEXT/CALLOUTS

LAYER LIST FOR FILE: SHT1-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
5	1	DASHED	UNIMPROVED ROADS
12	51	DASHED	CORPORATE BOUNDARIES
21	4	CONTINUOUS	ANNOTATION (ROAD NAMES)
55	2	CONTINUOUS	CONTOUR LINES
63	2	CONTINUOUS	MISCELLANEOUS
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	2	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	3	PHANTOM2	INDEX CONTOUR LINES
LG-TXT	2	CONTINUOUS	TITLE BLOCK TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	2	CONTINUOUS	TITLE BLOCK TEXT
ML	3	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	5	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	3	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	2	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CTEXT	1	CONTINUOUS	CONTOUR INDEX TEXT
TRL	1	CONTINUOUS	TRAIL
TXT	1	CONTINUOUS	MISCELLANEOUS TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

LAYER LIST FOR FILE: SHT2-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	1	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	BUILDING
FENCE	1	CONTINUOUS	FENCE LINE
FENCTICK	1	CONTINUOUS	TEXT FOR ERM
PAVEMENT	1	CONTINUOUS	PAVEMENT
TXT	2	CONTINUOUS	MISC. TEXT

LAYER LIST FOR FILE: SHT4-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
BASE-TX	1	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
TRL	1	DASHED	TRAIL
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

LAYER LIST FOR FILE: SHT5-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
4	50	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS

12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	2	DIVIDE2	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
RET	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XWALL	7	CONTINUOUS	SPILLWAY/OUTLET STRUCTURES

LAYER LIST FOR FILE: SHT6-WO.DWG

LAYER	COLOR	LINETYPE	DESCRIPTION
2	1	CONTINUOUS	
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	MISCELLANEOUS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
NLV	3	DIVIDE2	SPILLWAY/OUTLET STRUCTURES
TXT	2	CONTINUOUS	MISC. TEXT
XPOLE	1	CONTINUOUS	EXISTING POLE

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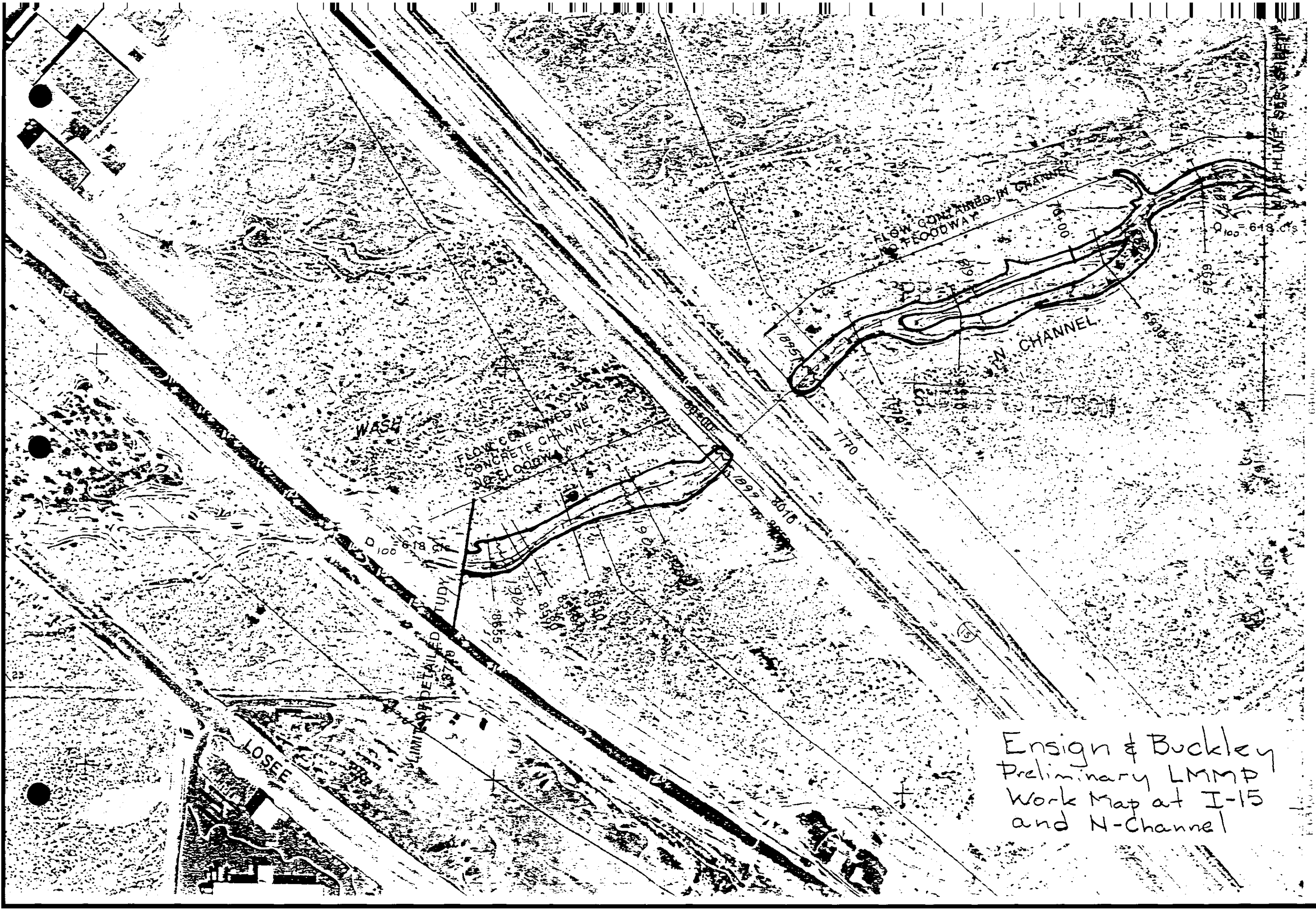
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2	1	CONTINUOUS	HOUSES/BUILDINGS
4	1	DASHED	SECONDARY ROADS
5	1	DASHED	UNIMPROVED ROADS

12	3	PHANTOM2	CORPORATE BOUNDARIES
21	2	CONTINUOUS	ANNOTATION (ROAD NAMES)
40	1	CONTINUOUS	HYDROGRAPHIC FEATURES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
63	1	CONTINUOUS	
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
INDEXTX	2	CONTINUOUS	INDEX CONTOUR LINE TEXT
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
PAVEMENT	1	CONTINUOUS	PAVEMENT
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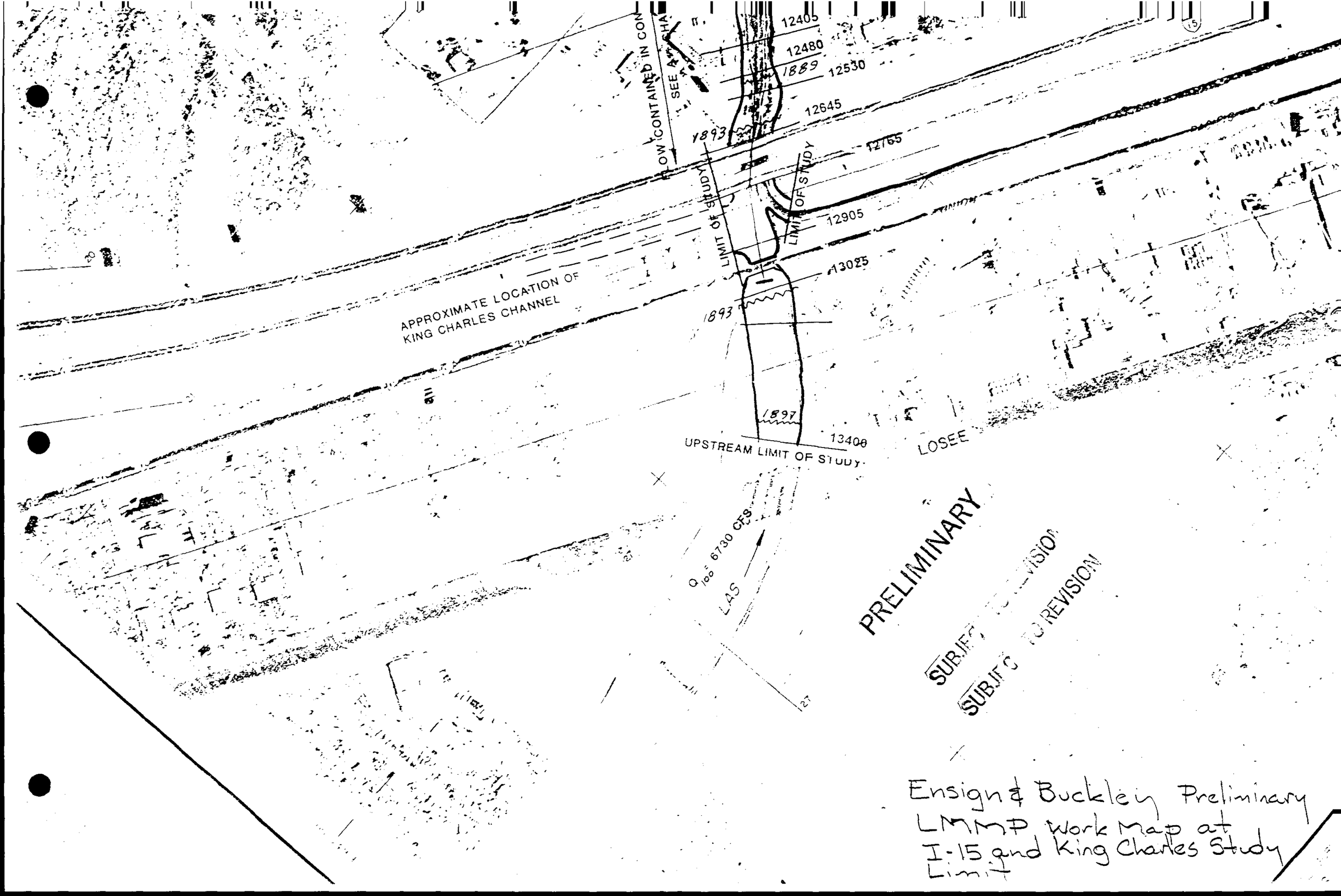
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2	1	CONTINUOUS	HOUSES/BUILDINGS
5	1	DASHED	UNIMPROVED ROADS
8	1	CONTINUOUS	RAILROAD
12	3	PHANTOM2	CORPORATE BOUNDARIES
21	1	CONTINUOUS	ANNOTATION (ROAD NAMES)
22	1	DASHDOT	HYDROGRAPHIC FEATURES
40	1	CONTINUOUS	BRIDGES
55	1	CONTINUOUS	CONTOUR LINES
60	1	CONTINUOUS	SPOT ELEVATIONS
CHANNEL-EX	1	CONTINUOUS	EXISTING CHANNEL
CTRLTXT	1	CONTINUOUS	CONTROL TEXT
DEF_POINTS	7	CONTINUOUS	ALIGNMENT TICKS FOR TOPO
GRID	1	CONTINUOUS	NORTHING/EASTING GRID
GRIDTXT	1	CONTINUOUS	NORTHING/EASTING GRID TEXT
HVP	1	CONTINUOUS	ERM
INDEX	2	CONTINUOUS	INDEX CONTOUR LINES
LG-TXT	3	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
LN_MNT_CONT	6	CONTINUOUS	CONTOUR LINES FROM BSI SITE IMPROVEMENTS
LOGO	5	CONTINUOUS	NHC LOGO
MED_TXT	5	CONTINUOUS	TITLE BLOCK ANNOTATION TEXT
ML	4	CONTINUOUS	SHEET MATCH LINE
SEC-LINE	2	CONTINUOUS	TOWNSHIP SECTION LINES
SPOTX	1	CONTINUOUS	SPOT ELEVATIONS (X)
SPTEXT	1	CONTINUOUS	SPOT ELEVATIONS NUMERIC
STR-NAME	1	CONTINUOUS	STREET NAME
MISC. PHOTOGRAMETRIC ELEMENTS			
2DCONC	1	CONTINUOUS	CONCRETE
BASE-TX	3	CONTINUOUS	CALLOUTS FOR MISC. APPURTENANCES
CANOPY	1	CONTINUOUS	CANOPY
CONC	1	CONTINUOUS	CONCRETE
FENCE	1	CONTINUOUS	FENCE
FENCTICK	1	CONTINUOUS	FENCE X
OBBLDG	1	HIDDEN	BUILDING
PAVEMENT	1	CONTINUOUS	PAVEMENT
PIPE	1	CONTINUOUS	PIPE
RET	1	CONTINUOUS	CHANNEL

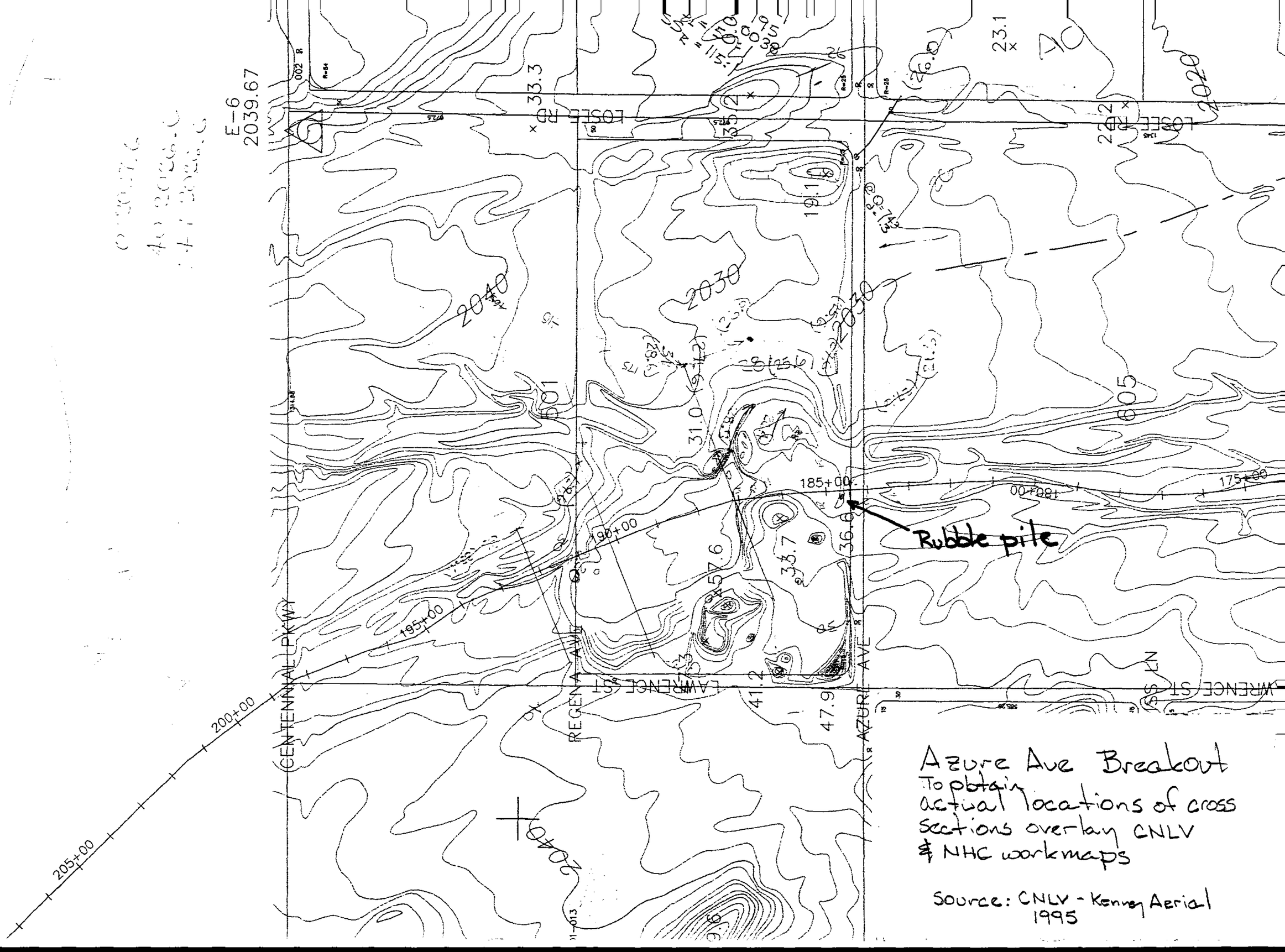
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TXT	2	CONTINUOUS	MISC. TEXT
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XSBKBK	1	CONTINUOUS	SIGN
XWALL	1	CONTINUOUS	WALL



Ensign & Buckley
Preliminary LMMP
Work Map at I-15
and N-Channel



Ensign & Buckley Preliminary
LMMP Work Map at
I-15 and King Charles Study
Limit


E-6
2039.67
LOSEE RD
33.3
23.1
2020
2040
2030
2030
2030

BSI Mapping and Craig Site Improvements overlain on CNLV Topo

Scale: 1"=200'
NAVD 1988

C-4 C-5

C-6 C-7 C-8

C-9 C-10 C-11

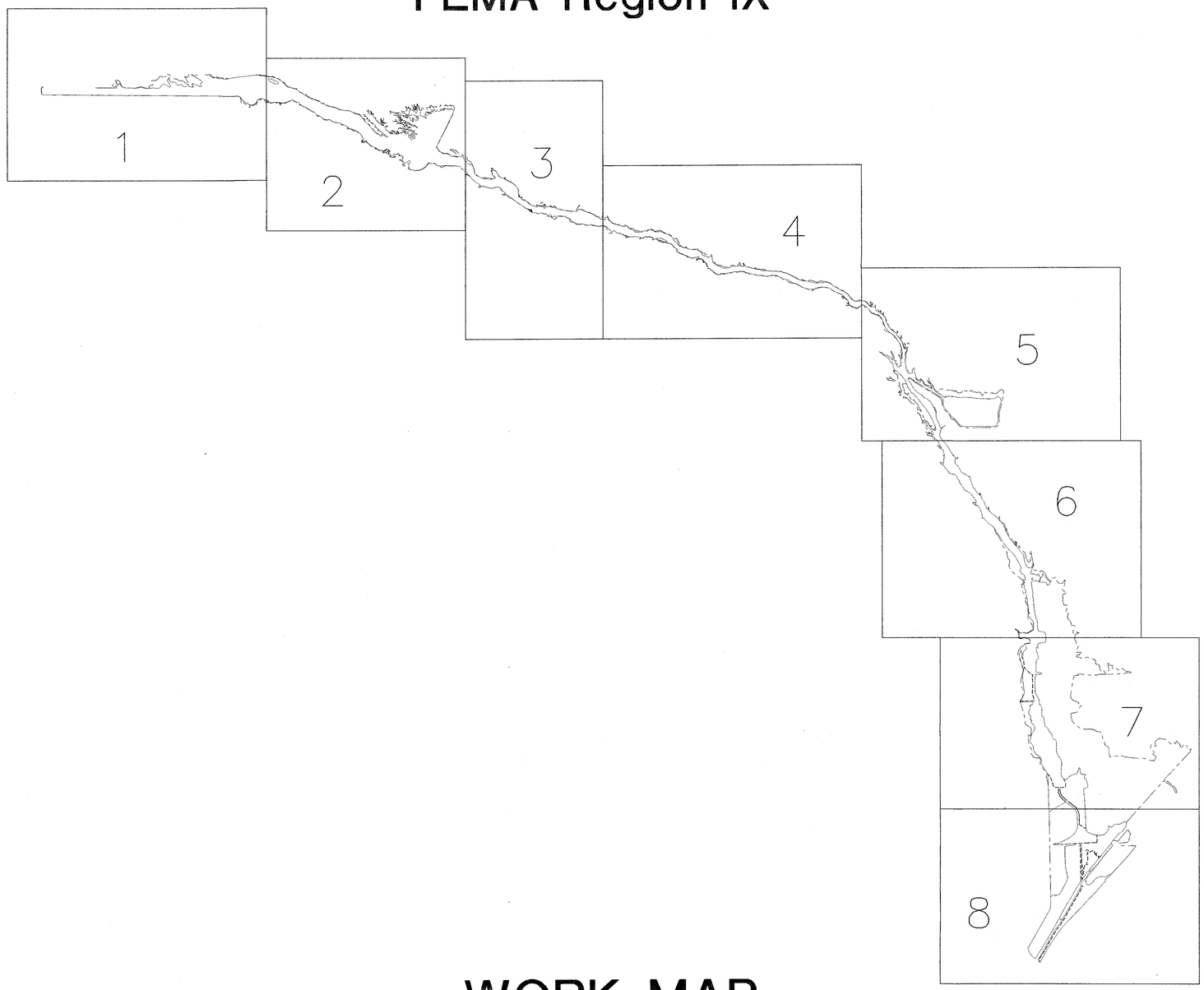
C-12 C-13 C-14

ROAD

MOUNTAIN

Reference Map CDs in other binder

Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County, Nevada
EMW-95-C-4840
FEMA Region IX



WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS DETENTION BASIN DIVERSION DIKE

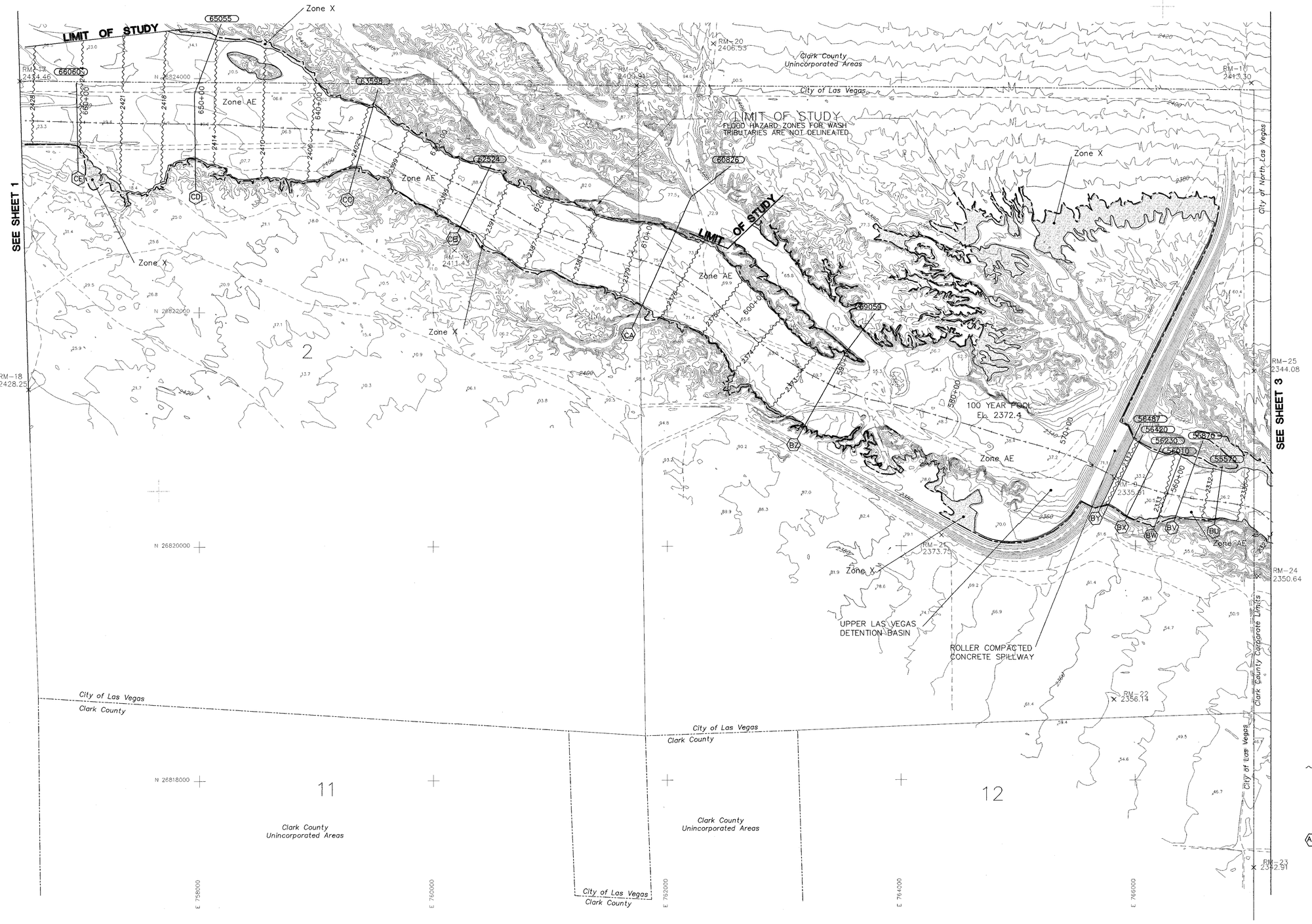
JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691–3430
west sacramento tukwila
edmonton vancouver

RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING



N

SHEET INDEX

1 3 4 5 6 7 8

LEGEND

15	Section Line and Number
	Corporate Limits
RM-1 × 2342.91	Elevation Reference Mark
67.8	Spot Elevation
	Intermediate Contour
2360	Index Contour
	Unpaved Road
	Trail
N 26818000 E 766000	Grid Tick with Northing and Easting
1952	Base Flood Elevations
Zone AE	Zone Designations
	Zone AE/AO Subboundary
	100 Year Flood Plain Boundary
	500 Year Flood Plain Boundary
AU 24530	Cross Section Line
410+00	Hydraulic Base Line and Station

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT.

DRAWING FILE NAME: SHT2-WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
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west sacramento, california 95691-3430
west sacramento tukwila
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RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDRAULIC ANALYSIS AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/DIVERSION ENGINEERING

Flood Insurance Study of City of Las Vegas, City of North Las Vegas,
Unincorporated Areas of Clark County
EMW-95-C-4840
FEMA Region IX

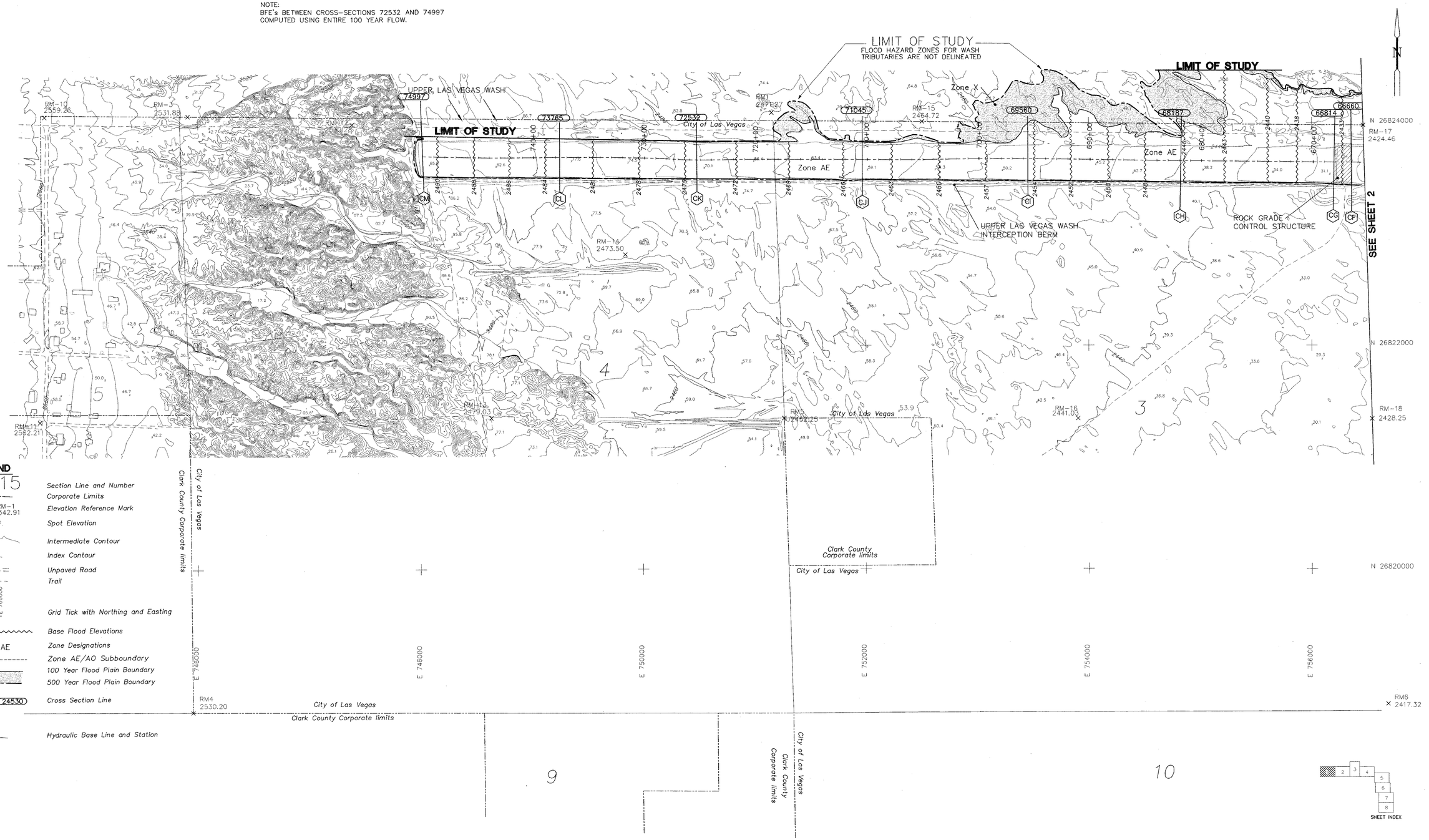
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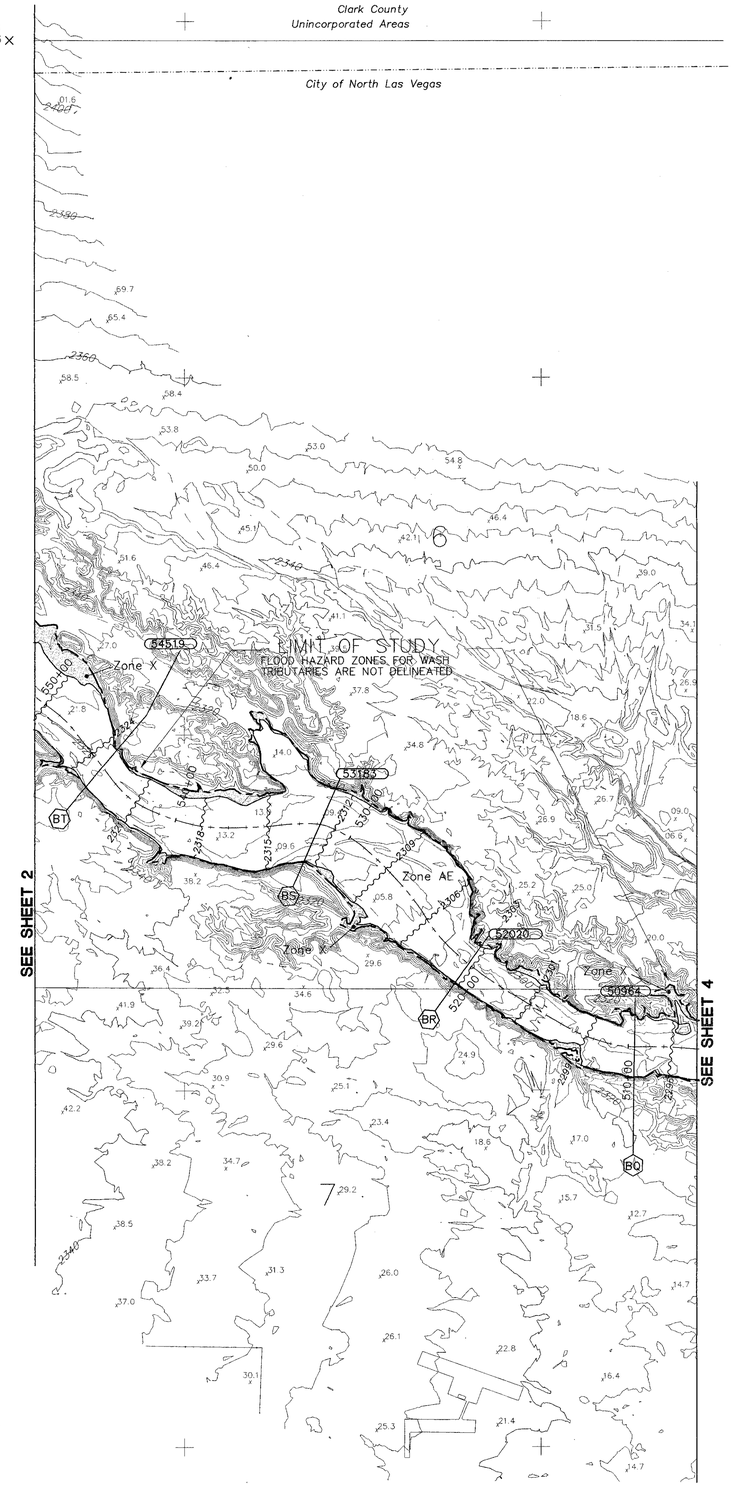
UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS
DETENTION BASIN DIVERSION DIKE

SHEET 2 OF 8

DATE: 4/6/98

NOTE:
BFE's BETWEEN CROSS-SECTIONS 72532 AND 74997
COMPUTED USING ENTIRE 100 YEAR FLOW.

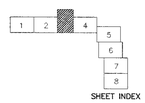

LIMIT OF STUDY
FLOOD HAZARD ZONES FOR WASH TRIBUTARIES ARE NOT DELINEATED
LIMIT OF STUDY
LIMIT OF STUDY
UPPER LAS VEGAS WASH
74997
73765
72532
71045
69560
68187
66814
66660
RM-3
2531.88
RM-10
2559.26
RM-15
2464.72
RM-17
2424.46
RM-16
2473.50
RM-12
2479.03
RM-13
2471.27
RM-5
2462.25
RM-16
2441.03
RM-18
2428.25
RM-12
2582.21
RM4
2530.20
RM6
2417.32
City of Las Vegas
Zone AE
Zone X
UPPER LAS VEGAS WASH INTERCEPTION BERM
ROCK GRADE CONTROL STRUCTURE
SEE SHEET 2
N 26824000
N 26822000
N 26820000
E 746000
E 750000
E 752000
E 754000
E 756000
Clark County Corporate limits
City of Las Vegas
Clark County Corporate limits
City of Las Vegas
Clark County Corporate limits
City of Las Vegas



N

LEGEND

- 15 — Section Line and Number
- Corporate Limits
- RM-1 × 2342.91 — Elevation Reference Mark
- 67.8 — Spot Elevation
- Intermediate Contour
- 2360 — Index Contour
- Unpaved Road
- Trail
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- 1952 — Base Flood Elevations
- Zone AE — Zone Designations
- Zone AE/AO Subboundary
- 100 Year Flood Plain Boundary
- 500 Year Flood Plain Boundary
- AU 24530 — Cross Section Line
- 410+00 — Hydraulic Base Line and Station



REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: SHT3-WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
edmonton vancouver
RIVER ENGINEERING/ HYDRAULIC MODEL TESTING/ HYDROLOGIC ANALYSES AND DESIGN/ COASTAL ENGINEERING
HYDROLOGY/SEDIMENTATION ENGINEERING/NUMERICAL MODELING/APPLIED RESEARCH/FORENSIC ENGINEERING

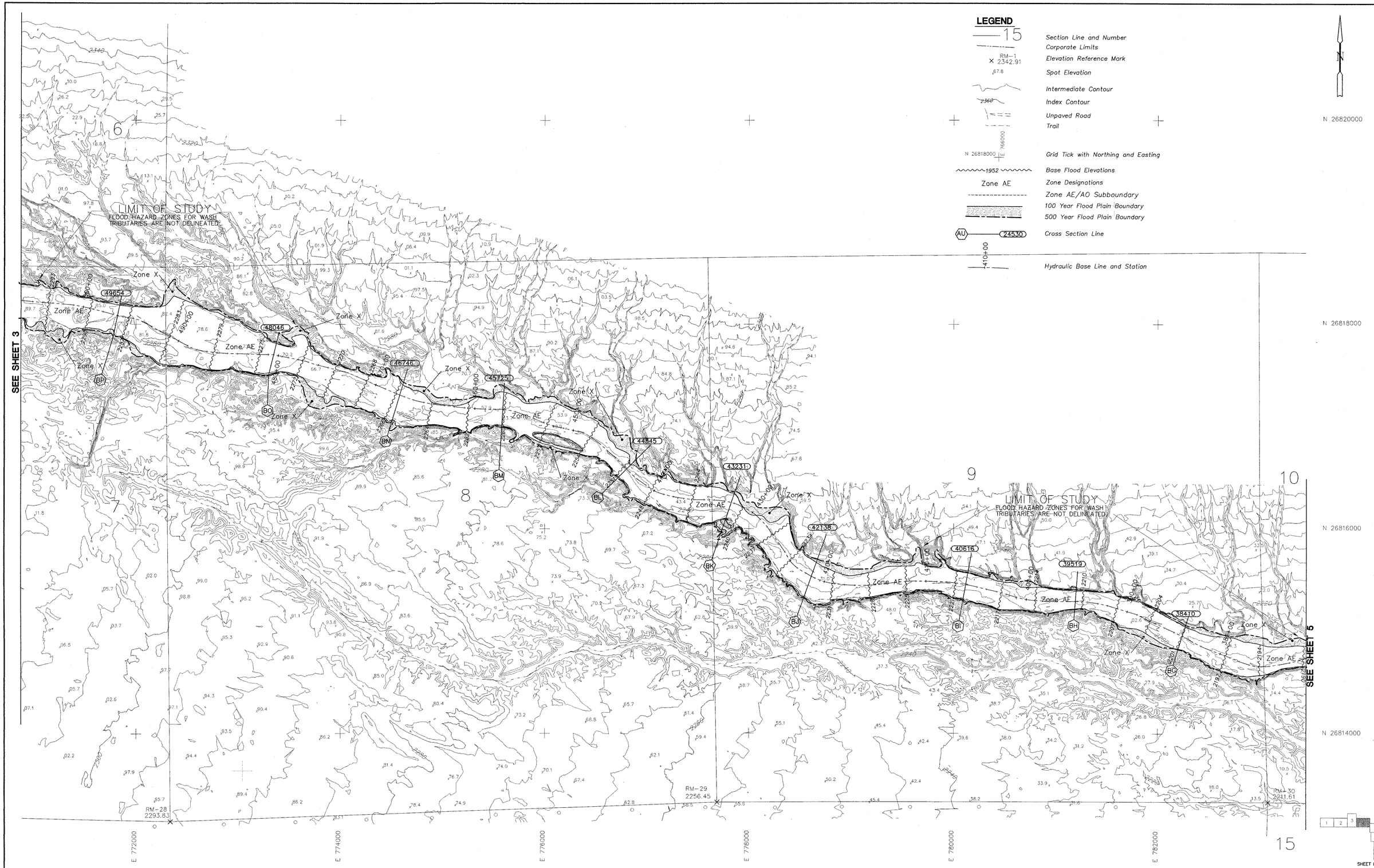
Flood Insurance Study of City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County, Nevada
EMW-95-C-4840
FEMA Region IX

WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS
DETENTION BASIN DIVERSION DIKE

SHEET 3 OF 8

DATE: 4/6/98



REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: SHT4-WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

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FEMA Region IX

WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS
DETENTION BASIN DIVERSION DIKE

SHEET 4 OF 8

DATE: 4/6/98

SEE SHEET 4

LIMIT OF STUDY
FLOOD HAZARD ZONES FOR WASH TRIBUTARIES ARE NOT DELINEATED

RM-31
2194.85

RM-32
2219.21

RANGE WASH DIVERSION DIKE

NORTH LAS VEGAS DETENTION BASIN DIVERSION DIKE WEIR (SEE NOTE)

STA. AHEAD 311+00
STA. BACK 299+01.96

LIMIT OF STUDY
FLOOD HAZARD ZONES FOR WASH TRIBUTARIES ARE NOT DELINEATED

POOL ELEV.
EL. 2135.4

CONCRETE SPILLWAY

NORTH LAS VEGAS DETENTION BASIN

Zone X

Zone AE

Zone X

Zone AE

36822
35645
33671
32044
31500
31235
29413
28095
28545
24530

BF
BE
BD
BC
BB
BA
AZ
AY
AX
AU

620+00
600+00
580+00
560+00
540+00
520+00
500+00
480+00
460+00
440+00
420+00
400+00
380+00
360+00
340+00
320+00
300+00
280+00
270+00

E 784000
E 786000
E 788000
E 790000
E 792000
E 794000

N 26816000
N 26814000
N 26812000
N 26810000
N 26808000

10
11
14
15

SEE SHEET 6

NOTE:
THE NORTH LAS VEGAS DETENTION BASIN DIVERSION DIKE WEIR WAS OVERTOPPED BY THE 100 YEAR FLOW. THEREFORE, THE DIKE AND THE DETENTION BASIN WERE NOT INCLUDED IN THE ANALYSES FOR THE PURPOSE OF DETERMINING PEAK FLOWS DOWNSTREAM. THE 100 YEAR AND 500 YEAR FLOWS AT THIS POINT ARE 8536cfs AND 17,855cfs WITHOUT THE DIKE.

LEGEND

- 15 — Section Line and Number
- Corporate Limits
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- Zone AE/AO Subboundary
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- AU — 24530 — Cross Section Line
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1 2 3 4 6 7 8
SHEET INDEX

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT. _____

DRAWING FILE NAME: SHT5-WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

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west sacramento tukwila
edmonton vancouver
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EMW-95-C-4840
FEMA Region IX

WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS DETENTION BASIN DIVERSION DIKE

SHEET 5 OF 8

DATE: 4/6/98

SEE SHEET 5



SEE SHEET 7

LEGEND

- Section Line and Number
- Corporate Limits
- RM-1 × 2342.91 — Elevation Reference Mark
- 57.8 — Spot Elevation
- Intermediate Contour
- 2360 — Index Contour
- Unpaved Road
- Trail
- N 26818000 / E 786000 — Grid Tick with Northing and Easting
- 1952 — Base Flood Elevations
- Zone AE — Zone Designations
- Zone AE/AO Subboundary
- 100 Year Flood Plain Boundary
- 500 Year Flood Plain Boundary
- AU — 24530 — Cross Section Line
- 410+00 — Hydraulic Base Line and Station

SHEET INDEX: 1 2 3 4 5 7 8

REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT.

DRAWING FILE NAME: SHT6-WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

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northwest hydraulic consultants inc.
3950 Industrial boulevard, suite 100c
west sacramento, california 95691-3430
west sacramento tukwila
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EMW-95-C-4840
FEMA Region IX

WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS
DETENTION BASIN DIVERSION DIKE

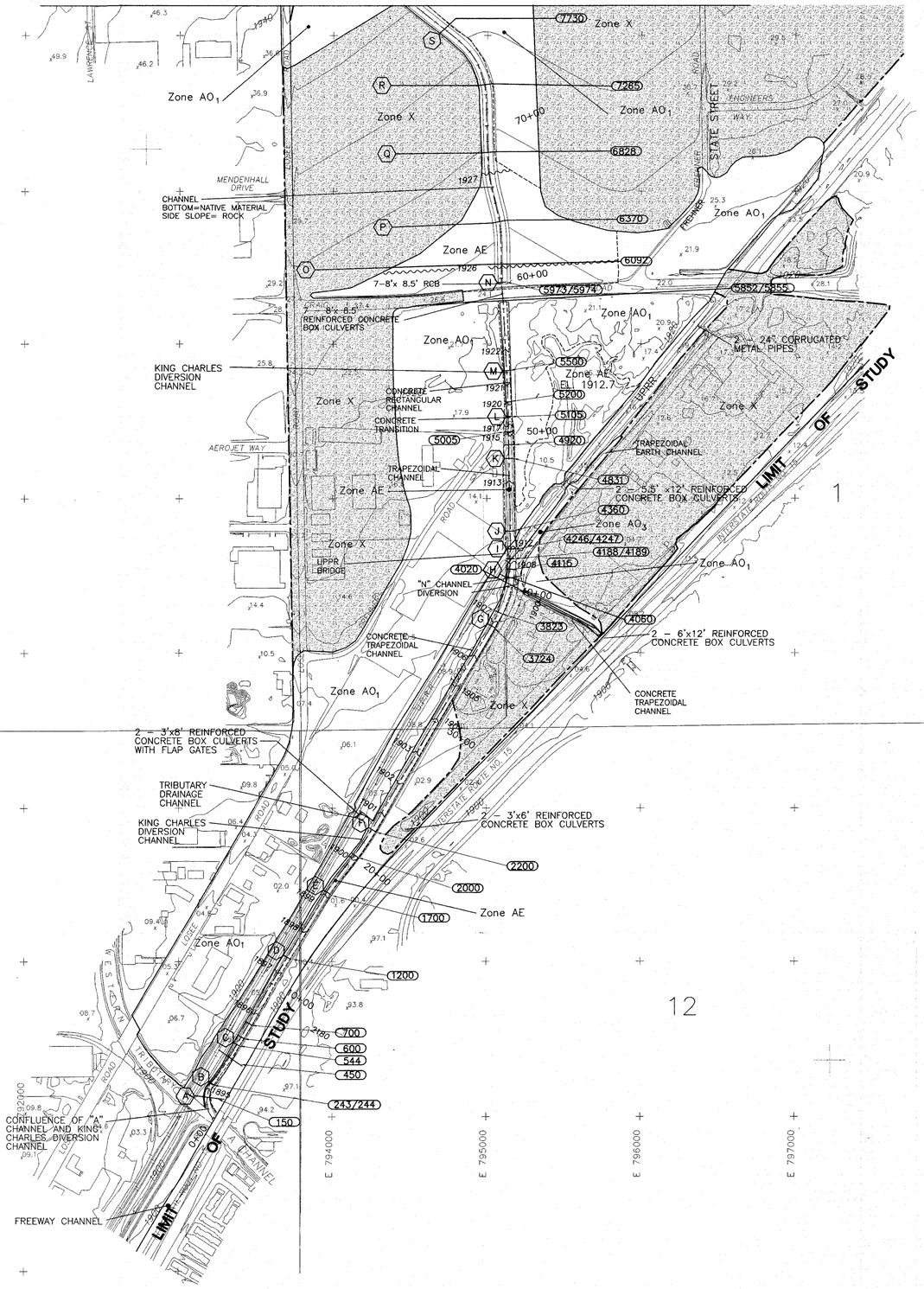
SHEET 6 OF 8

DATE: 4/6/98

SEE SHEET 6

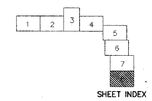
City of North Las Vegas
Clark County
City of North Las Vegas
Clark County
City of North Las Vegas
Clark County
Unincorporated areas
Clark County
City of North Las Vegas
City
Las Vegas
Clark County
City of North Las Vegas
of North
Clark County
Unincorporated areas
Clark County
City of North Las Vegas
City of North Las Vegas
Clark County
City of North Las Vegas
Clark County
City of North Las Vegas
Clark County

SEE SHEET 7



LEGEND

15	Section Line and Number
	Corporate Limits
RM-1 × 2342.91	Elevation Reference Mark
67.8	Spot Elevation
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REV.	DATE	DESCRIPTION	BY	APP'D

SCALE
HORIZ. 1"=400' VERT.

DRAWING FILE NAME: SHT8WO.DWG

JOB NUMBER: 50010.10

KENNEY AERIAL MAPPING
1130 West Fillmore
Phoenix, Arizona 85007

Aerial Photography Date: 2/96
Datum: NGVD 29
Contour Interval: 4'

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west sacramento tukwila
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EMW-95-C-4840
FEMA Region IX

WORK MAP

UPPER LAS VEGAS WASH
WITHOUT NORTH LAS VEGAS
DETENTION BASIN DIVERSION DIKE

SHEET 8 OF 8

DATE: 4/6/98

UPPER LAS VEGAS WASH VOLUME 10

Technical Support Data Notebook

Upper Las Vegas Wash

Flood Insurance Restudy
Clark County, Nevada and Incorporated Areas
including
City of Las Vegas, City of North Las Vegas,
and Unincorporated Areas of Clark County

Volume 10
Miscellaneous Reference Materials

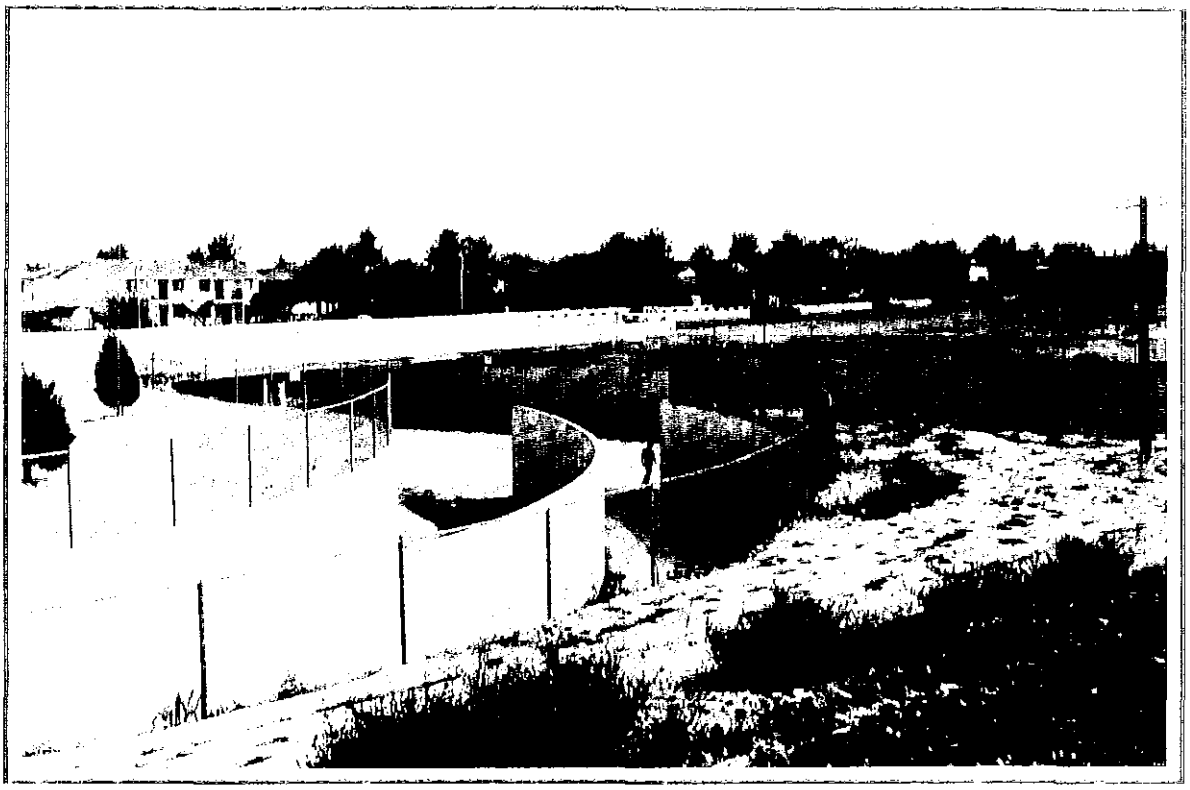
Study Contractor: Northwest Hydraulic Consultants, Inc.
Contract: EMW - 95 - C - 4840
Date Submitted: April 20, 1998

TSDN - Flood Insurance Study

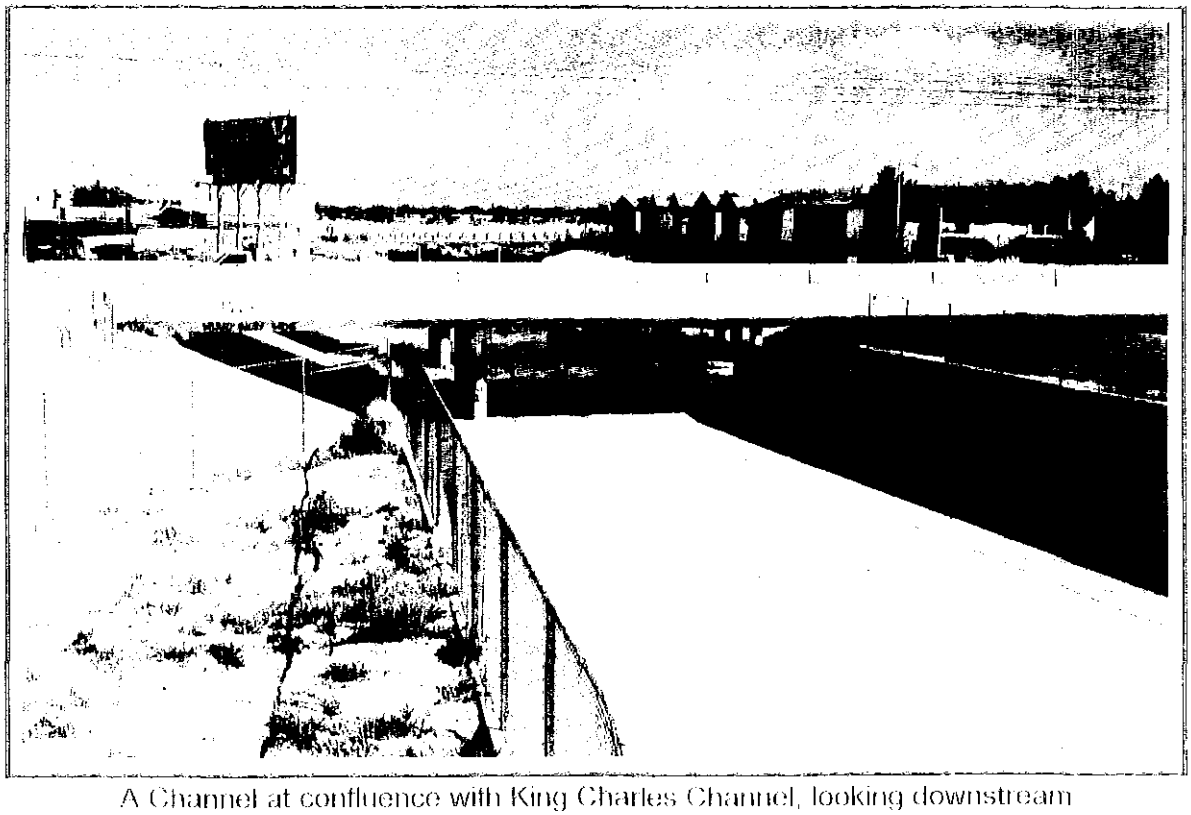
Upper Las Vegas Wash
City of Las Vegas, City of North Las Vegas, Unincorporated Areas of Clark County
EMW - 95 - C - 4840

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Miscellaneous Reference Materials

A. Photographs



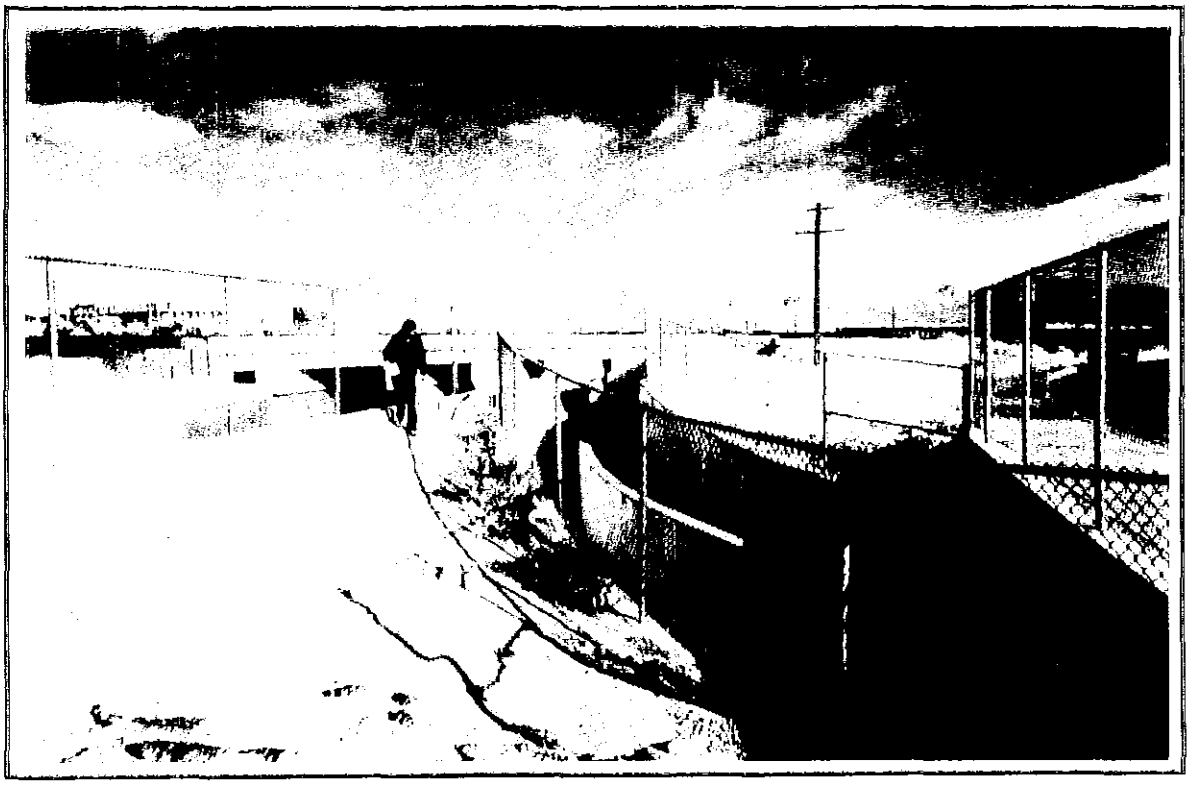
Confluence of King Charles Channel and A Channel, looking downstream



A Channel at confluence with King Charles Channel, looking downstream



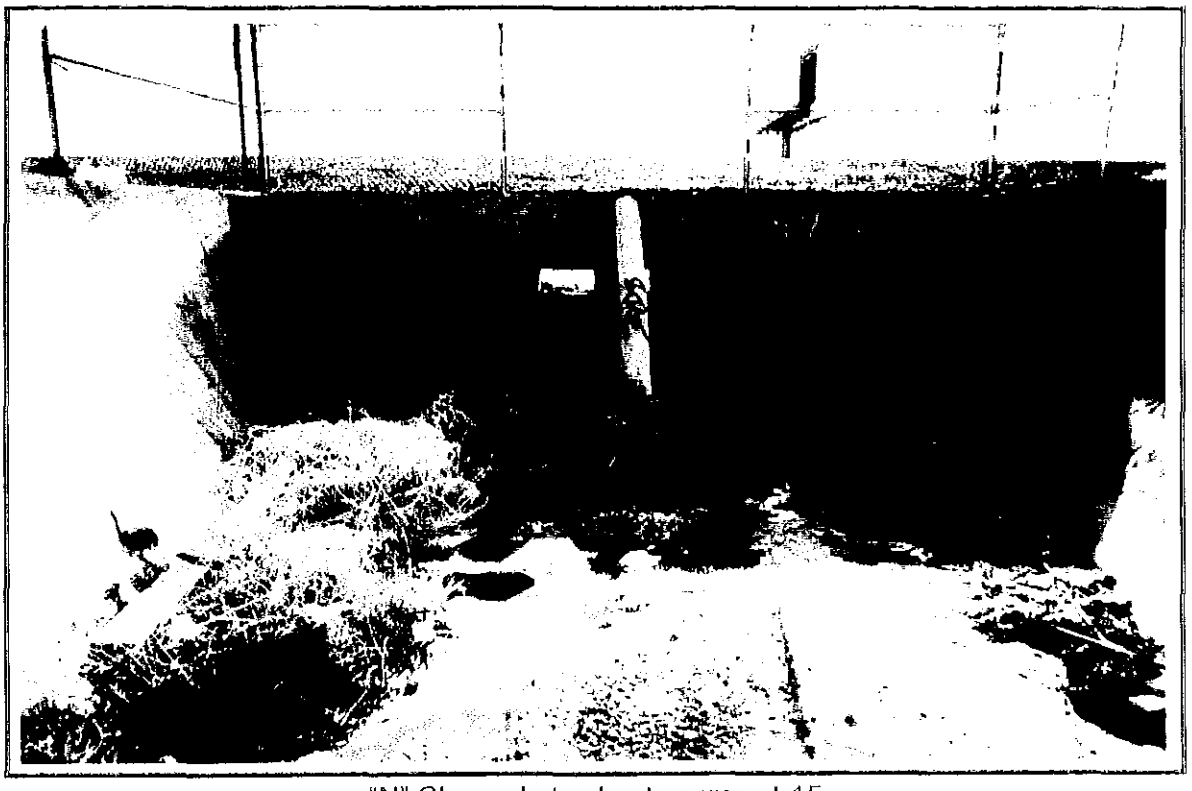
"N" Channel Diversion



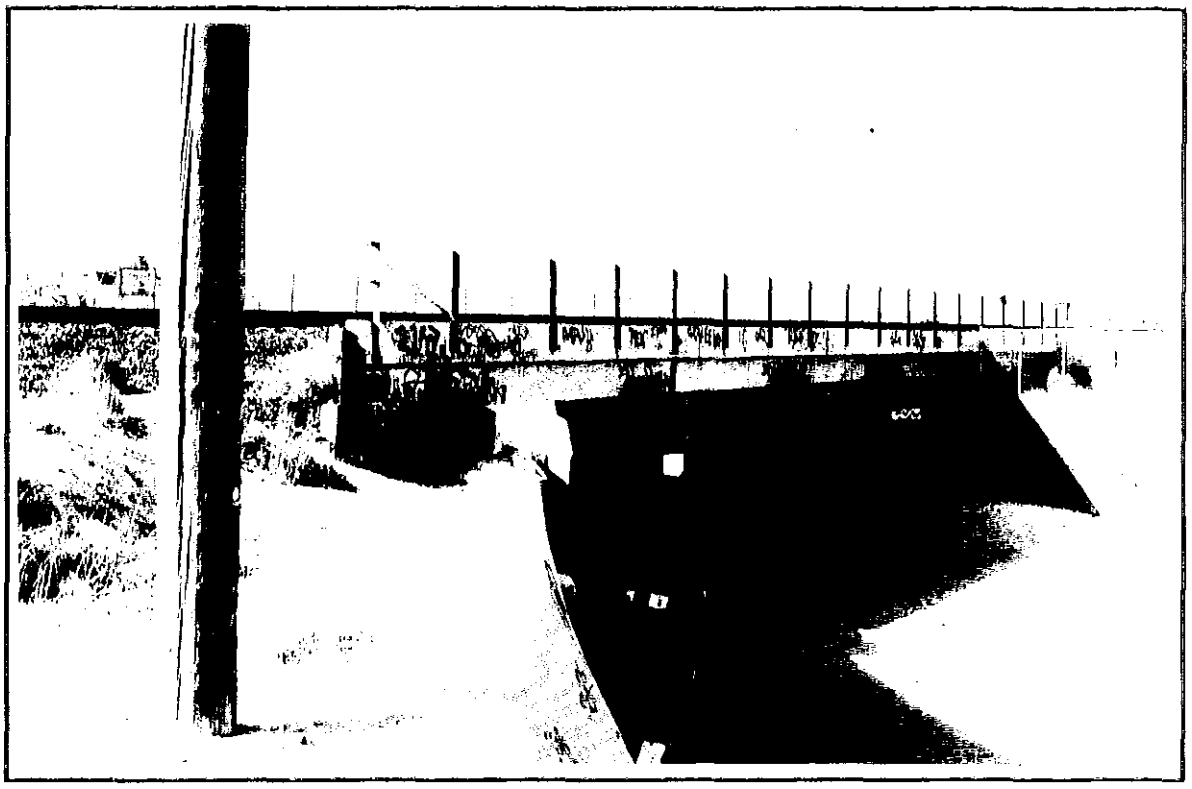
"N" Channel downstream of diversion at King Charles Channel



"N" Channel downstream of Donovan Road



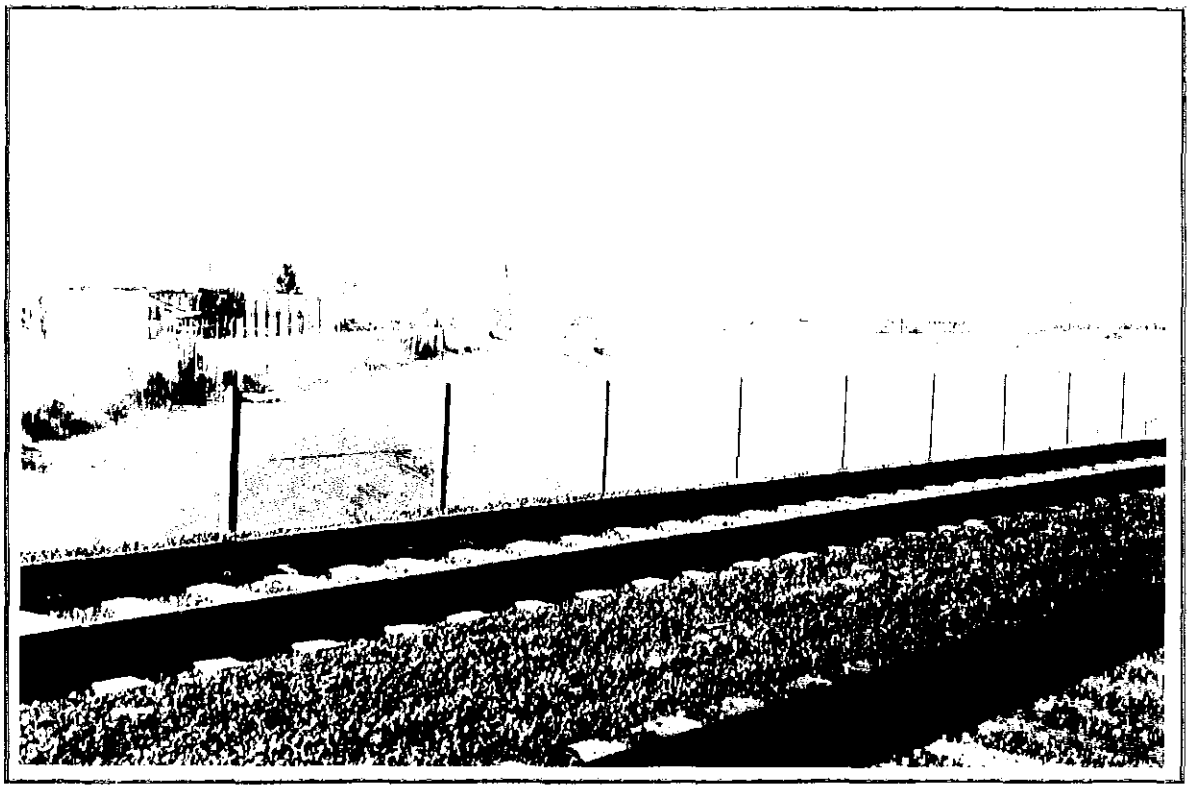
"N" Channel at culverts across I-15



UPRR bridge, looking upstream



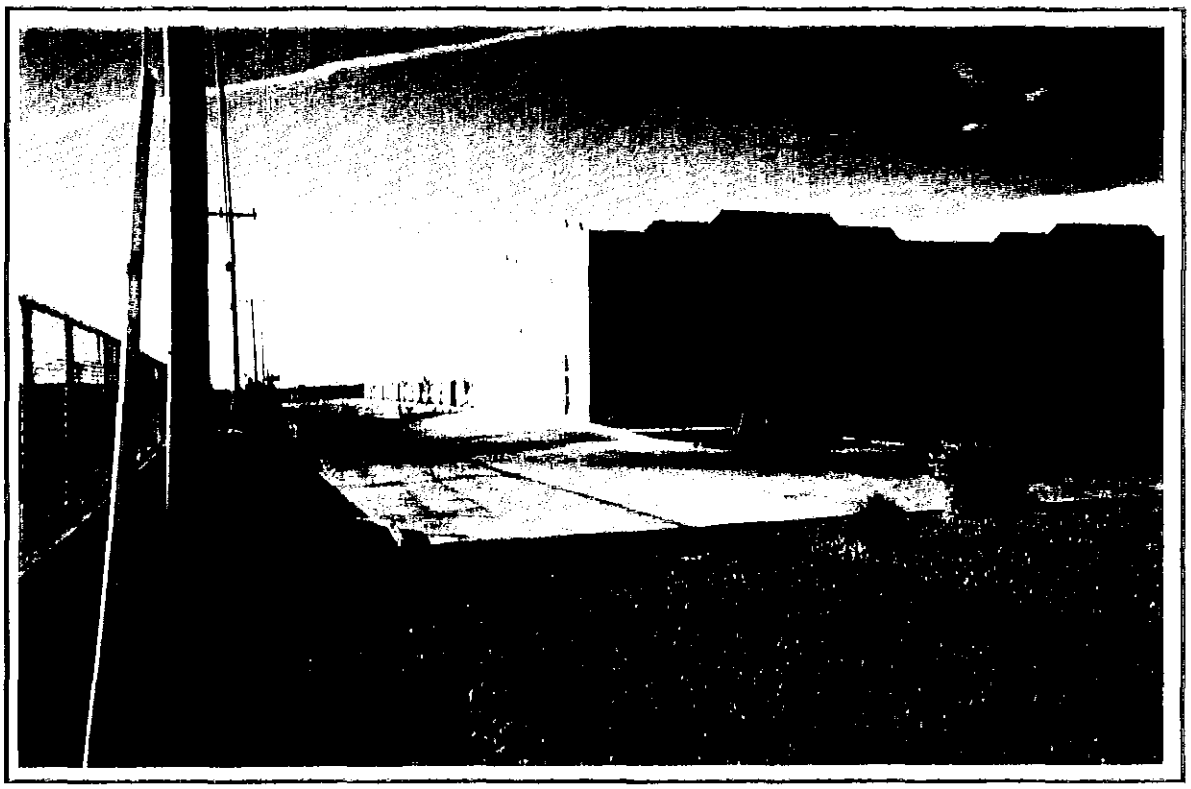
Upstream face of UPRR bridge



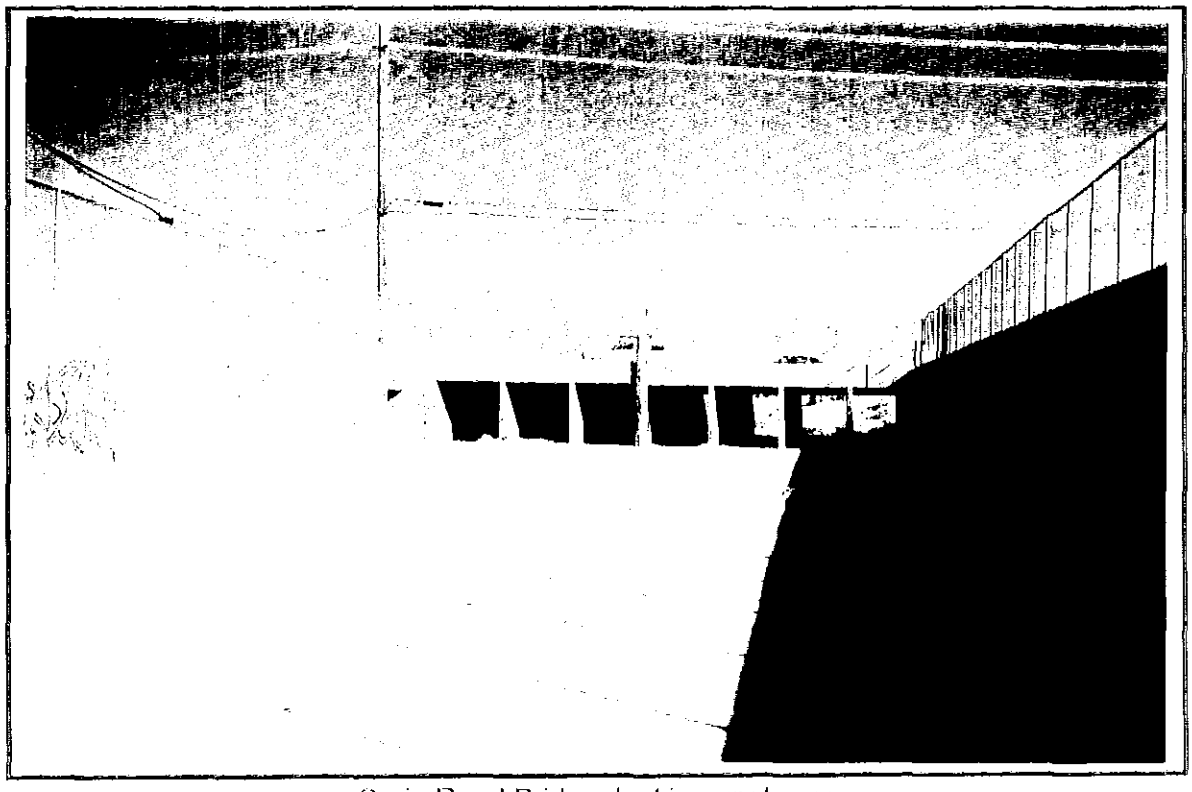
King Charles Channel upstream of UPRR bridge



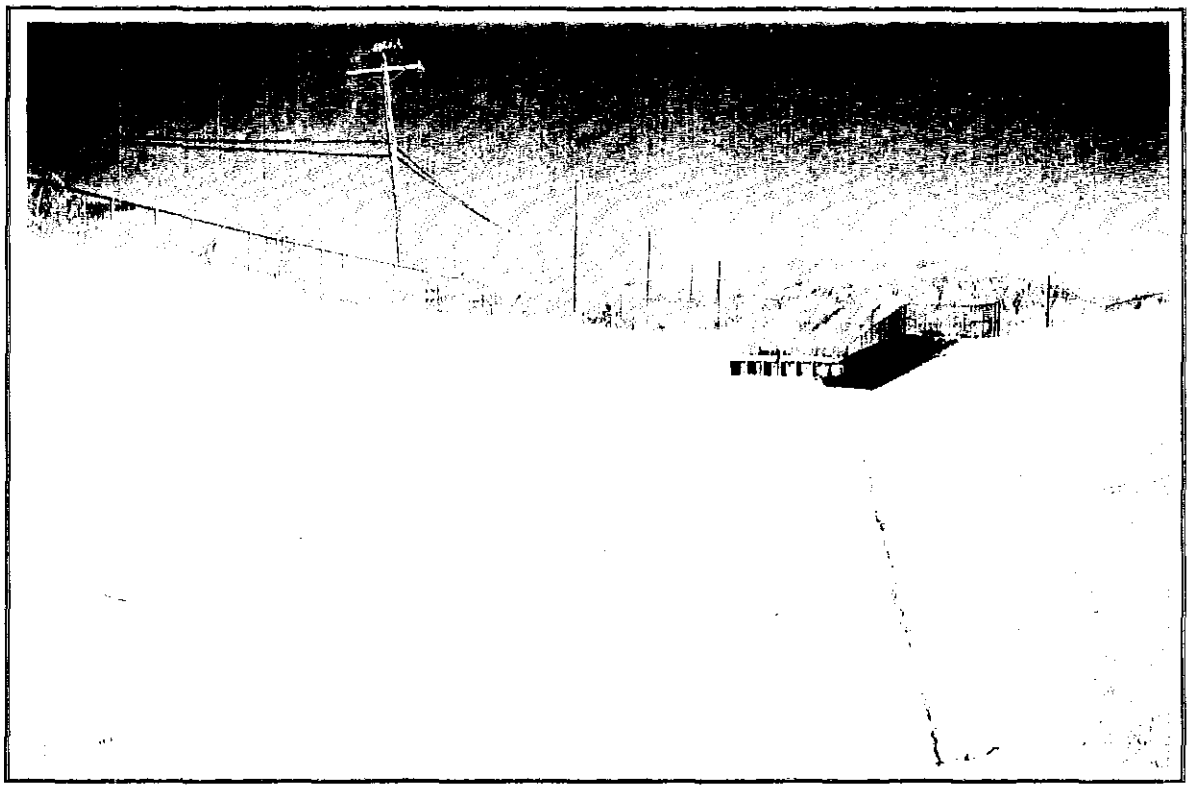
UPRR upstream of King Charles/UPRR bridge along Donovan Road



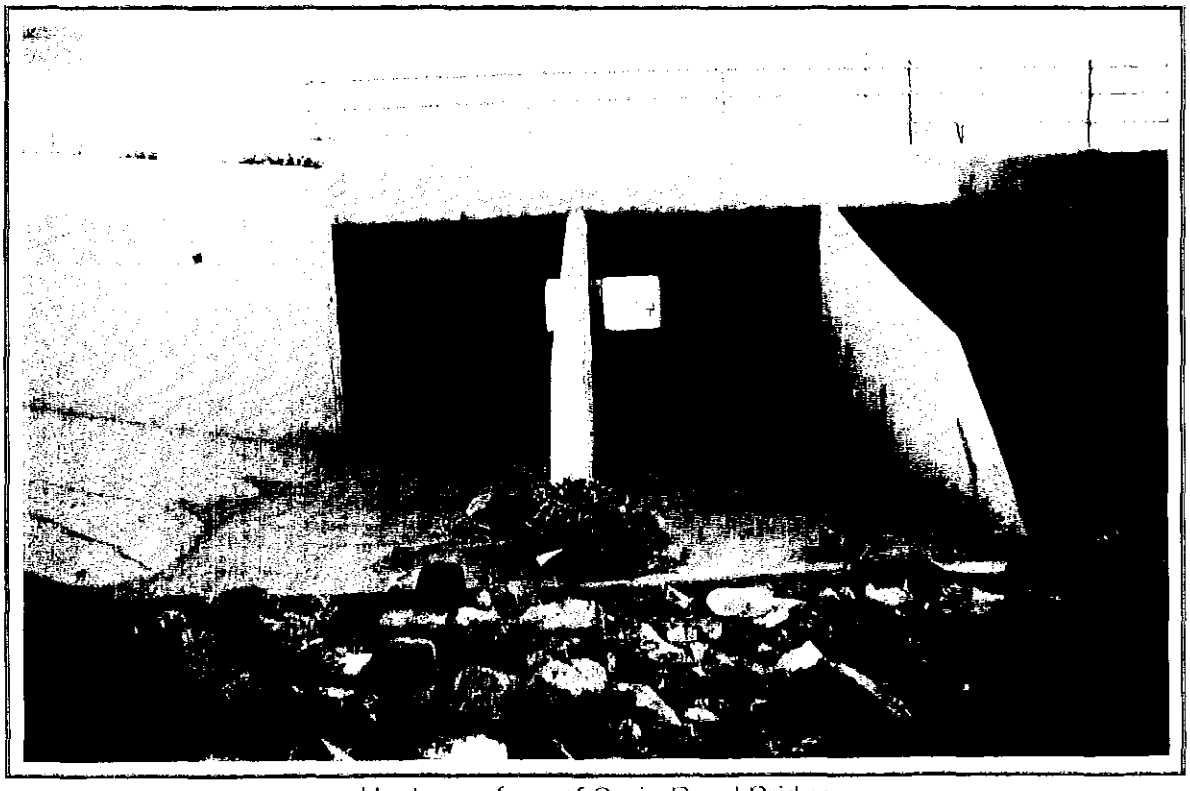
Offices east of King Charles Channel downstream of Craig Road, looking downstream



Craig Road Bridge, looking upstream



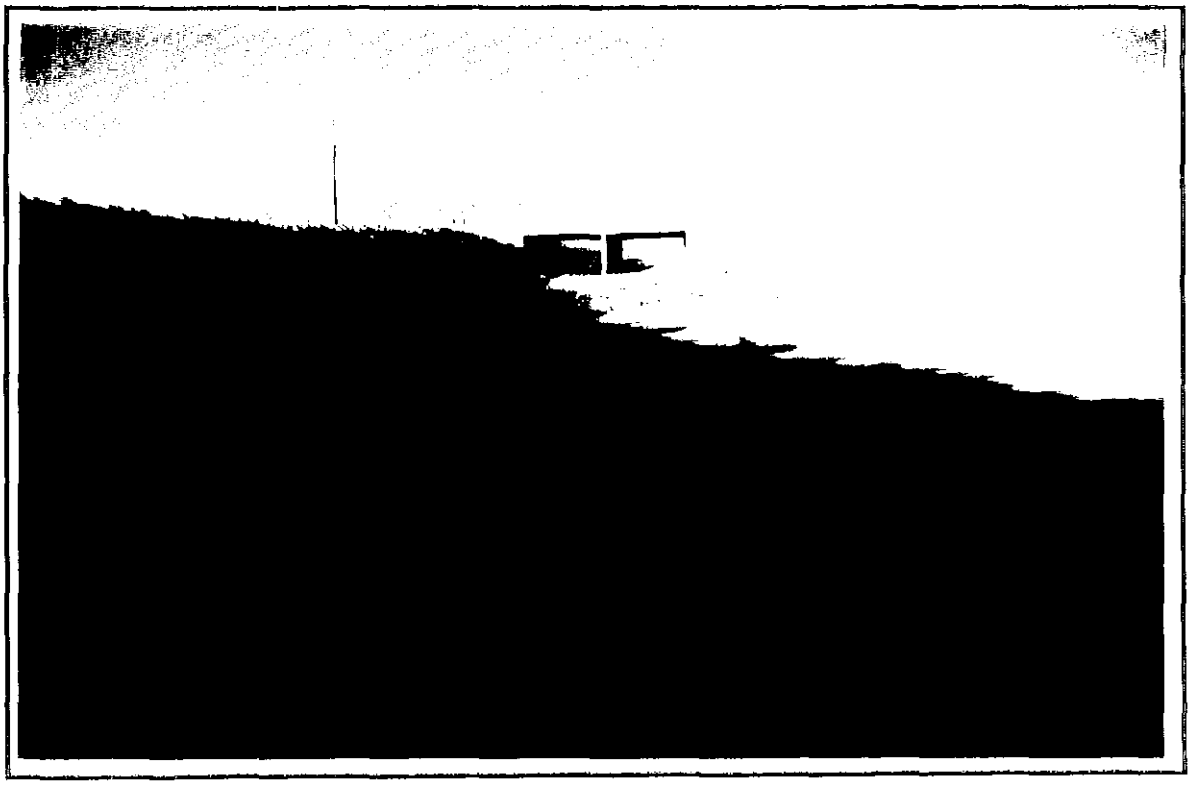
King Charles Channel looking upstream towards Craig Road Bridge



Upstream face of Craig Road Bridge



Constructed channel upstream of Craig Road



Lone Mountain Road Bridge, looking upstream



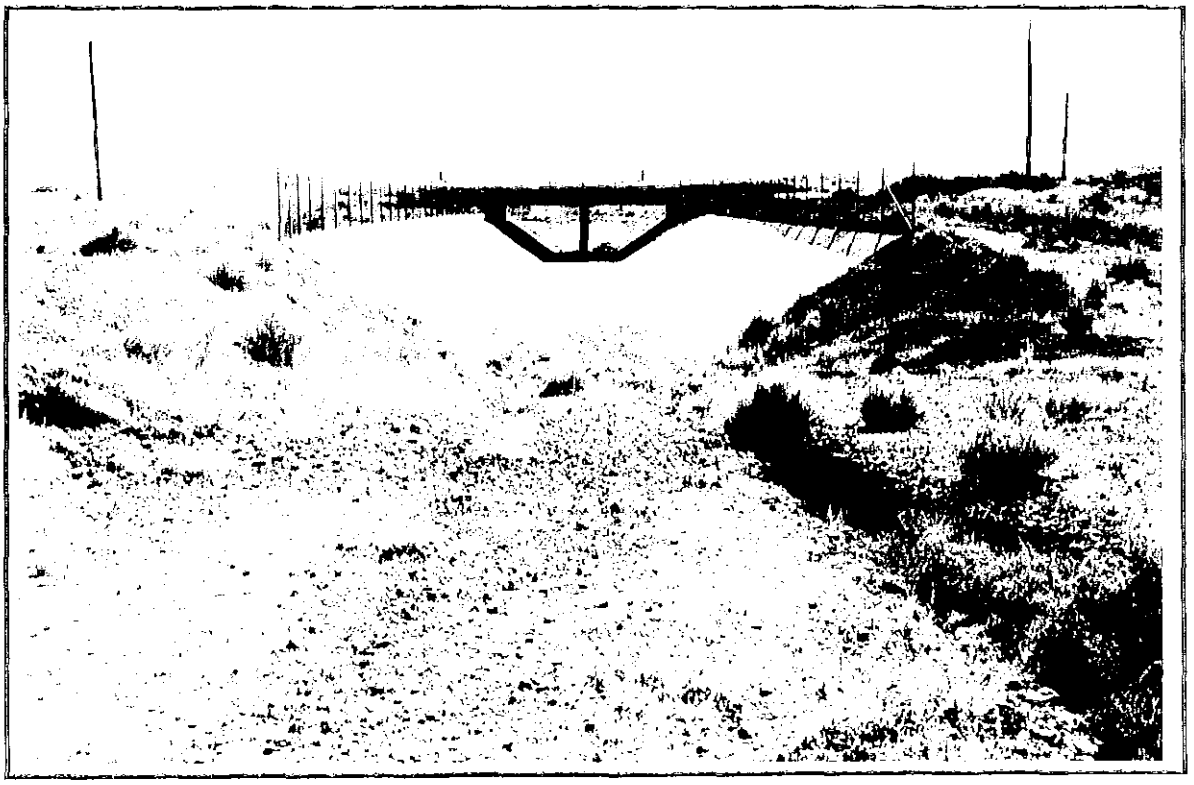
Channel downstream of Lone Mountain Road Bridge



Deposition at concrete transition to Lone Mountain Road Bridge



Lone Mountain Road Bridge, looking downstream, December, 1997



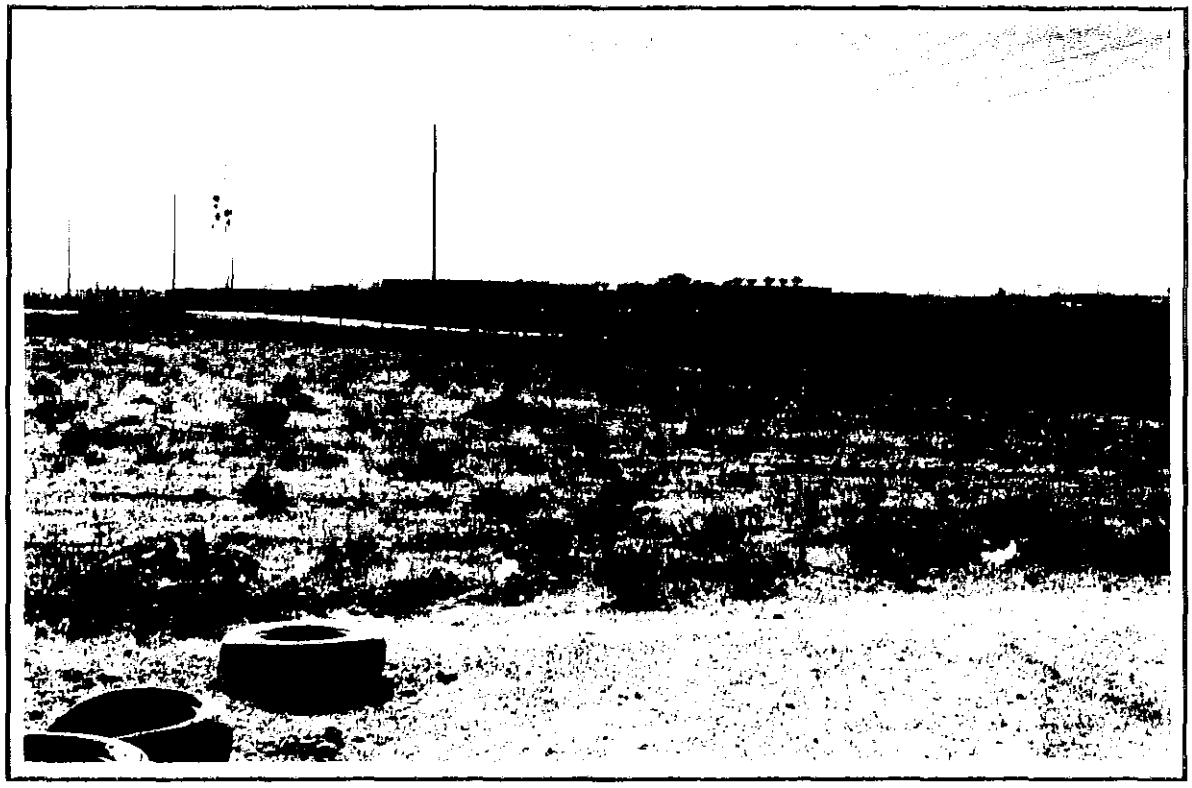
Lone Mountain Road Bridge, looking downstream, 1996



Channel upstream of Lone Mountain Road Bridge



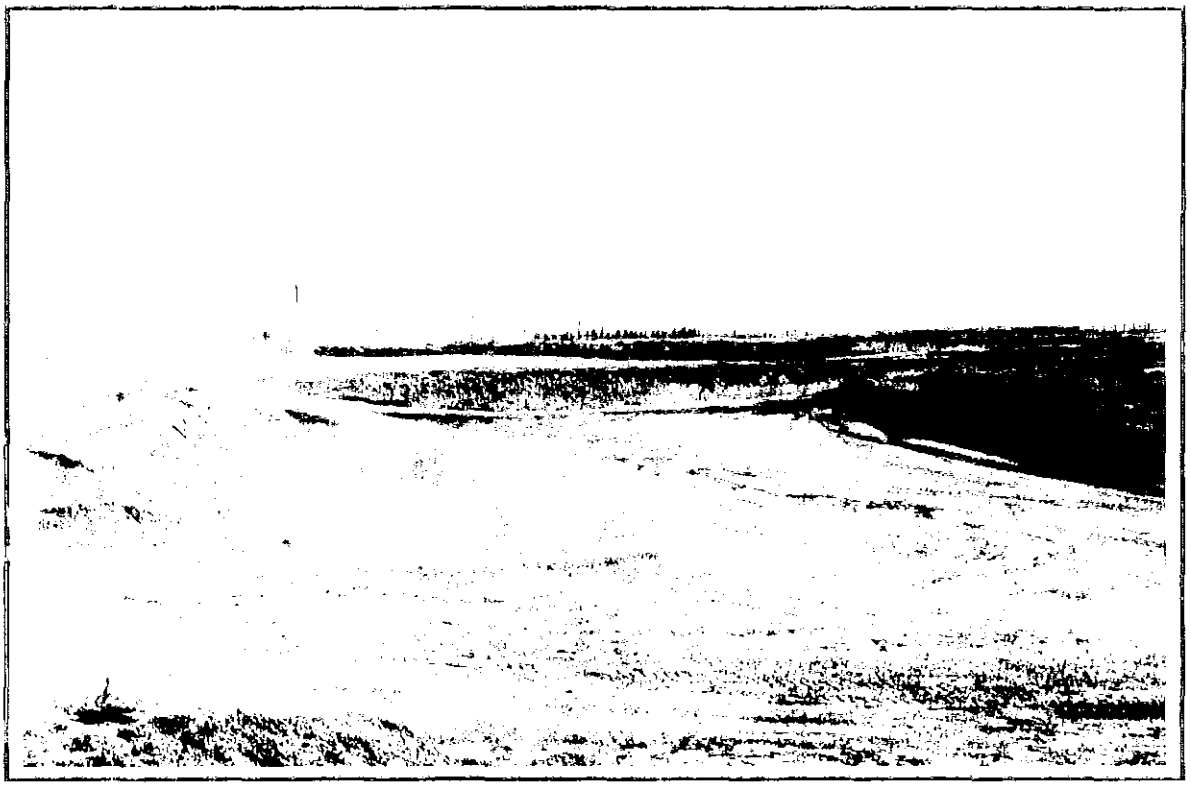
Headcuts at channel upstream of Lone Mountain Road Bridge



Low water crossing at Losee Road, looking southwest



Low water crossing at Losee Road, looking upstream



Incomplete rough grading in wash for development approximately 2000 feet downstream of Azure



Debris in wash at unimproved road crossing approximately 1400 feet downstream of Azure



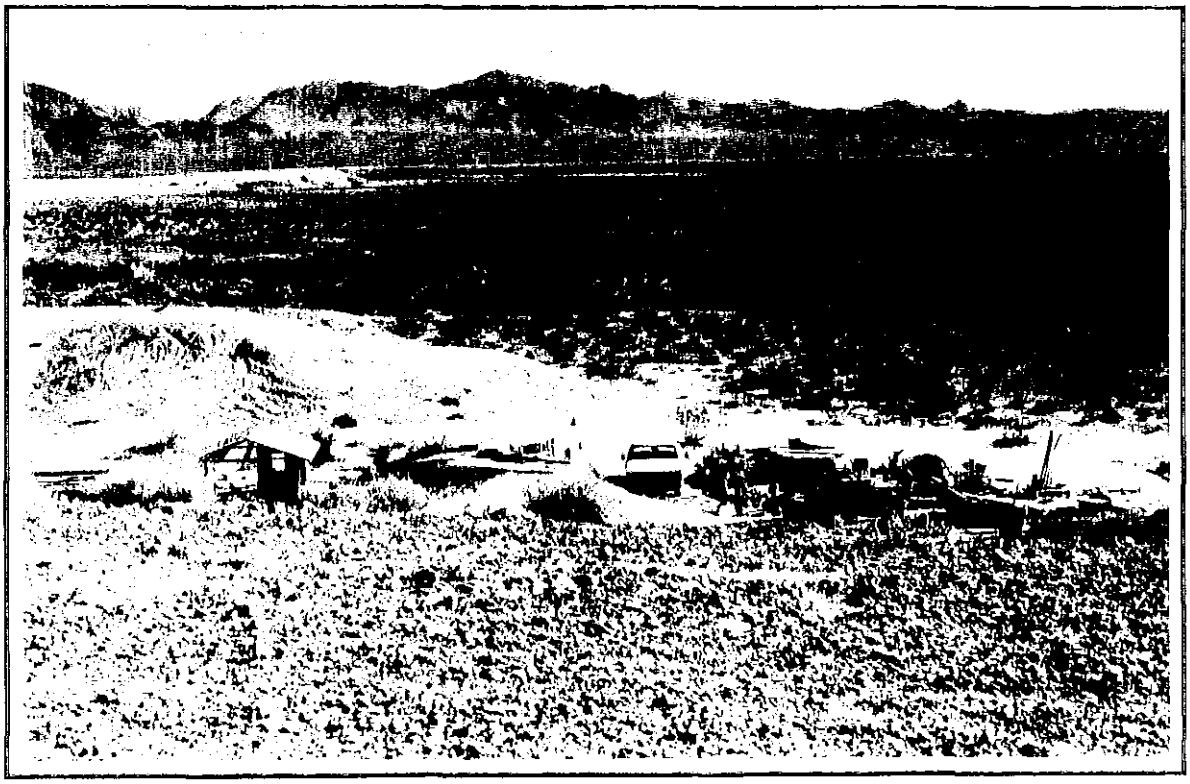
Debris in wash near Azure



Wash crossing Azure



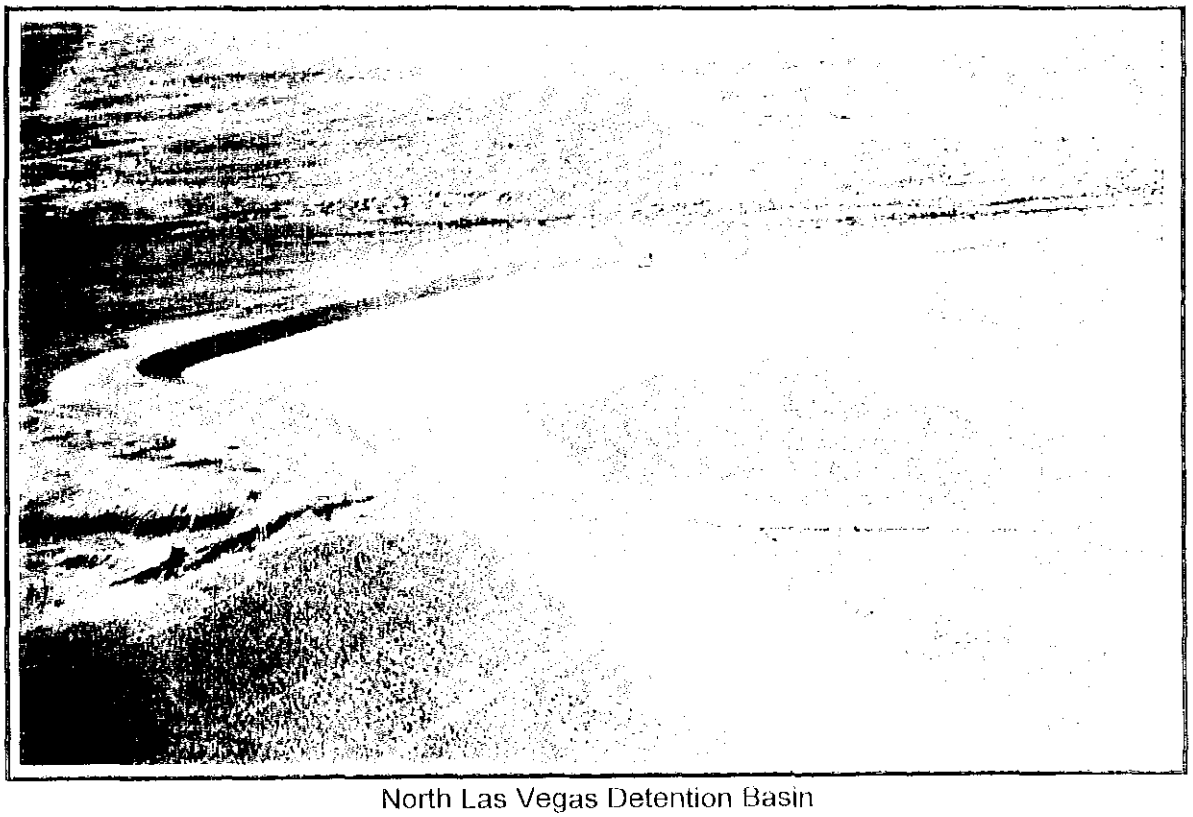
Debris in wash upstream of Azure



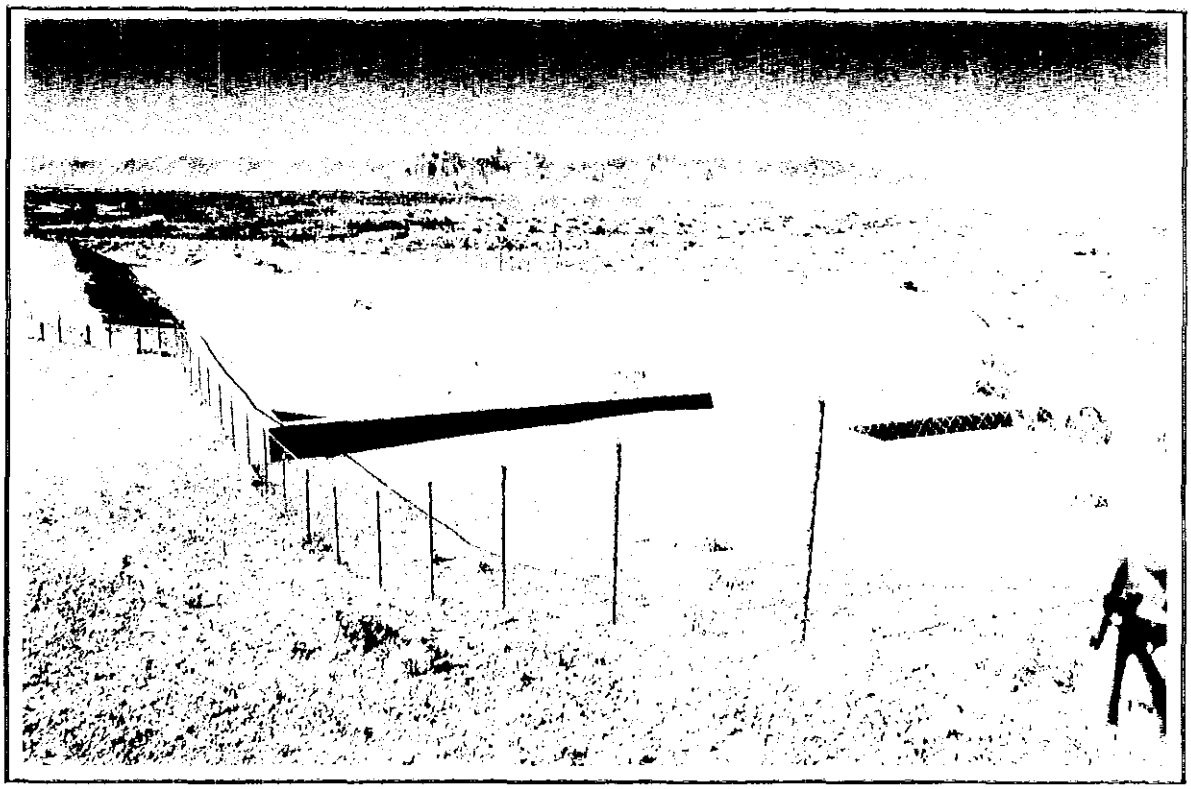
Habitation in Upper Las Vegas Wash, downstream of North Las Vegas Detention Basin



North Las Vegas Detention Basin outlet works



North Las Vegas Detention Basin



Channel downstream of North Las Vegas Detention Basin outlet



North Las Vegas Detention Basin



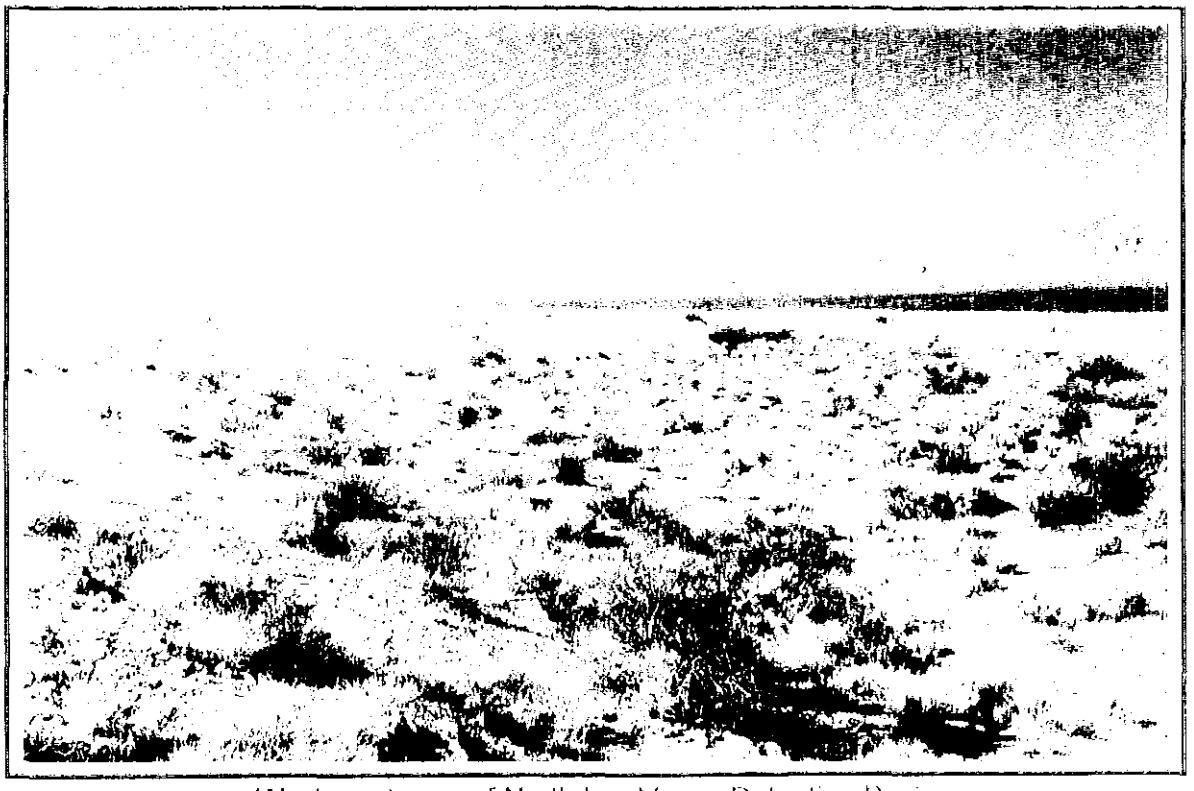
Wash upstream of North Las Vegas Detention Basin Diversion Dike, looking downstream



Wash upstream of North Las Vegas Detention Basin Diversion Dike, looking downstream



North Las Vegas Detention Basin Diversion Dike, looking downstream



Wash upstream of North Las Vegas Detention Basin



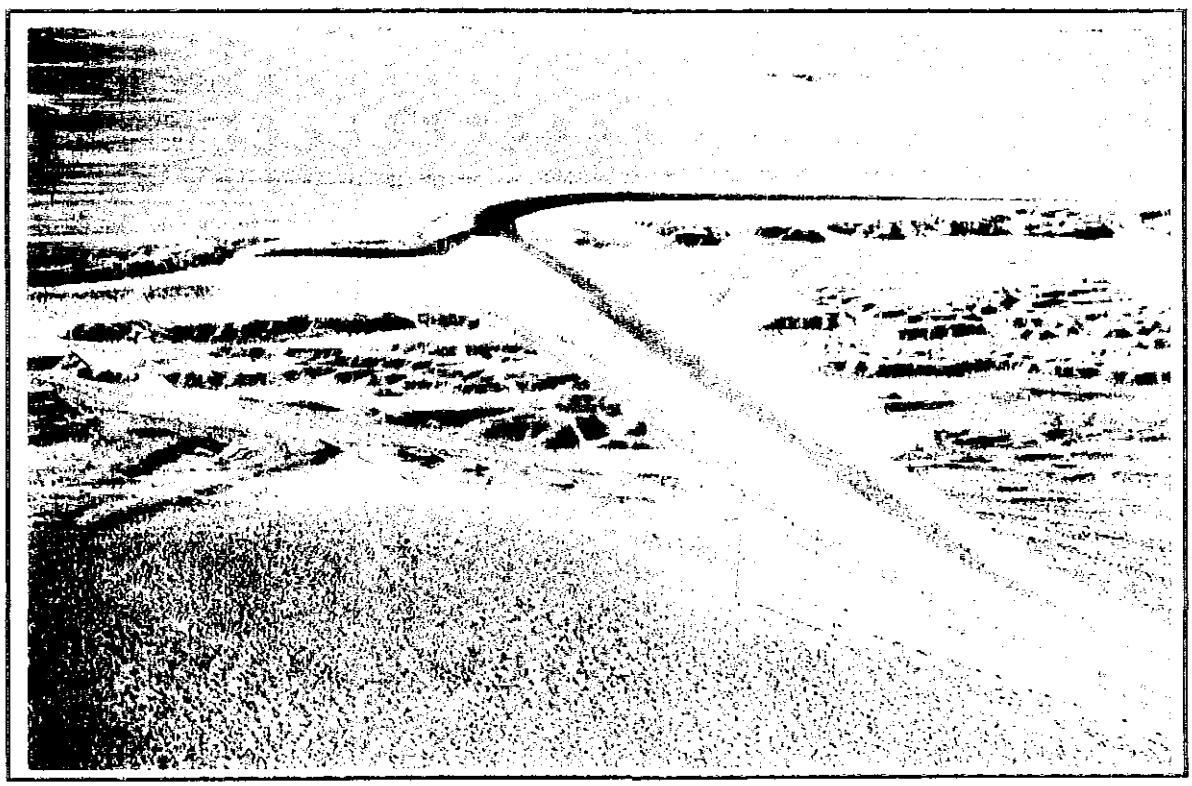
Wash upstream of North Las Vegas Detention Basin



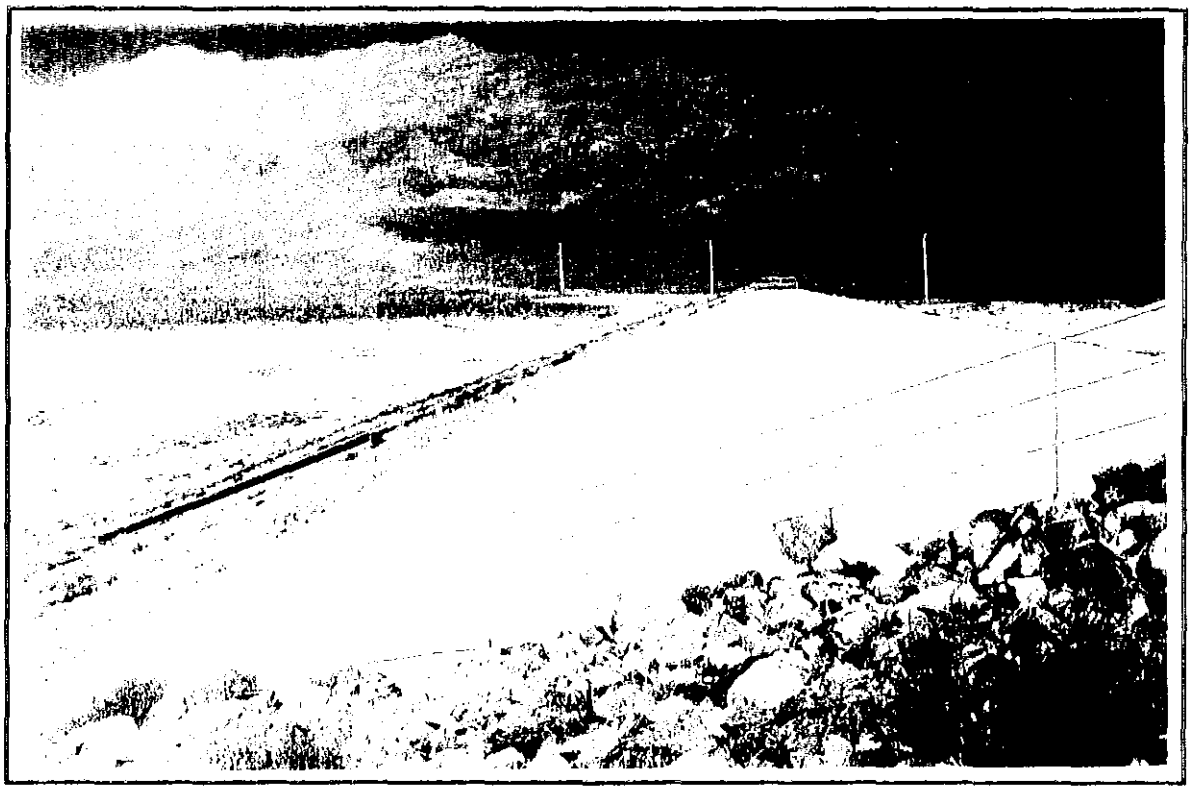
Wash upstream of North Las Vegas Detention Basin



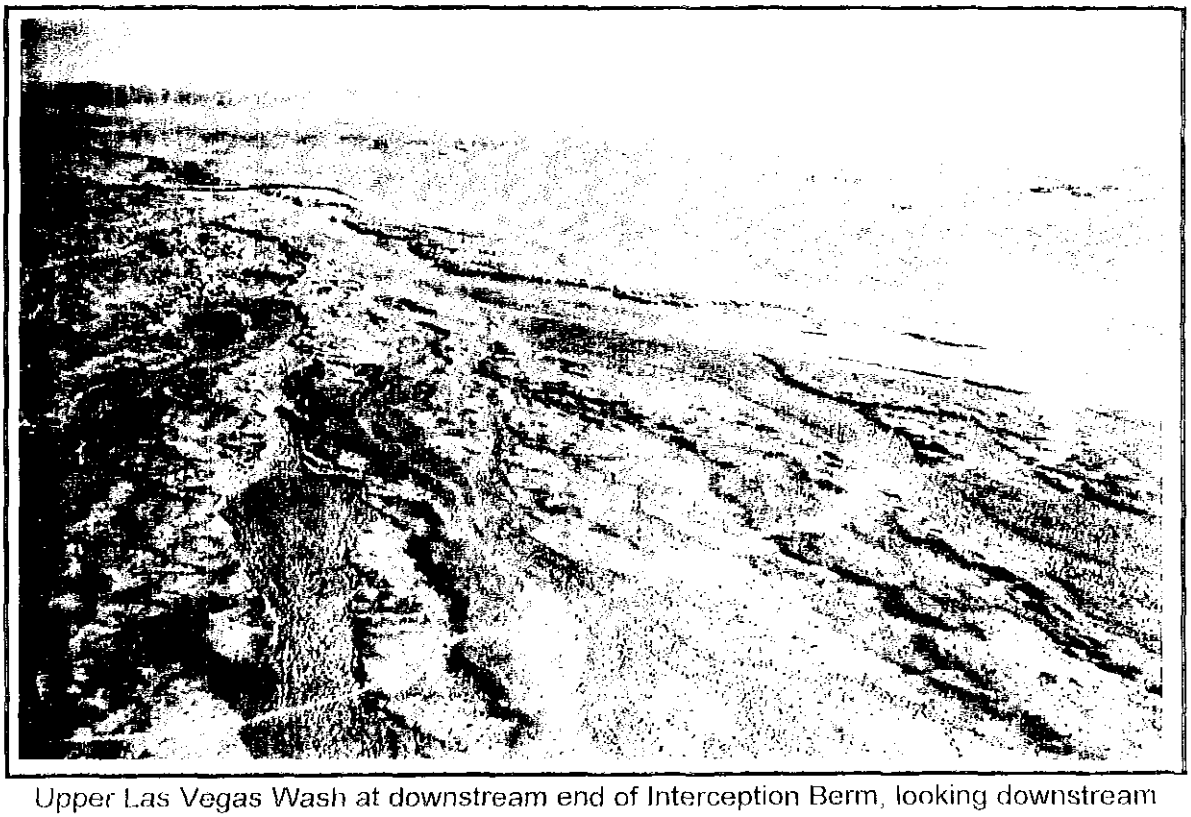
Wash upstream of North Las Vegas Detention Basin



Upper Las Vegas Detention Basin



Upper Las Vegas Detention Basin Spillway



Upper Las Vegas Wash at downstream end of Interception Berm, looking downstream



Upper Las Vegas Wash Interception Berm



Upper Las Vegas Wash Interception Berm



Upper Las Vegas Wash Interception Berm